HENRY BAKER COLLEGE, MELUKAVU

A Christian Minority Educational Institution run by CSI East Kerala Diocese

Criterion 3: Research, Innovations and Extension

3.3.2. Number of Researche Papers per Teachers in the Journals notified on UGC Website during the last five years
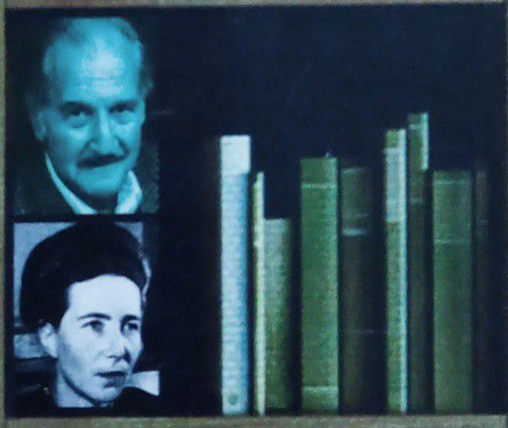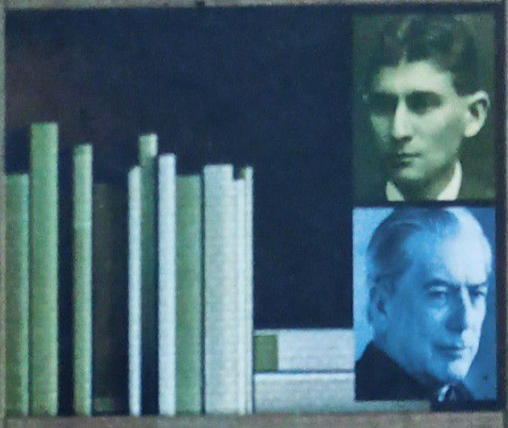
Submitted to

THE NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

ഫ്രാൻസ് കാഫ്‌ക
സാർത്ര്
ആൽബേർ കാമു
സോൾഷെനിറ്റ്സിൻ
നെരുദ
ഴാങ് ഴനേ
സരമാഗോ
സിമോൺ ദ് ബുവ്വ
യസുനാരി കവാബത്ത
ബോർഹസ്
ഹ്യൂഗ്‌സ്
യോസ
സീസ് നൂനേ
കൂറ്റ്‌സി
പാമുക്ക്
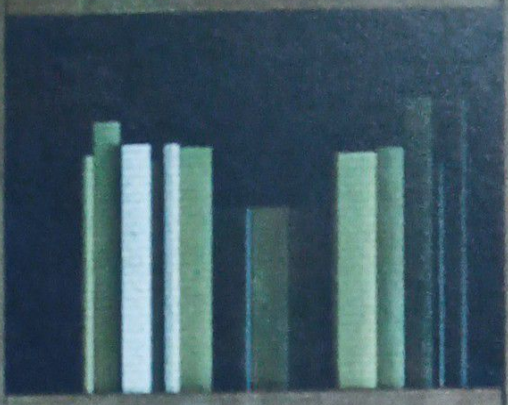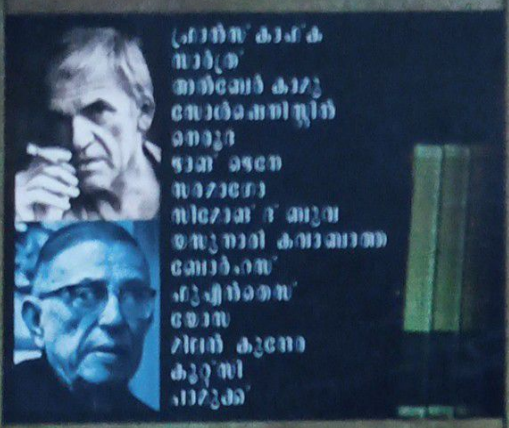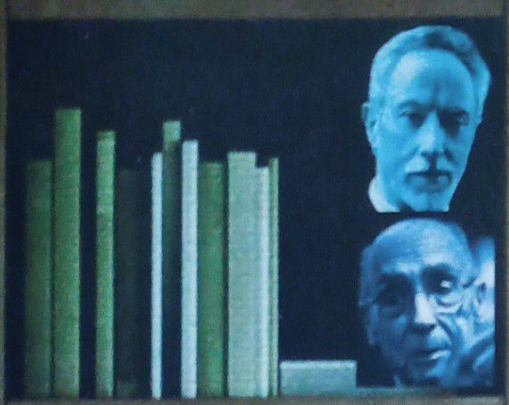
സ്വർഗ വിസ്മയങ്ങൾ

ലോകസാഹിത്യത്തിലെ
15 പ്രതിഭകളെ അവതരിപ്പിക്കുന്ന
പ്രത്യേകപതിപ്പ് **2**

ഉള്ളടക്കം

വാല്യം രണ്ട്

ലേഖനങ്ങൾ

കവിതകൾ

മറ്റു ലേഖനങ്ങൾ

വാല്യം ഒന്ന്

ലേഖനങ്ങൾ

3

മിലൻ കുന്ദേര
ഓർമ്മയുടെ പലായനങ്ങൾ

കെ. ജീവൻകുമാർ

ഭരണകൂടത്തിന്റെ അധമമായ ക്രൗര്യത്തിനു മുൻപിൽ
അടിപതറുന്ന ജീവിതങ്ങൾ ചിത്രീകരിക്കുന്ന കുന്ദേര
യുടെ നോവലുകളിലെ അനന്യമായ ഹാസ്യം അവ
യ്ക്ക് അസാധാരണമായ ചാരുത നൽകുന്നു.

ഡോൺ കി
ക്സോട്ടിന്റെയും
സാഞ്ചോ പാൻസ
യുടെയും സാഹ
സയാത്രകൾ തിരു
ത്തിയെഴുതുന്ന
"The Truth about
Sancho Panza"
എന്ന കഥയിൽ
കാഫ്ക സാഞ്ചോ
പാൻസയെ കിക്
സോട്ട് എന്ന കഥാ
പാത്രത്തിന്റെ സ്ര
ഷ്ടാവായും ഡോ
ൺ കിക്സോട്ടിനെ
സ്വന്തം ശരീരത്തി
ൽ നിന്നും സാഞ്ചോ പാൻസ
ഉച്ചാടനം ചെയ്യുന്ന പിശാചാ യും
അവതരിപ്പിക്കുന്നു. നിരന്തരം
സാഹസകഥകൾ വായിച്ചും പറ
ഞ്ഞും സാഞ്ചോ തന്നെ ബാധിച്ചിരി
ക്കുന്ന പിശാചിനെ ഒഴിപ്പിക്കുന്നു.
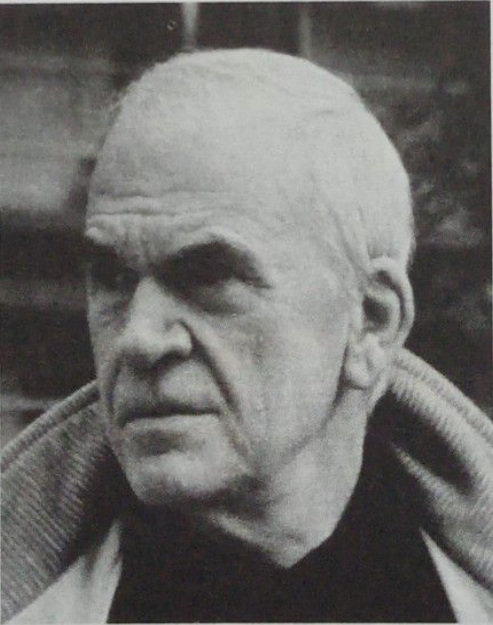
എഴുത്ത് സമഗ്രാ
ധിപത്യത്തിന്റെ
പിശാചുക്കളെ
അകറ്റുവാനും
ഓർമ്മ അത്തരം
ആധിപത്യങ്ങൾ
കടിപ്പെട്ട സമൂഹ
ങ്ങളുടെ മറവി
കളെ പ്രതിരോധി
ക്കുവാനും ആവ
ശ്യമാണെന്ന്
മിലൻ കുന്ദേര
യുടെ കൃതികൾ
നമ്മെ അനുസ്മ
രിപ്പിക്കുന്നു. കു
ന്ദേരയുടെ ഭാവ
നാലോകങ്ങൾ നിറയെ എഴുത്തി
ലൂടെ ഉച്ചാടനം ചെയ്യപ്പെടുന്ന, ചരിത്ര
ത്തിന്റെ അതിരുകൾ കടന്ന് പലാ
യനം ചെയ്യുന്ന, വഴിതെറ്റിയുഴറുന്ന
ഓർമ്മയുടെ പിശാചുക്കൾ ഏറെയു
ണ്ട്. വ്യക്തിപരവും സാംസ്കാരിക

വുമായ ഓർമ്മയുടെ/ മറവിയുടെ നിഴൽമേഖലക ളിലാണ് കുന്ദേരയുടെ കഥാപാത്രങ്ങൾ അഭിരമി ക്കുന്നത്. പേടിസ്വപ്നത്തിന്റെ ഉൾക്കിടിലമുള്ള വാക്കുന്ന ഏകാധിപത്യത്തിൽ നിന്നും ഓടിയ കലവേ നഷ്ടമാകുന്ന ചരിത്രത്തെ വീണ്ടെടു ക്കുവാനുള്ള ഏക ഉപാധിയും ഓർമ്മ തന്നെ. പക്ഷേ വീണ്ടെടുപ്പുകൾ പലപ്പോഴും നിഷ്ഫ ലമായ ശ്രമങ്ങൾ മാത്രമായി ഒതുങ്ങുന്നു. നിർബന്ധിത പ്രവാസം ശിക്ഷയും രക്ഷാ മാർഗവ മുമായവർക്ക് കൈപ്പിടിയിലൊതു ക്കാനാവുന്ന ചരിത്രം തുലോം പരിമിതമായി അവശേഷിക്കുന്നു. ഭരണകൂടത്തിന്റെ അധമമായ ക്രൗര്യത്തിനു മുൻപിൽ അടിപതറുന്ന ജീവിതങ്ങൾ ചിത്രീ കരിക്കുന്ന കുന്ദേരയുടെ നോവലു കളിലെ അനന്യമായ ഹാസ്യം അവയ്ക്ക് അസാധാര ണമായ ചാരുത നൽ കുന്നു.

ജീവിതം

1929 ൽ ചെക്കോസ്ലോ വോക്യയിലെ ബ്രനോ യിൽ (Brno) ജനിച്ച മിലൻ കുന്ദേരയുടെ പിതാവ് ലുഡ്വിക് കുന്ദേര പ്രമുഖ സംഗീത ജ്ഞനായിരുന്നു. രണ്ടാം ലോകമഹായുദ്ധത്തിനു മുൻപു നിലനിന്നിരുന്ന ജനാധിപത്യത്തേക്കാൾ ജർമ്മൻ ആധിപത്യകാല മാണ് കുന്ദേരയുടെ തല മുറയ്ക്ക് ഏറെ പരിചിതം.

മിലൻ കുന്ദേര (Milan Kundera, 1929-) : ചെക്കോസ്ലോവോക്യൻ നോവലിസ്റ്റ്/ കഥാകൃത്ത്. ചെക്കോസ്ലോവോക്യയിൽ ജനിച്ചു. 1975 ൽ ഫ്രാൻസിലേക്ക് കുടി യേറി. 1979 ൽ ചെക്ക് പൗരത്വം നഷ്ട പ്പെട്ടു. 1981 ൽ ഫ്രഞ്ച് പൗരത്വം സ്വീക രിച്ചു. രചനകൾ ചെക്കിലും ഫ്രഞ്ചിലും. മുഖ്യ കൃതികൾ: The Unbearable Lightness of Being, Immortality, Slowness, Ignorance, The Joke, The Book of Laughter and Forgetting, The Festival of Insignificance, The Farewell (കഥാസമാഹാ രങ്ങൾ), Waltz, Identity(നോവലുകൾ), Laughable Loves, The Art of the Novel, Testaments betrayed, The Curtain(കലാ, സാഹിത്യ പഠനങ്ങൾ)

കൗമാരകാലത്ത് കമ്മ്യൂണിസ്റ്റ് പാർട്ടി അംഗ മായിരുന്ന കുന്ദേര പ്രാഗിലെ ചാൾസ് യൂണി വേഴ്സിറ്റിയിൽ കലയും സാഹിത്യവും പഠിച്ചു. 1948ൽ കമ്മ്യൂണിസ്റ്റ് പാർട്ടി ചെക്കോസ്ലോവോ ക്യയിൽ അധികാരത്തിലെത്തി. കുന്ദേരയുടെ ആദ്യകാല കവിതകളിൽ കമ്മ്യൂണിസ്റ്റ് ആഭിമുഖ്യം പ്രകടമാണ്. പക്ഷേ ഈ കൃതികൾ അദ്ദേഹം കയ്യൊഴിഞ്ഞുകഴിഞ്ഞു. പിൽക്കാലത്ത് എഴുതിയ നോവലുകൾ ഏകാധിപത്യം ഉളവാക്കുന്ന ദുരന്തവും അതിന്റെ പരിഹാസ്യതയും വെളി പ്പെടുത്തുന്നു. 1950ൽ കുന്ദേരയെ പാർട്ടി വിരുദ്ധ പ്രവർത്തനങ്ങൾക്ക് കമ്മ്യൂണിസ്റ്റ് പാർട്ടി പുറത്താക്കി. അദ്ദേഹത്തോടൊപ്പം പുറത്താക്ക

പ്പെട്ട Jan Trefulka ഈ അനുഭവം തന്റെ happiness Rained on Them എന്ന കൃതിയിൽ വിവരിക്കുന്നുണ്ട്. കുന്ദേരയുടെ ആദ്യ നോവൽ The Joke ഈ സംഭവത്തിൽ നിന്നുമാണ് ഉയിരെടുത്തത്. 1956ൽ അദ്ദേഹത്തിന് വീണ്ടും പാർട്ടി അംഗത്വം ലഭിച്ചെങ്കിലും 1970ൽ പിന്നെയും പുറത്താക്കപ്പെട്ടു. 1968ലെ പ്രാഗ് വസന്തം കുന്ദേരയുടെ തലമുറയ്ക്ക് നൽകിയ പ്രതീക്ഷകൾ 1968 ആഗസ്റ്റിലെ റഷ്യൻ അധിനി വേശം തച്ചുടച്ചു. 1975ൽ ഫ്രാൻസിലേക്കു പലായ നം ചെയ്ത കുന്ദേരയ്ക്ക് 1981ൽ ഫ്രഞ്ച് പൗരത്വം ലഭിച്ചു. 1993 മുതൽ അദ്ദേഹം ഫ്രഞ്ചു ഭാഷയിലാണ് എഴുതുന്നത്. പലായനം, സ്വത്വത്തിന്റെ അനിശ്ചിത ത്വം, അതിരുകൾക്ക് അതീതമായ ജീവിതം, ചരിത്രത്തിന്റെ അനു സ്യൂതമായ തിരിച്ചുവരവ്, സമഗ്രാധിപത്യത്തിൽ തകർന്നടിയുന്ന ജീവിതം, ഓർമ്മയും മറവിയും തമ്മിലുള്ള പാരസ്പര്യം, പ്രവാസം എന്നിവ കുന്ദേര പ്രമേയമാക്കുന്നു.

പലായനം

ഏകാധിപത്യ വ്യവ സ്ഥിതിയിൽ അതി ജീവനത്തിനുള്ള ഏക ഉപാധിയായ പലായനം നൽകുന്ന അനിശ്ചിതത്വം കുന്ദേരയുടെ കൃതി കളിൽ പ്രതിഫലിക്കുന്നു. പാതിവഴി കടന്ന ജീവിത ത്തിൽ ഫ്രാൻസിലേക്കു കുടിയേറിയത് തന്റെ ജീവിതത്തിലെ ഏറ്റവും നിർണായകമായ സംഭവമാണെന്ന് അദ്ദേഹം പറയുന്നു. പുതിയ ഒരു സ്വത്വം രൂപീകരിക്കു വാനുള്ള ശ്രമം കൂടിയായി രുന്നു അത്. കമ്മ്യൂണിസ്റ്റ് ആഭിമുഖ്യമുള്ള ചെക്ക് എഴുത്തുകാരൻ എന്ന പഴയ പ്രതിഛായ മായ്ച്ചു കളഞ്ഞ ശേഷം സാർവദേശീയതയുടെയും സ്വാതന്ത്ര്യദാഹത്തിന്റെയും പ്രതിരോധത്തി ന്റെയും അടയാളമായ വിമത എഴുത്തുകാരൻ എന്ന പരിവേഷം സൃഷ്ടിക്കുവാൻ അദ്ദേഹം ആത്മകഥാപരമായ ശബ്ദമായി തന്റെ ആദ്യകാല നോവലുകളിൽ നിലകൊള്ളുന്നു. തന്റെ ജീവിത

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രേഖ ചെക്കോസ്ലോവോക്യയിൽ ജനനം. 1975നു ശേഷം ഫ്രാൻസിൽ കഴിയുന്നു എന്നു സംഗ്രഹിച്ച് പലായനത്തിനു ശേഷം സൃഷ്ടിച്ചെടുത്ത അധികാരവുമായി കലഹിക്കുന്ന എഴുത്തുകാരൻ എന്ന സ്വത്വത്തെ തകർക്കുവാനാകുന്ന സൂക്ഷ്മമായ ജീവചരിത്രം തിരസ്കരിക്കുന്നു.

ജർമ്മൻ അധിനിവേശം ഏൽപ്പിച്ച മുറിവുകൾ മാർക്സിസ്റ്റ് വീക്ഷണം സ്വീകരിക്കുവാൻ കുന്ദേരയുടെ തലമുറയിൽപ്പെട്ട യുവ ചെക്ക് സാഹിത്യകാരന്മാരെ പ്രേരിപ്പിച്ചു. Man, a Wide Garden (1953), Monologues (1957) എന്നിവ കുന്ദേരയുടെ ആദ്യ കവിതാസമാഹാരങ്ങളാണ്. The Owners of the Keys (1962) എന്ന അദ്ദേഹത്തിന്റെ നാടകം പ്രാഗിലെ നാഷണൽ തീയറ്ററിൽ അരങ്ങേറി. മാർക്സിസ്റ്റ് സാഹിത്യം എന്ന വിഭാഗത്തിൽ ഉൾപ്പെടുത്താവുന്ന ഈ കൃതികളിലും സോഷ്യലിസ്റ്റ് റിയലിസത്തിന്റെ നിശിതഘടനയെ അതിലംഘിക്കുന്ന അംശങ്ങൾ പ്രകടമായിരുന്നുവെന്ന് നിരൂപകർ അഭിപ്രായപ്പെടുന്നു. മാർക്സിസ്റ്റ് സാഹിത്യനിരൂപണം തള്ളിക്കളഞ്ഞ യൂറോപ്യൻ അവാങ് ഗാർദ് കവിതക്ക് അനുകൂലമായ വാദമുഖങ്ങളുയർത്തുന്ന "Arguing about Our Inheritance" (1955) എന്ന ലേഖനത്തിൽ കുന്ദേര കമ്മ്യൂണിസ്റ്റ് വീക്ഷണം വച്ചുപുലർത്തുന്നുവെന്ന വൈരുദ്ധ്യവുമുണ്ട്. പ്രാദേശികതയും ദേശീയതയും നിഷേധിക്കുന്ന കുന്ദേരയുടെ പിൽക്കാല കൃതികളിൽ വീണ്ടെടുക്കാനാവാത്ത ആധികാരികമായ ചരിത്രത്തോടു ഗൃഹാതുരതയും കാണാം.

1984ൽ പ്രമുഖ അമേരിക്കൻ നോവലിസ്റ്റ് ഫിലിപ്പ് റോത്തുമായുള്ള അഭിമുഖത്തിൽ തന്റെ ആദ്യകാല കൃതികളെ കുന്ദേര തള്ളിക്കളയുന്നു: പിന്നീട് അവർ എന്നെ യൂണിവേഴ്സിറ്റിയിൽ നിന്നും പുറത്താക്കി. തൊഴിലാളികൾക്കിടയിൽ ഞാൻ ജീവിച്ചു. ചെറുപട്ടണങ്ങളിൽ കാബറേ നൃത്തത്തിനു പശ്ചാത്തല സംഗീതമൊരുക്കിയ ജാസ് ബാൻഡുകളിൽ അക്കാലത്ത് ട്രംപറ്റ് വായിച്ചു. പിന്നീട് ഞാൻ കവിത എഴുതി; ചിത്രം വരച്ചു. അതെല്ലാം അസംബന്ധമായിരുന്നു.

കുന്ദേര, വെറോനിക്ക ജെംഗ്, ഫിലിപ്പ് റോത്ത് എന്നിവർ

മുപ്പതാം വയസിൽ ഞാനെഴുതിയ ഒരു കഥയാണ് 'പരിഹാസ്യമായ പ്രണയങ്ങൾ' (Laughable Loves). ഈ കഥയാണ് എന്റെ ശ്രദ്ധേയമായ ആദ്യ കൃതി. ഇതോടെയാണ് എഴുത്തുകാരനായുള്ള എന്റെ ജീവിതം തുടങ്ങിയത്. ജീവിതത്തിന്റെ പാതി അറിയപ്പെടാത്ത ഒരു ചെക്ക് ബുദ്ധിജീവിയായി ഞാൻ കഴിച്ചുകൂട്ടി.

കുന്ദേര അവതരിപ്പിക്കുന്ന ജീവിതചിത്രത്തിൽ ചെറുപ്പകാലത്തെ തന്റെ കമ്മ്യൂണിസ്റ്റ് ആഭിമുഖ്യം ഫലപ്രദമായി മറച്ചുവെക്കുവാനുള്ള തീവ്രമായ ആഗ്രഹം പ്രതിഫലിപ്പിക്കുന്നുവെന്ന് Milan Jungmann അഭിപ്രായപ്പെടുന്നു. എന്നാൽ അദ്ദേഹം പൂർണമായും അധികാരത്തിന് വഴങ്ങിക്കൊടുത്തിരുന്നില്ല. കമ്മ്യൂണിസ്റ്റ് ഭരണകൂടത്തിന് കീഴിൽ അടിമകളാക്കപ്പെടുന്ന ചെക്ക് എഴുത്തുകാർക്ക് സ്വാതന്ത്ര്യമേകണമെന്ന് ആവശ്യപ്പെട്ട് 1967ൽ ചെക്കോസ്ലോവോക്യയിലെ സാഹിത്യകാരന്മാരുടെ വാർഷിക സമ്മേളനത്തിൽ കുന്ദേര നടത്തിയ പ്രഭാഷണം ഏറെ ഒച്ചപ്പാടുണ്ടാക്കിയിരുന്നു. അതേ വർഷം പ്രസിദ്ധീകരിച്ച ആദ്യനോവൽ The Joke അദ്ദേഹത്തിന് പാർട്ടിയിൽ നിന്നും പുറത്തേക്കുള്ള വഴി തുറന്നു കൊടുത്തു. 1970കളുടെ തുടക്കത്തിൽ ചെക്ക് സാംസ്കാരിക ചരിത്രത്തിൽ നിന്നും തന്നെ തുടച്ചു നീക്കുവാനുള്ള ഭരണകൂടത്തിന്റെ ശ്രമങ്ങൾ അദ്ദേഹം തിരിച്ചറിഞ്ഞു. ഫിലിം അക്കാദമിയിലെ അദ്ധ്യാപകജോലിയിൽ നിന്നു പിരിച്ചുവിടപ്പെട്ട കുന്ദേരയുടെ കൃതികൾ ലൈബ്രറികളിൽ നിന്നും

പുസ്തകശാലകളിൽ നിന്നും അപ്രത്യക്ഷമായി. 1973ൽ പ്രസിദ്ധീകരിച്ച Life is Elsewhere എന്ന കൃതിയിൽ വൈകാരികത നിറഞ്ഞ ഭാവഗാന ശൈലിയെയും അപക്വമായ യൗവന കാമനക ളെയും ആത്മരതിയെയും രൂക്ഷമായി പരിഹസി ക്കുന്നതിലൂടെ തന്റെ യൗവനത്തിലെ കമ്മ്യൂണിസ്റ്റ് കാലത്തെ നേരിട്ട് അതിൽ നിന്നും വിമോചിത നാകുവാൻ ശ്രമിക്കുക കൂടിയാവാം കുന്ദേര.

1976ൽ ഫ്രെഞ്ചു ഭാഷയിലാണ് കുന്ദേരയുടെ The Farewell Party പ്രസിദ്ധീകരിച്ചത്. 1975ൽ ഭാര്യ വേര (Vera) യുമൊത്ത് ഫ്രാൻസിലേക്കു കുടിയേറിയ നോവലിസ്റ്റിനെപ്പോലെ 1972ൽ പ്രാഗിൽ വച്ച് പൂർത്തിയാക്കിയ ഈ നോവലിലെ കഥാപാത്രങ്ങളും അവസാനം നാട് വിട്ട് പോയ വരായിരുന്നു. ഫ്രാൻസിൽ താൻ പുനർജന നത്തിന്റെ അവിസ്മരണീയമായ വികാരം അറിഞ്ഞുവെന്നും ആറു വർഷങ്ങൾക്കു ശേഷം ഭയാശങ്കകളോടെ വീണ്ടും സാഹിത്യ രചന യിലേക്കു തിരിഞ്ഞു വെന്നും കുന്ദേര പറയുന്നു. ഫ്രാൻസ് തന്റെ നാടാണെന്നും പാരീസിലല്ല പ്രാഗിലെത്തിയാലാണ് തനിക്കു വേരുകളില്ലെന്ന തോന്നൽ ഉളവാകുന്നതെന്നും അദ്ദേഹം കരുതുന്നു.

വിവാദം

റെസ്പെക്റ്റ് (Respekt) എന്ന ചെക്ക് വാരിക 2008ൽ കുന്ദേരയെ ഒരു വിവാദത്തിലേക്കു വലിച്ചിഴച്ചു. 1950ൽ മിറോസ്ലാവ് ദ്വാരാചെക്ക് എന്ന പൈലറ്റിനെ കുന്ദേര പോലീസിന് ഒറ്റിക്കൊടുത്തു വെന്നായിരുന്നു ആരോപണം. അയാളെ പതിനാലു വർഷം ലേബർ ക്യാംപിൽ കഠിന തടവിനു വിധിച്ചുവെന്നും ഈ ലേഖനം പറയുന്നു. കുന്ദേര ഇതു നിഷേധിച്ചെങ്കിലും തെളിയിക്കാ നാവാത്ത ഈ ആരോപണം അദ്ദേഹത്തിന്റെ യശസ്സിനു കളങ്കമായി. പോലീസിന്റെ ഒറ്റുകാരൻ എന്ന് അദ്ദേഹത്തെ കുറ്റപ്പെടുത്തിയവർ ഏറെയാ യിരുന്നെങ്കിലും ആരോപണം അടിസ്ഥാനരഹിത മാണെന്ന് അഭിപ്രായപ്പെട്ടവരും കുറവല്ലായിരുന്നു. റെസ്പെക്റ്റിന്റെ കുറയുന്ന സർക്കുലേഷൻ വീണ്ടെടുക്കുവാനുള്ള ശ്രമമായും ഈ ആരോ പണം വിലയിരുത്തപ്പെട്ടു. 2008 നവംബറിൽ കുന്ദേരക്ക് അനുകൂലമായി ഈ ആരോപണം തികച്ചും വ്യാജമാണെന്നു പ്രഖ്യാപിച്ച് പ്രമുഖ എഴുത്തുകാരായ ഗബ്രിയേൽ ഗാർസിയ മാർകേസ്, ഹുവാൻ ഗോയ്തിസോളെ, ജെ. എം. കൂറ്റ്സേ, നദീൻ ഗോർഡിമെർ, കാർലോസ്

ഫ്വേന്തെസ്, ഫിലിപ് റോത്ത്, ഓർഹാൻ പാമുക്, സൽമാൻ റുഷ്ദി, ഹൊർഹെ സെംപ്രൂൺ എന്നിവർ സംയുക്ത പ്രസ്താവന നടത്തി.

എഴുത്ത്

അധികാരത്തിന്റെ നൃശംസതയും പരിഹാസ്യ തയും വെളിപ്പെടുത്തുന്ന The Joke സമഗ്രാധി പത്യം മനുഷ്യജീവിതത്തെ ഇരുളിലാഴ്ത്തുന്നതും ചിത്രീകരിക്കുന്നു. ലുഡ്വിക്, ഹെലീന, കോസ്റ്റ്ക, യാരോസ്ലാവ് എന്നിവരുടെ വീക്ഷണത്തിലൂടെ യാണ് കുന്ദേര കഥ പറയുന്നത്. 1950ൽ തന്റെ ജീവിതം തകിടം മറിച്ച ഒരു തമാശയെപ്പറ്റി ഓർമ്മി ക്കുന്ന ലുഡ്വിക്കിലൂടെയാണ് നോവലിന്റെ ആഖ്യാനം ആരംഭിക്കുന്നത്. ഊർജസ്വലനും ബുദ്ധിമാനുമായ ലുഡ്വിക് രണ്ടാം ലോക മഹായുദ്ധാനന്തര കാലത്തെ ചെക്ക് കമ്മ്യൂണിസ്റ്റ് ഭരണകൂടത്തോട് ആവേശഭരിതമായ ആഭിമുഖ്യം പുലർത്തിയിരുന്നു. അവധിക്കാലത്ത് തന്റെ സഹപാഠിയായ ഒരു യുവതിക്ക് അയാൾ ഒരു കാർഡ് അയക്കുന്നു. സ്വതേ ഗൗരവക്കാരിയായ അവളെ ഒന്നു കളിയാക്കണമെന്നുദ്ദേശിച്ച് അയാൾ കുറിച്ച നിർദോഷമായ ഫലിതം അപ്രതീക്ഷിത മായ മാനം കൈവരിച്ച് അയാളുടെ ജീവിതം തകർക്കുന്നു. "Optimism is the opium of the people. A healthy atmosphere stinks of stupidity. Long live Trotsky" ഇതായിരുന്നു ലുഡ്വിക് കുറിച്ച വരികൾ. സ്റ്റാലിനിസ്റ്റ് ആശയങ്ങൾക്കു വിരുദ്ധമായ രാഷ്ട്രീയ നിലപാടുകൾ പഠനവിധേ യമാക്കിയിരുന്ന ആ യുവതിയോടുള്ള രസകര മായ പ്രതികരണം മാത്രമായിരുന്നു ലുഡ്വിക്കി ന്റെ ഈ ഫലിതം. സഹപ്രവർത്തകർക്കും പാർട്ടി മേലാളന്മാർക്കും ഇതു വെറുമൊരു തമാശയായി തോന്നിയില്ല. പാർട്ടിയിലും കോളേജിലും നിന്നു പുറത്തായ ലുഡ്വിക്കിന് വർഷങ്ങളോളം ഖനികളിൽ നിർബന്ധിത സേവനം അനുഷ്ഠി ക്കേണ്ടി വരുന്നു.

സദാ ജാഗരൂകമായി നിലകൊള്ളുന്ന പാർട്ടി ലുഡ്വിക്കിന്റെ വ്യക്തിനിഷ്ഠമായ വ്യതിചലന ങ്ങൾ സൂക്ഷ്മമായി നിരീക്ഷിക്കുന്നു. അയാളി ടെ ചിരിയിൽ തന്നെക്കുറിച്ചു മാത്രം ചിന്തിക്കുന്ന ഒരാളെ അവർ കാണുന്നു. ഉറച്ച കമ്മ്യൂണിസ്റ്റായ ലുഡ്വിക്കിന്റെ പ്രത്യയശാസ്ത്രപരമായ നില പാടിലെ ഒരേയൊരു ദൗർബല്യമായ കുസൃതി നിറഞ്ഞ ഹാസ്യം അയാൾക്ക് വൻവിനയാകുന്നു. ഖനിത്തൊഴിലാളിയായി ശിക്ഷാകാലം ചെല വഴിക്കുന്ന അയാൾ അവധിദിനങ്ങളിൽ ലുസി

എന്ന യുവതിയെ പരിചയപ്പെടുന്നു. സംസാര ശേഷിയില്ലാത്ത ഭയചകിതയായ അവളുമായി ഉടലെടുക്കുന്ന പ്രണയം നിരാശാജനകമാകുന്നു.

പഠനത്തിന് താല്ക്കാലികമായ വിരാമമുണ്ടാ യെങ്കിലും ലുഡ്‌വിക് അറിയപ്പെടുന്ന ഒരു ശാസ്ത്ര ജ്ഞനാകുന്നു. തന്റെ പഴയ സുഹൃത്തുക്കളുടെ ചതി അയാളില്‍ കോപവും നിരാശയും നിറ ക്കുന്നു. തന്നെ പാര്‍ട്ടിയില്‍ നിന്നും പുറത്താക്കു ന്നതിന് നേതൃത്വം നല്‍കിയ സുഹൃത്ത് പാവെ ലിന്റെ ഭാര്യ ഹെലീനയെ ലുഡ്‌വിക് കാണാനിടയാ കുന്നു. അവളുമായി പ്രണയം നടിച്ച് പാവെ ലിനോടു പ്രതികാരം ചെയ്യാനൊരുങ്ങുന്ന ലുഡ് വിക്കിനെ ജീവിതം തന്നെ മറ്റൊരു തമാശയാക്കി മാറ്റുന്നു. ഭാര്യ എങ്ങനെയെങ്കിലും ഒഴിഞ്ഞു കിട്ടിയാല്‍ മതിയെന്നു കരുതിയിരുന്ന പാവെലിന് അവളുടെ പുതിയ പ്രണയം ആശ്വാസമാകു ന്ന തോടെ പ്രതികാരം നിരാശയിലമര്‍ന്ന് ഫലി തമായി ത്തീരുന്നു. നിഷ് ഫലമായ പ്രതികാരത്തെ ക്കുറിച്ച് തത്ത്വചിന്താ പരമായി വിശകലനം ചെയ്യുന്ന ലുഡ്‌വിക് ജീവി തത്തിലെ അടിസ്ഥാ നപരമായ ഇത്തരം ഫലിത ങ്ങള്‍ അവയ്ക്കു തുടക്ക മിടുന്ന മനുഷ്യരുടെ കുറ്റമല്ലെന്നും ചരിത്ര പരമായ അനിവാര്യത

പലായനം, സ്വത്വത്തിന്റെ അനി ശ്രിതത്വം, അതിരുകള്‍ക്ക് അതീതമായ ജീവിതം, ചരിത്ര ത്തിന്റെ അനുസ്യൂതമായ തിരി ച്ചു വരവ്, സമഗ്രാധിപത്യത്തില്‍ തകര്‍ന്നടിയുന്ന ജീവിതം, ഓര്‍ മ്മയും മറവിയും തമ്മിലുള്ള പാരസ്പര്യം, പ്രവാസം എന്നിവ കുന്ദേര പ്രമേയമാക്കുന്നു.

യാണെന്നും തിരിച്ചറിയുന്നു. ഈ നോവലും അതിനെ അധികരിച്ച് ചെക്ക് ന്യൂ വേവ് സംവിധായകന്‍ Jaromil Jires ഒരുക്കിയ സിനിമയും 1968ലെ സോവിയറ്റ് ആധിപത്യ കാലത്ത് നിരോധി ക്കപ്പെട്ടു.

സ്റ്റാലിനിസ്റ്റ് ആധിപത്യത്തിലെ ചെക്ക് ജീവിതത്തിന്റെ തികഞ്ഞ വിമര്‍ശനമാണ് കുന്ദേരയുടെ ഈ നോവല്‍. ഏകാധിപത്യം അനിവാര്യമാക്കുന്ന ഭീതിയുടെ പരിഹാസ്യത കുന്ദേര തീവ്രതയോടെ വരച്ചു കാട്ടുന്നു. മരണവും പരിഭ്രാന്തിയും വിതയ്ക്കുന്ന ഏകാധിപത്യം ജീവിതങ്ങളെ തകര്‍ക്കുന്നതിലെ ഫലിതം അവതരിപ്പിക്കുവാന്‍ ഹാസ്യം പോലെ ശക്തമായ ഒരായുധം എഴുത്തുകാരന്റെ പക്കലില്ല എന്ന് കുന്ദേര വെളിപ്പെടുത്തുന്നു. നോവലിന്റെ

ആമുഖത്തില്‍ കുന്ദേര ഇങ്ങനെ പറയുന്നു: മനുഷ്യന്‍ ഒരു ഫലിതത്തിന്റെ കെണിയില്‍ അകപ്പെട്ട് വ്യക്തിപരമായ ദുരന്തം അനുഭവി ക്കുന്നു. പുറത്തുനിന്നു വീക്ഷിക്കുന്നവര്‍ക്ക് അതു പരിഹാസ്യമായി തോന്നും. ഫലിതം ദുരന്തത്തിന്റെ ഇരയാകുവാനുള്ള അയാളുടെ അവകാശം നിഷേധിക്കുന്നു എന്നതാണ് അയാളുടെ ദുരന്തം. അയാള്‍ നിസ്സാരതകളില്‍ അഭിരമിക്കുവാന്‍ വിധിക്കപ്പെട്ടവനാകുന്നു.

1979ല്‍ പ്രസിദ്ധീകരിച്ച The Book of Laughter and Forgetting കുന്ദേരയുടെ സാഹിത്യ ജീവിതത്തില്‍ പുതിയൊരു ഘട്ടം തുടങ്ങി വെക്കുന്നു. കുടിയേറ്റവും ഓര്‍മ്മയും പ്രമേയ മാകുന്ന ഈ നോവല്‍ ഘടനാപരമായും തികഞ്ഞ വൃത്യസ്തത പുലര്‍ത്തുന്നു. The Unbearable Lightness of Being (1984) എന്ന നോവലിലൂടെ കുന്ദേര ലോകസാഹി ത്യത്തില്‍ തന്റേതായ ഇടം സൃഷ്ടിച്ചെടുത്തു. 1989ല്‍ പ്രസിദ്ധീകരിച്ച Immortlity യില്‍ ചെക്ക് കഥാപാത്രങ്ങളെ അദ്ദേഹം പൂര്‍ണമായും ഒഴിവാക്കി. പിന്നീട് അദ്ദേഹം എഴുതിയ നോവലുകള്‍ (Slowness (1995), Identity (1997), Ignornce (2000), The Fes- tival of Insignificnce (2015)) താരതമ്യേന ഹ്രസ്വവും വ്യതിരിക്തമായ ആഖ്യാനശൈലിയാര്‍ന്നവയുമാണ്. കലയും സാഹിത്യവും വിശകലനം ചെയ്യുന്ന കുന്ദേരയുടെ കൃതികള്‍ (The Art of the Novel (1988), Testaments Betryed (1993), The Curtain (2005) സാഹിത്യതല്‍പ്പര്‍ക്ക് ഒഴിവാക്കാനാ വാത്ത ഗ്രന്ഥങ്ങളാണ്.

ഏകാധിപത്യ ഭരണകൂടത്തോടുള്ള വൈ വിധ്യമാര്‍ന്ന പ്രതിരോധങ്ങള്‍ ആവിഷ്കരിക്കുന്ന നോവലാണ് The Book of Laughter and Forgetting. നോവലിന്റെയും ചെറുകഥയുടെയും എഴുത്തുകാരന്റെ ധ്യാനനിരതമായ ചിന്തയു യും ആഖ്യാനധാരകളുടെ സംയോജനമാണ് ഈ കൃതി. കുന്ദേര പറയുന്നു: മരണത്തിന് രണ്ടു മുഖങ്ങളുണ്ട്. ഒന്ന് അസ്തിത്വരാഹിത്യമാണ്.

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മറ്റൊന്ന് ശവശരീരത്തിന്റെ ഭീതിജനകമായ ഭൗതിക അസ്തിത്വവും. 'മിറെക' എന്ന കഥാപാത്രം അധികാര ഘടനകൾക്കെതിരെയുള്ള ഓർമ്മയുടെ നിരന്തര പ്രതിരോധം അടിവരയിട്ടു പറയുന്നു: അധികാരത്തിനെതിരെയുള്ള മനുഷ്യന്റെ പോരാട്ടം മറവിക്കെതിരായുള്ള ഓർമ്മയുടെ പോരാട്ടം തന്നെയാണ്. ഏകാധിപത്യ ഭരണ കൂടങ്ങൾ ജനങ്ങളുടെമേൽ അടിച്ചേൽപ്പിക്കുന്ന ചരിത്രപരമായ മറവിയെ മറികടക്കുവാനായി പൊരുതുന്നവരാണ് കുന്ദേരയുടെ കഥാപാത്രങ്ങൾ. പക്ഷേ മറവിയിൽ നിന്നും വിടുതൽ നേടാൻ അവർക്ക് പൂർണമായും കഴിയുന്നില്ല. കടന്നുവന്ന പാതയിലെ കാലടിപ്പാടുകൾ മായ്ച്ചു കളയുവാനും സ്വന്തം ജീവചരിത്രത്തെയും ഭൂതകാലത്തെയും തിരുത്തിയെഴുതുവാനുമുള്ള ശ്രമങ്ങൾ എക്കാലവും മനുഷ്യചരിത്രത്തിന്റെ ഭാഗമായിരുന്നു.

ഓർമ്മകൾ തുടച്ചുമാറ്റുവാനുള്ള ശ്രമം പല പ്പോഴും പരിഹാസ്യമാകുന്നു. 1948ൽ ആദരവോടെ തന്റെ രോമത്തൊപ്പി ചെക്കോസ്ലോവാക്യയിലെ കമ്മ്യൂണിസ്റ്റ് പാർട്ടി നേതാവും പ്രസിഡന്റു മായിരുന്ന Klement Gottwald ന്റെ തലയിൽ വച്ചുകൊടുത്ത ക്ളെമാന്റിസ് എന്ന സഖാവ് നാലു വർഷങ്ങൾക്കു ശേഷം പാർട്ടി വിരുദ്ധനായി മുദ്രകുത്തപ്പെട്ട് വധിക്കപ്പെടുന്നു. അയാളെ സംബന്ധിച്ചിടത്തോളം ആകെ അവശേഷിച്ചത് ഗോട്ട്‌വാൾഡിന്റെ തലയിൽവച്ച തൊപ്പി മാത്രം. ദ്യൂബ്‌ചെക്കിനെ പുറത്താക്കി റഷ്യാക്കാർ അവരോധിച്ച പ്രസിഡന്റ് ഗുസ്താവ് ഹ്യൂസാക്ക് അറിയപ്പെടുന്നതുതന്നെ മറവിയുടെ പ്രസിഡന്റ് എന്നാണ്.

നോവലിലെ പ്രധാന കഥാപാത്രമായ റ്റാമിന യെക്കുറിച്ച് ആഖ്യാതാവ് ഇങ്ങനെ പറയുന്നു: ഇത് റ്റാമിനയെക്കുറിച്ചുള്ള നോവലാണ്; റ്റാമിനയുടെ അസാന്നിധ്യത്തിൽ അവൾക്കുവേണ്ടിയുള്ള നോവലും. നോവലിലെ മറ്റു കഥാധാരകളെല്ലാം പ്രവാസിയായ റ്റാമിനയുടെ കഥയുടെ വിവിധ രൂപങ്ങളാണ്. റ്റാമിനയുടെ കഥ നോവലിന്റെ നാലും (നഷ്ടപ്പെട്ട കത്തുകൾ) ആറും (മാലാഖമാർ) ഭാഗങ്ങളിലാണ് പ്രതിപാദിക്കുന്നത്. ഭർത്താവുമൊത്ത് വിദേശത്തേക്ക് കടന്ന റ്റാമിനയെ ദുരന്തം കാത്തിരുന്നു. ഒരു വർഷ ത്തിനു ശേഷം അവളുടെ ഭർത്താവ് മരണ മടയുന്നു. വ്യക്തിപരമായ ഈ ദുരന്തം അവളെ ആത്മഹത്യയിലേക്കു നയിക്കുന്നു. ഉറക്കഗുളിക

കൾ കഴിച്ചശേഷം ഉൾക്കടലിലേക്കു നീന്തിയ റ്റാമിന മരവിപ്പിക്കുന്ന തണുപ്പുള്ള സമുദ്രജല ത്തിന്റെ സ്പർശമേറ്റ് മൃതിയുടെ പാത വെടിഞ്ഞ് ജീവിതത്തിലേക്കു കരകയറുന്നു. അതിനുശേഷം അവൾ നിശബ്ദതയിലാഴ്ന്ന് നിശബ്ദതക്കു വേണ്ടി ജീവിതം തുടരുന്നു. പന്ത്രണ്ടു വർഷ ത്തെ ജീവിതത്തിന്റെ നാൾവഴികൾ മറവിയിലാ ണ്ടു പോകുന്നത് അവൾ തിരിച്ചറിയുന്നു. മരിച്ചു പോയ തന്റെ ഭർത്താവ് തന്നെ വിളിച്ചിരുന്ന ചെല്ലപ്പേരുകൾ ഓർമ്മിച്ചെടുക്കുന്നുവെങ്കിലും അയാളുടെ മുഖം അവൾക്ക് ഓർമ്മിക്കാനാവു ന്നില്ല. കാണുന്ന മനുഷ്യരുടെ മുഖങ്ങൾ നിറം ഇരുണ്ടതാക്കിയും ചെവിയുടെ രൂപം മാറ്റിയും മിഴികൾ നീലനിറമാർന്നതാക്കിയും ഒരു ശില്പി യെപ്പോലെ മനസ്സിൽ തന്റെ ഭർത്താവിന്റെ മുഖം കൊത്തിയെടുക്കുവാനുള്ള അവളുടെ ശ്രമങ്ങൾ വിഫലമാകുന്നു. അയാളുടെ രൂപം എന്നേക്കു മായി മറവിയിലാഴുന്നു. ജീവിതത്തെക്കുറിച്ചുള്ള തന്റെ കുറിപ്പുകളടങ്ങിയ നോട്ട് ബുക്കുകളും ഭർത്താവിന്റെ പ്രേമലേഖനങ്ങളും പ്രാഗിൽ നിന്നും വീണ്ടെടുക്കാനായെങ്കിൽ തന്റെ ഭൂത കാലം പുനർനിർമ്മിക്കാനാവുമെന്ന് അവൾ കരുതുന്നു.

മറവിയുടെ രാഷ്ട്രീയം ചിത്രീകരിക്കവെ ഓർമ്മയും രതിയും തമ്മിലുള്ള പാരസ്പര്യം നോവലിന്റെ കേന്ദ്ര പ്രമേയമാണെന്ന് തന്റെ പിൻകുറിപ്പിൽ കുന്ദേര സൂചിപ്പിക്കുന്നു. നോവ ലിന്റെ രണ്ടും നാലും ഭാഗങ്ങളിലെ രതിയുടെ ആഖ്യാനങ്ങൾ പരസ്പരവിരുദ്ധമായ പ്രതിബിംബ ങ്ങൾ തെളിയുന്ന രണ്ടു കണ്ണാടികളായി മാറുന്നു. പ്രാഗിൽ നിന്നും തന്റെ നോട്ട്ബുക്കുകൾ വീണ്ടെടുക്കാമെന്നു പറയുന്ന ഹ്യൂഗോയ്ക്ക് പ്രതിഫലമെന്നോണം തന്റെ ശരീരം നൽകുന്ന റ്റാമിനയ്ക്ക് ഓർമ്മ രതിയുടെ നാശകാരിയാവുന്നു. ബാല്യകാലത്തെ ഒരോർമ്മ ജനിപ്പിക്കുന്ന തീവ്ര കാമനയിൽ കാറൽ തന്റെ ഭാര്യ മാർക്കീതയും കാമുകി ഈവയുമായി രതിയിലേർപ്പെടവേ ഓർമ്മയും രതിയും തമ്മിലുള്ള ചേർച്ചയില്ലായ്മ തെളിയുന്നു. ചതുരംഗത്തിൽ രണ്ട് എതിരാളികളെ ഒന്നിച്ചു തോൽപ്പിച്ച ബോബി ഫിഷറാണ് താനെന്ന് വികാരത്തിന്റെ കൊടുമുടി കയറുന്ന കാറൽ ആക്രോശിക്കുന്നു. ഇതു തികച്ചും പരിഹാസ്യ മായി തോന്നുന്ന മാർക്കീതയുടെ ശ്രദ്ധയാകർഷിക്കുന്നത് ഈവയുടെ ശരീരമാണ്. കാറലിനോ ടുള്ള പ്രണയത്തിന്റെ ഓർമ്മ അവൾക്കു നഷ്ട മാകുന്നു.

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തുടർന്നു വരുന്ന ഭാഗങ്ങളിൽ യുജീൻ ഐനസ്കോയുടെ റൈനോസറസ് ചർച്ച ചെയ്യുന്ന ഒരു ക്ലാസ്റൂമിൽ തുടങ്ങി തന്റെ ജീവിതം മാറ്റി മറിച്ച രാഷ്ട്രീയത്തിലേക്ക് കുന്ദേര തിരിയുന്നു. നാലാം ഭാഗത്തിലെ ചിരിയെ ക്കുറിച്ചുള്ള പ്രബന്ധത്തിൽ മാലാഖമാർക്ക് സാത്താനോടുള്ള വൈരത്തെ ആക്ഷേപഹാസ്യ ത്തിന്റെ കുസൃതിക്കണ്ണോടെ കുന്ദേര വീക്ഷി ക്കുന്നു. ലോകത്തിന്റെ ആധിപത്യം പിശാചു ക്കൾക്കും മാലാഖമാർക്കുമായി പങ്കുവെച്ചിരിക്കു ന്നു. ലോകനന്മയ്ക്ക് മാലാഖമാർ പിശാചുക്കളുടെ മേൽ ആധിപത്യം നേടേണ്ടതില്ല. ലോകത്തിനാ വശ്യം അവർ തമ്മിലുള്ള അധികാര വടംവലിയല്ല, സമതുലിതാവസ്ഥയാണ്. ചോദ്യം ചെയ്യാനാ വാത്തവിധം അർഥവത്തായ മാലാഖമാരുടെ ലോകത്തിന്റെ ഭാരംപേറി മനുഷ്യർ വലഞ്ഞു പോകും. പിശാചുക്കളുടെ അർഥശൂന്യമായ ലോകത്ത് ജീവിതം തന്നെ അസാദ്ധ്യമാകുന്നു. ചിരി പിശാചിന്റെ പ്രവിശ്യയാണെന്ന് കുന്ദേര പറയുന്നു. പിശാചിന്റെ ചിരി വിദ്വേഷത്തിന്റെ വിസ്ഫോട നമാണ്. സ്വത്വത്തിന്റെ അപൂർണത തിരിച്ചറിഞ്ഞ് അതിൽ ആശ്വാസം കൊണ്ട പറുദീസയിൽ ചിരിയില്ലായിരുന്നുവെന്ന് പിശാച് പറയുന്നു. ചിരി ഉടലെടുത്ത് പറുദീസയിൽ നിന്നുള്ള പതന ത്തിനുശേഷമാണ്. അതിനാൽത്തന്നെ അത് സ്വത്വരൂപീകരണത്തിന്റെ പൈശാചിക മുദ്ര വഹിക്കുന്ന സാക്ഷാത്കാരവുമാണ്.

The Unbearable Lightness of Being (1984) കുന്ദേരയുടെ ഏറെ നിരൂപകശ്രദ്ധ നേടിയ നോവലാണ്. ഓർമ്മയുടെ അവശിഷ്ടങ്ങളും ഭൂതകാലത്തിന്റെ അടയാളങ്ങളുമായ ഫോട്ടോകൾ സാംസ്കാരികവും രാഷ്ട്രീയവുമായ മാനങ്ങൾ കൈവരിച്ച് ഏകാധിപത്യത്തിന്റെ ആയുധമായി മാറുന്നത് ഈ നോവലിൽ കാണാം. നാടുവിട്ട ചെക്ക് പെയിന്റർ സാബിന, ഭരണകൂടവുമായി ഇടയുന്ന ഡോക്ടർ റ്റോമസ്, അയാളുടെ ഭാര്യ തെരേസ, അദ്ധ്യാപകനായ ഫ്രാൻസ് എന്നീ കഥാപാത്രങ്ങളെല്ലാം കാമനയുടെയും നിരാസ ത്തിന്റെയും ശൂന്യതയുടെയും ലോകങ്ങളിലൂടെ കടന്നു പോകുന്നു. റഷ്യൻ അധിനിവേശകാലത്ത് തെരേസ പ്രാഗിലെ തെരുവുകളിൽ നടന്ന സംഭവങ്ങൾ ക്യാമറയിൽ പകർത്തുന്നു. പില്ക്കാലത്ത് ഈ ഫോട്ടോകൾ ഭരണകൂടത്തിന് രാഷ്ട്രീയ എതിരാളികളെ തിരിച്ചറിയുവാനുള്ള ഉപാധിയാകുന്നു. ഹിറ്റ്ലറുടെ ചിത്രങ്ങൾ

വീക്ഷിക്കുന്ന ആഖ്യാതാവ് ഏകാധിപത്യത്തിന്റെ ക്രൂരതകൾ മറവിയിലാഴ്ന്നു പോകുന്നതിൽ ആകുലപ്പെടുന്നു. ശസ്ത്രക്രിയാവിദഗ്ധനായ റ്റോമസ് ഒരു കാസനോവ കൂടിയാണ്. 1968ൽ ദ്യൂബ്ചെക്ക് കമ്മ്യൂണിസ്റ്റ് ഭരണകൂടത്തെ മാനുഷികവത്കരിക്കുവാൻ ശ്രമിക്കുന്ന കാലത്ത് പൊതുമണ്ഡലത്തിലെ ചർച്ചകളിൽ റ്റോമസ് പങ്കെടുക്കുന്നു. സോഷ്യലിസ്റ്റ് സ്വർഗരാജ്യം ഭൂമിയിൽ സ്ഥാപിക്കുക എന്ന സ്വപ്നം നടക്കി ല്ലെന്നു തിരിച്ചറിയുന്ന പഴയ കമ്മ്യൂണിസ്റ്റുകാർ അതിനായി ചെയ്ത മനുഷ്യവിരുദ്ധമായ പ്രവർത്തികൾക്കു പ്രായശ്ചിത്തമായി, സ്വന്തം പാപങ്ങൾ വെളിപാടുപോലെ മുന്നിൽ തെളിഞ്ഞ പ്പോൾ അന്ധത വരിച്ച രാജ്യം വെടിഞ്ഞ ഈഡിപ്പസിന്റെ മാതൃക പിൻതുടരണമെന്ന് റ്റോമസ് വാദിച്ചു. അതിനുശേഷമുണ്ടായ റഷ്യൻ അധിനിവേശത്തോടെ പൊതുചർച്ചകൾ നിലയ് ക്കുന്നു. തന്റെ വാദങ്ങൾ പിൻവലിക്കുന്നതായി എഴുതിക്കൊടുക്കുവാൻ പുതിയ അധികാരികൾ റ്റോമസിനോട് ആവശ്യപ്പെടുന്നു. അതു തന്റെ പ്രതിഷേധസ്വരത്തെ എന്നേക്കുമായി ഇല്ലാതാക്കു മെന്നു തിരിച്ചറിയുന്ന അയാൾ അതിനു വിസമ്മതിക്കുന്നു. സോവിയറ്റ് യൂണിയനോടുള്ള സ്നേഹം പ്രഖ്യാപിക്കുന്ന ഒരു കത്തു നല്കണ മെന്നായി അടുത്ത ആവശ്യം. അതും അയാൾ തള്ളിക്കളയുന്നു. പ്രാഗിലെ ജോലി ഉപേക്ഷിച്ച് ഒരു ചെറുപട്ടണത്തിൽ അഭയം തേടാൻ അയാൾ നിർബന്ധിതനാകുന്നു. ജനങ്ങളുടെ മേൽ മറവി അടിച്ചേൽപ്പിക്കുന്ന ഏകാധിപത്യഭരണകൂടം തങ്ങളെ എതിർത്തവരെ ഒരിക്കലും മറക്കാറില്ല. അവർ റ്റോമസിനെ ഭിഷഗ്വരവൃത്തിയിൽ നിന്നും പുറത്താക്കുന്നു.

കടകളിലെ ജാലകങ്ങൾ തുടച്ചുവൃത്തിയാ ക്കുന്ന ജോലി ചെയ്യേണ്ടിവരുന്ന റ്റോമസിന് ജീവിതം അസ്തിത്വത്തിന്റെ ഭാരമൊഴിഞ്ഞതായി അനുഭവപ്പെടുന്നു. അനേകം രതിബന്ധങ്ങളുടെ ആഴങ്ങളിലേക്ക് അയാൾ മുങ്ങിത്താഴുന്നു. വാഴ്വിന്റെ ഭാരമൊഴിഞ്ഞ് ശൂന്യതയിൽ അഭിരമിക്കുന്നു. മനുഷ്യരുടെ ഒഴിവാക്കാനാ വാത്ത ദുരന്തങ്ങളുടെ പരിഹാസ്യത തന്റെ കൃതികളിലുടനീളം നിസ്സാരവത്കരിക്കുന്ന കുന്ദേര ഈ നോവലിൽ ഏറ്റവും ഹൃദയ സ്പർശിയായി അവതരിപ്പിക്കുന്നത് തെരേസയുടെ കരേനിൻ എന്ന നായയുടെ മരണമാണ്. കരേനിൻ വെറുമൊരു മൃഗമല്ല; ഡിക്കൻസിന്റെ ബുൾസ്

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ഐയെപ്പോലെ അസാധാരണമായ ഒരു കഥാ പാത്രം തന്നെയാണ്. മനുഷ്യകുലത്തിന്റെ ധാർമ്മികതയുടെ അടിസ്ഥാനം മൃഗങ്ങളോടുള്ള സമീപനമാണെന്ന് കുന്ദേര പറയുന്നു.

സാബിനയുടെ കാമുകൻ കൂടിയാണ് ഫ്രാൻസ്. ദൃഢഗാത്രനായ അയാൾ തികച്ചും സൗമ്യനാണ്. രതി വന്യവും അക്രമാസക്തവു മാണെന്നു കരുതുന്ന സാബിനക്ക് അയാളെ വേഗം മടുക്കുന്നു. കംബോഡിയയിലെ കെമർ റോഷ് ഉന്മൂലനത്തിനെതിരെ പ്രതിഷേധിക്കുന്ന ഫ്രാൻസ് വാടകക്കൊലയാളികൾക്ക് ഇരയാ കുന്നു. സാബിന എല്ലാറ്റിൽ നിന്നും-കുടുംബം, കാമുകൻമാർ, രാജ്യം-പലായനം ചെയ്യുന്നു; വാഴ്വിന്റെ ഭാരമില്ലായ്മയിലേക്ക് സ്വയം നാടുകടത്തുന്നു. പ്രതിബദ്ധതയോ വിശ്വസ്ത തയോ ധാർമിക ഉത്തരവാദിത്വമോ ഇല്ലാത്ത ജീവിതം അതിൽനിന്നുതന്നെയുള്ള ഒരു ഒളിച്ചോട്ടമാകുന്നു.

അധികാരത്തിന്റെ ചൂണ്ടുവിരൽ അടിച്ചമർത്ത ലിന്റെ, സ്വതന്ത്രചിന്തയുടെ തിരസ്കാരത്തിന്റെ ചിഹ്നമാകുന്നു. ഭരണകൂടത്തിന്റെ ഈ ചിഹ്നം ഒരു പകർച്ചവ്യാധിപോലെ അതിന്റെ ഇരകളും എതിരാളികളുമായവരെക്കൂടി ഗ്രസിക്കുന്നതിന്റെ ഭീദിതമായ ചിത്രം കുന്ദേര വരച്ചിടുന്നുണ്ട്. കമ്മ്യൂണിസ്റ്റ് ഭരണത്തിൽ നിന്നു രക്ഷപെട്ട് പാരീസിലേക്കു പലായനം ചെയ്ത വിമതരിൽ ഒരാൾ തന്നോടൊപ്പം കുടിയേറിയവരെ അവരുടെ തീവ്രമല്ലാത്ത കമ്യൂണിസ്റ്റ് വിരുദ്ധതയുടെ പേരിൽ കുറ്റപ്പെടുത്തുന്ന രംഗത്ത് ചെക്ക് കമ്യൂണിസ്റ്റ് പാർട്ടി നേതാവും പ്രസിഡന്റുമായിരുന്ന അന്റോണിൻ നൊവോട്നിയുടെ ഭീഷണമായ അധികാര പ്രയോഗത്തിന്റെ രൂക്ഷത തന്നെയാണ് കുന്ദേര കാണുന്നത്. പ്രവാസിയായ ഈ വിമതനും പഴയ ഭരണാധികാരിയും തങ്ങളുടെ ചൂണ്ടുവിരലിന്റെ ഭീഷണമായ ചലനത്തിലൂടെ മറ്റുള്ളവരുടെ മേൽ തികഞ്ഞ വിധേയത്വം അടിച്ചേൽപ്പിക്കുന്നു. ഇത്തരം ആളുകളുടെ ചൂണ്ടുവിരലുകൾക്കു നടുവിരലുകളേക്കാൾ നീളമുണ്ടെന്ന് കുന്ദേര പറയുന്നു. ചരിത്ര ദുരന്തങ്ങളുടെ ആവേഗങ്ങളിൽ ഇരയും വേട്ട ക്കാരനും ഒരേ സ്വത്വം ആർജ്ജിക്കുന്നത് ഉൾക്കിടിലമുണ്ടാക്കുന്നു. ഇതോടൊപ്പം ചേർത്തു വായിച്ചാൽ തന്റെ നോവലുകളിൽ കുന്ദേര നടത്തുന്ന എഴുത്തുകാരന്റെ ഇടപെടലുകൾ സവിശേഷമാനം കൈവരിക്കുന്നതായി കാണാം.

അത് ഉത്തരാധുനിക നോവലിസ്റ്റുകളുടെ വെറുമൊരു സങ്കേതം മാത്രമാണോ? തന്റെ കഥാപാത്രങ്ങളോട് എങ്ങനെ പെരുമാറണമെന്നു പറയുകയും ചിലപ്പോൾ അവരെ പൊടുന്നനെ ആഖ്യാനത്തിൽ നിന്നും അപ്രത്യക്ഷരാക്കുകയും ചെയ്യുന്ന നോവലിസ്റ്റ് വ്യക്തിസ്വാതന്ത്ര്യത്തിൽ ഇടപെടുന്ന ഏകാധിപത്യത്തിന്റെ ധാർഷ്ട്യവും ഭിന്നസ്വരമുള്ളവരെ കാണാതായവരാക്കുന്ന ഏകാധിപത്യ ഭരണക്രമത്തിന്റെ നൃശംസതയു മാണ് എഴുത്തിൽ പ്രതിഫലിപ്പിക്കുന്നത്. പ്രണയം പോലും കുന്ദേരക്ക് കാവ്യാത്മകമായ ഓർമ്മയി ലേക്കുള്ള മധുരമായ അധിനിവേശമാണ്.

ഉത്തരാധുനിക രചനാശൈലിയുടെ ചാരുത പൂർണമായും ആവാഹിക്കുന്ന അസാധാരണമായ നോവലാണ് Immortality. എഴുത്തിലൂടെ ഉരുത്തിരിയുന്ന യാഥാർഥ്യത്തിന്റെയും ഭാവനാ ലോകങ്ങളുടെയും സന്നിഗ്ധത സദാ തെളിയുന്ന ഈ കൃതിയുടെ കാതലായ പ്രമേയം മരണവും അനശ്വരതയുമാണ്. ഇവയെ കുന്ദേര നിരന്തരം പ്രശ്നവത്കരിക്കുകയും ചെയ്യുന്നു. മരണ ത്തിന്റെ നിതാന്ത സാന്നിധ്യം നോവലിലുട നീളമുണ്ട്. ഗെഥേയും ഹെമിങ്വേയുമടക്കം നോവലിലെ പല പ്രധാന കഥാപാത്രങ്ങളും നേരത്തെതന്നെ മരണമടഞ്ഞവരാണ്. പല കഥാപാത്രങ്ങളും കൊല്ലപ്പെടുന്നു. ആത്മഹത്യ ചെയ്യാൻ ശ്രമിച്ച ഒരാളെ രക്ഷിക്കാനായി കാർ വെട്ടിത്തിരിച്ചിരിച്ചപ്പോഴാണ് ആഗ്നസിനെ മൃത്യു കീഴടക്കുന്നത്. മരണവും അനശ്വരതയും വേർപെടുത്താനാവാത്ത ജോടികളാണെന്ന് കുന്ദേര പറയുന്നു. അവർക്ക് മാർക്സ്എംഗൽസ്, റോമിയോജൂലിയറ്റ്, ലോറൽഹാർഡി ജോടികളേ ക്കാൾ പൂർണതയുണ്ട്. മരണശേഷം കണ്ടുമുട്ടുന്ന ഗെഥേയും ഹെമിങ്വേയും തങ്ങളുടെ പ്രശ സ്തിക്കു നിദാനമെന്തെന്ന് ചർച്ചചെയ്യുന്നു. തന്റെ കൃതികൾ വായിക്കാതെ അവർ തന്നെക്കുറിച്ച് ഗ്രന്ഥങ്ങൾ രചിക്കുകയാണെന്ന് ഹെമിങ്വേ പരിതപിക്കുന്നു. അതുതന്നെയാണ് അന ശ്വരത-ഗെഥേ പറയുന്നു, അനശ്വരതയെന്നാൽ ശാശ്വതമായ വിചാരണയാണ്.

അനേകം വിഷയങ്ങൾ നോവലിസ്റ്റിന്റെ ധ്യാനനിരതമായ ചിന്തക്കു വിധേയമാകുന്നു. മനുഷ്യാവകാശങ്ങൾക്ക് ഇരുനൂറു വർഷത്തെ പഴക്കമുണ്ടെങ്കിലും 1970കളിലാണ് അവ പ്രാധാന്യം നേടിയതെന്ന് അയാൾ പറയുന്നു. പാശ്ചാത്യ ബുദ്ധിജീവികളെ നാടുകടത്തപ്പെട്ട

അലക്സാൻഡർ സോൾഷെനിറ്റ്സെന്റെ രൂപം ആവേശിച്ചതാണ് ഇതിനു കാരണം. തങ്ങൾക്ക് അതുപോലെ മഹത്തായ ഒരു വിധി ഉണ്ടാകാഞ്ഞത് അവരെ നിരാശയിലാഴ്ത്തി. റഷ്യൻ കമ്മ്യൂണിസ്റ്റുകാർ മനുഷ്യാവകാശം ലംഘിച്ചപ്പോഴാണ് ഫ്രെഞ്ച് വിപ്ലവകാലത്ത് വിളംബരം ചെയ്യപ്പെട്ട അവകാശങ്ങളെപ്പറ്റി ഈ ബുദ്ധിജീവികൾക്കു ബോധമുണ്ടായത്.

നാടകീയമായ സംഘർഷം നോവലിന്റെ ശാപമാണെന്ന് നോവലിസ്റ്റ് പറയുന്നു. ഉദ്യോഗ മുണർത്തുന്ന കഥാഗതി നോവലിന് ആവശ്യമില്ല. പ്രഫസർ അവനേറിയസുമായി താൻ എഴുതിക്കൊണ്ടിരിക്കുന്ന ഈ നോവലിനെപ്പറ്റി ചർച്ച ചെയ്യവെ അതിലെ ആറാം ഭാഗം നോവലിനുള്ളിലെ നോവലും രതിയെക്കുറിച്ച് താനെഴുതിയ ഏറ്റവും ദുഃഖകരമായ കഥയുമാണെന്ന് അദ്ദേഹം പറയുന്നു. ഈ നോവലിന്റെ പേരെന്താണെന്ന് അവനേറിയസ് ചോദിക്കുന്നു. The Unbearable Lightness of Being എന്നാണ് മറുപടി. അത് മറ്റാരോ നേരത്തെതന്നെ എഴുതിയതല്ലേ എന്ന ചോദ്യത്തിനു കുന്ദേര ഇങ്ങനെ മറുപടി പറയുന്നു: ഞാൻ തന്നെയാണ് അതെഴുതിയത്. എന്നാൽ തലക്കെട്ടിന്റെ കാര്യത്തിൽ അന്ന് എനിക്കു തെറ്റു പറ്റി. ഇപ്പോൾ ഞാനെഴുതിക്കൊണ്ടിരിക്കുന്ന നോവലിനാണ് അതു ചേരുക. കാലം കടന്നുപോകവേ എഴുത്തുകാരും അവരുടെ കൃതികളും പുതിയ അർഥങ്ങൾ ആർജ്ജിക്കുന്നു. ഒരിക്കൽ കുട്ടികളുടെ ഉറക്കുപാട്ടായിരുന്ന ഗെഥേയുടെ ഒരു രചന പിന്നീട് മരണ സൂചകമായ കവിതയായി മാറുന്നു. നോവലിലെ സംഭവങ്ങൾ നിരന്തരമായ പരിണാമങ്ങൾക്കു വിധേയമാകുന്നു. സത്യത്തിന്റെ അനേകം രൂപങ്ങൾ ഉയിരെടുക്കുന്നതോടെ യാഥാർഥ്യത്തിന്റെ ഏത് അടരാണ് വിശ്വസനീയമെന്ന അനിശ്ചിതത്വത്തിലാണ് എല്ലാം സന്ദിഗ്ധതയുടെ മൂടൽമഞ്ഞിലാഴുന്നു.

Slowness കുന്ദേര ആദ്യമായി ഫ്രെഞ്ച് ഭാഷയിൽ എഴുതിയ നോവലാണ്. ഒരു രാവിന്റെ സമയദൈർഘ്യത്തിൽ വ്യത്യസ്തകാലങ്ങളിലെ സംഭവങ്ങൾ സംയോജിക്കുന്ന ഈ കൃതിയുടെ ആരംഭത്തിൽ കുന്ദേരയും ഭാര്യ വേരയും ഒരു രാത്രി ചെലവഴിക്കാനായി ഗ്രാമപ്രദേശത്തെ സത്രത്തിലേക്കു യാത്രതിരിക്കുന്നു. ഭ്രാന്തമായ വേഗതയിൽ ബൈക്കിൽ അവരെക്കടന്നു പോകുന്ന യുവാവ് വേഗതയുടെ ഹരത്തിൽ സ്വയം മറന്ന അവസ്ഥയിലാണ്. വേഗത

ഹർഷോന്മാദമായ കാലത്ത് മന്ദഗതിയിൽ നിന്നും ഉളവാകുന്ന ആഹ്ലാദം എവിടെപ്പോയി മറഞ്ഞുവെന്ന് നോവൽ ആരായുന്നു. കുന്ദേര വായിക്കുന്ന Vivant Denon എഴുതിയ No Tomor-row എന്ന നോവലിൽ പതിനെട്ടാം നൂറ്റാണ്ടിലെ ഒരു പ്രഭു ഇതേ സത്രത്തിലേക്കു ഇരുനൂറു കൊല്ലം മുൻപു നടത്തിയ യാത്ര വിവരിക്കുന്നു. രാവിൽ ആനന്ദകരമായ രതിയിലേർപ്പെടുന്ന പ്രഭുവിന് ഒന്നിലും തിടുക്കമില്ലായിരുന്നു.

ഈ പ്രഭുവിന്റെ ആധുനികരൂപമാണ് ബൈക്കിൽ അവരെക്കടന്നു പോയ യാത്രികൻ. അയാൾ ഒരു ചെക്ക് എന്റമോളജിസ്റ്റാണ്. 1968ലെ റഷ്യൻ അധിനിവേശം തകർത്തെറിഞ്ഞ ഭൂതകാലമുള്ള ഒരു ശാസ്ത്രജ്ഞനും ബെർക്ക് എന്ന ഇടതുപക്ഷ ബുദ്ധിജീവിയും ജൂലി എന്ന സുന്ദരിയായ ടൈപിസ്റ്റും അവിടെയെത്തുന്നു. അവരുടെ കാമനകൾ പരസ്പരം ഇടയുന്ന രാവിന്റെ കഥയാണ് കുന്ദേര പറയുന്നത്.

കുന്ദേര വിമർശനവിധേയമാക്കുന്ന ശാസ്ത്രത്തിലൂടെ പുരോഗതിയിലേക്കു കുതിക്കുന്ന സമൂഹം എന്ന ആശയത്തിന്റെ അനുരണനങ്ങൾ അദ്ദേഹത്തിന്റെ Testament Betrayed ലും കാണാം. ചരിത്രം സ്ഥിരപുരോഗതിയുടെ ഒരു ഗ്രാഫല്ലെന്നും ആധുനികതയുടെ പരീക്ഷണാത്മകമായ കല ഏകാധിപത്യത്തിലെപ്പോലെ മാധ്യമങ്ങൾ പ്രദാനം ചെയ്യുന്ന ഏകമുഖമായ ആശയങ്ങൾക്ക് അനുസൃതമായി നീങ്ങുന്നുവെന്നും അദ്ദേഹം കരുതുന്നു. The Art of the Novelലിൽ പറയുന്നതുപോലെ ഒന്നും കാണപ്പെടുന്നത്ര സ്വച്ഛരമോ ലളിതമോ അല്ലെന്ന് ഈ കൃതി വ്യക്തമാക്കുന്നു.

തികച്ചും സാധാരണമായ തുടക്കത്തിൽ നിന്നും അസാധാരണമായ അന്ത്യത്തിലേക്കു നീളുന്ന ചെറു നോവലാണ് Identity. വിവാഹ മോചനം നേടിയ ഷന്താൽ വെക്കേഷൻ ചെലവഴിച്ച കടലോര ഹോട്ടലിൽ നിന്നും കാമുകനായ ഴാങ് മാർക്കുമൊത്തു മടങ്ങവേ യാദൃച്ഛികമായി ആണുങ്ങൾ ഇപ്പോൾ തന്നെ ശ്രദ്ധിക്കാറില്ലെന്നു പറഞ്ഞത് അയാൾ ഗൗരവമായി കാണുന്നു. അയാൾ അവൾക്ക് പേരെഴുതാത്ത പ്രണയലേഖനങ്ങൾ എഴുതുന്നു. തുടക്കത്തിൽ അത് അവരുടെ രതിയിൽ അഗ്നി പകരുന്നുവെങ്കിലും ക്രമേണ അത് അവരുടെ അകൽച്ചക്കു കാരണമാകുന്നു. കാണാതായവരെ ക്കുറിച്ചുള്ള ഒരു ടെലിവിഷൻ പരിപാടി ഷന്താലിന്

ഉത്കണ്ഠയുളവാക്കുന്നു. ഴാങ് മാർക്കുമൊത്തു ഭക്ഷണം കഴിക്കവേ അയാളുടെ അസാന്നിധ്യ ത്തിലെന്ന പോലെ അയാളെ കാണുവാൻ അവൾ ആഗ്രഹിക്കുന്നു. ക്രമേണ ആഖ്യാനം യാഥാർധ്യ ത്തിന്റെ അതിരുകൾ കടക്കുന്നു. നോവലിന്റെ അവസാനം ആഖ്യാനത്തിലേക്കു കടന്നുവരുന്ന കുന്ദേര കഥയുടെ അനിശ്ചിതമായ ഏതോ നിമിഷം മുതൽ ഷന്താളും ഴാങ് മാർക്കും സ്വപ്നത്തിൽ മുഴുകിയിരിക്കുവാൻ സാധ്യത യുണ്ടെന്നു പറയുന്നു. യാഥാർഥ്യത്തിനും ഭ്രമാത്മകതക്കും സ്വപ്നത്തിനും ഇടയിലുള്ള അതിർരേഖകൾ എവിടെയാണെന്ന അന്വേഷണ ത്തിന്റെ നിരർഥകത സൂചിപ്പിച്ചുകൊണ്ട് നോവൽ അവസാനിക്കുന്നു.

ഓർമ്മയും മറവിയും വീണ്ടും പ്രധാന പ്രമേയമാകുന്ന നോവലാണ് *Ignorance*. ഇരു പതു വർഷമായി പാരീസിൽ കഴിഞ്ഞുവരുന്ന ചെക്ക് പ്രവാസിയാണ് ഐറീൻ. ജന്മനാട്ടിൽ തിരിച്ചെത്തുക എന്ന സ്വപ്നം അവൾ ഇപ്പോഴും കയ്യൊഴിഞ്ഞിട്ടില്ല. 1989ലെ കമ്മ്യൂണിസത്തിന്റെ തകർച്ചക്കു ശേഷം ജന്മദേശത്തേക്കുള്ള മടക്കയാത്ര ഏറെ ആകർഷകമാകുന്നു. പാരീസ് വിമാനത്താവളത്തിൽ വച്ച അവൾ പ്രാഗിൽവച്ചു നേരിയ പരിചയമുണ്ടായിരുന്ന യോസഫ് എന്ന വെറ്റിനറി ഡോക്ടറെ കാണുന്നു.

മടങ്ങിപ്പോകുന്ന പ്രവാസിയുടെ അന്യവത്കര ണമാണ് നോവലിന്റെ പ്രമേയം. താൻ നാടുവിട്ടി ല്ലായിരുന്നെങ്കിൽ ഉണ്ടാകുമായിരുന്ന ജീവിതത്തെ ക്കുറിച്ച് ഐറീൻ ചിന്തിക്കുന്നു. സഹോദരന്റെ കൈയ്യിൽ തന്റെ പഴയ വാച്ചു കാണുന്ന യോസഫ് വല്ലാതെ അസ്വസ്ഥനാകുന്നു. തിരിച്ചുവരവ് ഉളവാക്കുന്ന വികാരങ്ങളുടെ അപരിചിതത്വം ഇരുവരെയും ഉലയ്ക്കുന്നു. മരണമടഞ്ഞ ഒരാൾ ഇരുപതു വർഷങ്ങൾക്കു ശേഷം കല്ലറയിൽ നിന്നും തിരിച്ചുവന്നതുപോലെ അയാൾക്കു തോന്നുന്നു. മാതൃഭാഷയിലെ ഓരോ വാക്കും മനസ്സിലായെങ്കിലും അത് അജ്ഞാതമായ ഏതോ ഭാഷയായി തോന്നിക്കുന്നു. ഉറ്റവരുടെയും സുഹൃത്തുക്കളുടെയും നിസ്സംഗത ഐറീനെ അലോസരപ്പെടുത്തുന്നു. ഇരുപതു കൊല്ലത്തെ സാഹസയാത്രകൾക്കു ശേഷം ഇത്താക്കയി ലേക്കു മടങ്ങിയെത്തിയ ഒഡീസിയസിനെപ്പോലെ തങ്ങളുടെ ജീവിതത്തിന്റെ അർഥവും സത്തയു മെല്ലാം ജന്മനാടിനു പുറത്താണെന്ന് അവർ തിരിച്ചറിയുന്നു. പലായനത്തിനു മുൻപുണ്ടായി

രുന്ന തങ്ങളുടെ നിഴൽ പോലും ഇല്ലാതായിരി ക്കുന്നു. കൗമാരകാലത്ത് താനെഴുതിയ ഡയറി ക്കുറിപ്പുകൾ വായിക്കുന്ന യോസഫ് തനിക്കു വന്നുപെട്ട മാറ്റത്തിൽ സ്തബ്ധനാകുന്നു. തികച്ചും അന്യരായ, വിരുദ്ധമായ ആശയങ്ങളിൽ വിശ്വസിക്കുന്ന ആ കൗമാരക്കാരനും തനിക്കും ഒരേ കൈയ്യക്ഷരം ഉണ്ടായതെങ്ങനെയെന്ന് അയാൾ വിസ്മയം കൊള്ളുന്നു.

ഈ വർഷം പ്രസിദ്ധീകരിച്ച Festival of Insignificanceൽ പാരിസ് നഗരം പശ്ചാത്തല മാകുന്നു. വിരമിച്ച യൂണിവേഴ്സിറ്റി അദ്ധ്യാപകൻ റാമോൺ, കേറ്ററിംഗ് ജോലി ചെയ്യുന്ന ചാൾസ്, അവസരങ്ങൾ ലഭിക്കാത്ത കാലിബൻ എന്ന നടൻ ചെറുപ്പത്തിൽ തന്നെ ഉപേക്ഷിച്ച അമ്മയുടെ ഓർമ്മകളിൽ മുഴുകുന്ന അലെയ്ൻ എന്നീ സുഹൃത്തുക്കളിലൂടെയാണ് കുന്ദേര കഥ പറയുന്നത്. സ്റ്റാലിന്റെ സാന്നിദ്ധ്യം The Medmoirs of Nikita Khrushchev എന്ന കൃതിയിലൂടെ ഈ നോവലിൽ പ്രകടമാവുന്നു. സ്റ്റാലിന്റെ കളിപ്പാവ യായിരുന്ന കാലിനിൻ എന്ന റഷ്യൻ പ്രസിഡന്റി നെക്കുറിച്ചുള്ള കഥകൾ അവർ ചർച്ച ചെയ്യുന്നു. കാലം കടന്നു പോകവെ ഭീഷണമായ കഥകൾ പുതിയ അർഥങ്ങൾ കൈവരിച്ച് പരിഹാസ്യവും ഹൃദയസ്പർശിയാകുന്നു. ചരിത്രവും മനുഷ്യരും ആരുടെയോ വിരലുകൾ ചലിപ്പിക്കുന്ന നിഴൽ നാടകത്തിലെ പാവകൾ മാത്രമായി മാറുന്നത് അവർ തിരിച്ചറിയുന്നു.

ഓർമ്മയുടെ വിദൂരപാതകളിലൂടെ പലായനം ചെയ്യുന്ന സ്വത്വങ്ങളുടെ അപരിചിതത്വം കുന്ദേര യുടെ കഥാപാത്രങ്ങളെ ചുഴ്ന്നു നിൽക്കുന്നു. നിശിതമായ ജീവിതവ്യഥകളെ തീവ്രതരമാക്കുന്ന ഏകാധിപത്യം ഓർമ്മയുടെ പ്രതിരോധങ്ങൾ തീർക്കുവാനും പലായനത്തിലൂടെ അതിജീവനം കണ്ടെത്തുവാനും അവരെ പ്രേരിപ്പിക്കുന്നു. അന്യാദൃശമായ ദുരനുഭവങ്ങളിലൂടെ കടന്നു പോകവേ തെളിയുന്ന ജീവിതത്തിന്റെ നിരർഥകത ആദ്യം പരിഭ്രമവും പിന്നെ ചിരിയുമുണർത്തുന്നു. ദുരന്തങ്ങളെ ചിരിയുടെ പരിചകൊണ്ടു തടുക്കുന്ന വിദൂഷകന്റെ ഹാസ്യം എമിർ കുസ്തൂറിക്കയുടെ ഏകാധിപത്യം പ്രമേയമായ സിനിമകളെ അനുസ്മരിപ്പിക്കുന്നു. തത്ത്വചിന്തയുടെ ഭാരമേതു മില്ലാതെ ജീവിതത്തെ ആഴമേറിയ വിശകലന ങ്ങൾക്കു വിധേയമാക്കാനും സിസിഫസിന്റെ വ്യഥകളെ നാറാണത്തു ഭ്രാന്തന്റെ ചിരികൊണ്ടു നേരിടുവാനും കുന്ദേരക്കു കഴിയുന്നു. ●

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Impact of CEO Duality on Financial Performance: A Study with Special Reference to Selected Listed Companies in BSE

Binoy Chacko*, Gireesh Kumar G.S.**

Abstract

This study examines the relationship between the CEO duality and the financial performance of BSE listed companies in India. To accomplish this, data were sourced from the websites of 50 selected companies'. Simple random sampling is used for selecting sample unit and the study mainly depend on secondary data from published sources. CEO duality in a financial year (Annual report 2014) is taken as independent variable and Return on Asset, Earnings Per Share, Calculated ROA and Current Ratio were taken as dependent variables. It is found that there exists a negative relation between CEO duality and ROA and Calculated ROA but no significant relationship with other variables considered for the study.

Keywords: CEO Duality; Financial Performance; Board Composition; Corporate Governance.

Introduction

Economic development of a country mainly depends on industrial growth and development. Industrial development needs well performed organizations and less growth of sick and other unviable units. Long term growth of any organization primarily depends on its good corporate governance mechanism. Good corporate governance is essential for companies to access domestic as well as global capital at competitive rates. Corporate governance has received the special attention of various stakeholders after the revelation of a number of corporate scandals such as financial scams of Enron, WorldCom and Satyam in India. These incidences emphasized the need of improved corporate governance and led the way towards more legislation in India and all over the world. Corporate governance deals with the rights and responsibilities of a company's management, its board, shareholders and various stakeholders such as employees and customers. Corporate governance affects the investment decisions of the company. Therefore, good corporate governance is necessary to make a sound investment decision which, in turn, helps firms to prosper in the domestic as well as in the global market. It is concerned with the proper implementation of policies and procedures by a company to satisfy its related parties including shareholders, employees, customers, suppliers, regulatory authorities and the community at large.

The Organization for Economic Corporation and Development [O.E.C.D] (1999) original definition reads: "Corporate governance specifies the distribution of rights and responsibilities among different participants in the corporation, such as the board, managers, shareholders and other stakeholders, and spells out the rules and procedures for making decisions on corporate affairs. By doing this, it also provides the structure through which the company objectives are set, and the means of attaining those objectives and monitoring performance." Financial system plays a very important role in the economic life of the nation. The board of directors of a company is obliged to monitor the activities of management on behalf of shareholders and other stakeholders. It is

Author's Affiliation: *Assistant Professor, St. Thomas College, Arunapuram, Pala, Kerala 686574. **Associate Professor, PG and Research, Department of Commerce, Nirmala College, Muvattupuzha, Kerala-685 661 (On Deputation as Director, Centre for Continuing Education Kerala).

Reprint's Request: Gireesh Kumar G.S., Associate Professor, PG and Research, Department of Commerce, Nirmala College, Muvattupuzha, Kerala-68 661.
E-mail: gireeshkartha@yahoo.coms

assumed that board performance of its monitoring duties is influenced by factors such as board composition and quality, size of board, duality of chief executive officer, number of board meetings etc.

The overall health of an economy is closely related to the effectiveness of the financial system in that economy. We cannot imagine any business / industrial activity in an economy without the involvement of efficient banking and financial services. Indian banking and financialindustry, has always played a key role in preventing the economic disasters in our economy.

Statement of the Problem

Often members of Board of directors have been largely criticized for the decline in shareholders' wealth and corporate failure.They have been in the spotlight for the fraud cases that had resulted in the failure of major corporations, such as Enron, WorldCom Global Crossing and Satyam computers in India. Some ofthe reasons stated for these corporate failures are the lack of vigilance by the board of directors,the inappropriate board composition etc. As a result, various corporate governance reforms have specificallyemphasized on appropriate changes to be made to the board of directors in terms of its composition, structureand ownership configuration and in India Securities and Exchange Board of India (SEBI) introduced clause 49 of listing agreement Therefore, the study is a humble attempt to understand the association of CEO duality-one of the essentials of board composition on financial performance of companies listed in BSE.

Research Question

The study attempts to address the research question "Is there any significant relation between the CEO duality and the financial performance of the listed companies in India?"

Research Objectives

The review of literature revealed that corporate governance has been studied from different angles. The present study therefore focuses on an important aspect of corporate governance i.e. CEO duality. The study attempts to understand the relationship of financial performance and CEO duality of companies listed in Bombay Stock Exchange (BSE).

Research Hypothesis

H_0:- There is a no significant relationship between CEO duality and organizational performance.

H_1:- There is a significant relationship between CEO duality and organizational performance.

Methodology

Since this study is on the board meeting of listed companies in India, population of the study is made up of companies listed on the Bombay Stock Exchange (BSE). A sample of 50 listed companies for the financial year 2013-2014 was used for detailed study and analysis. For the purpose of the study data has been collected through secondary sources. The sampling technique adopted for the purpose is simple random sampling for selecting industries (banking and finance) and sample units.

Descriptive statistics, one sample t-test and Spearman rank correlation coefficient test are used for data analysis. Statistical software SPSS used to analyze data.

Review of Literature

Adegbemi B.O Onakoya et al. conducted a study on the topic "Corporate Governance and Bank Performance: A Pooled Study of Selected Banks in Nigeria" among a sample of six selected banks listed on Nigerian Stock Exchange and the researcher observed that corporate governance have been on the low side and have impacted negatively on bank performance. The study therefore contends that strategic training for board members and senior bank managers should be embarked or improved upon, especially on courses that promote corporate governance and banking ethics.

"Corporate Governance and Firms' Financial Performance" is a study conducted by Sekhar Muni Amba among 39 companies listed in Bahrain bourse in the Kingdom of Bahrain and the study revealed that corporate governance variables do influence firms' performance. CEO duality, proportion of non-executive directors and leverage had negative influence and board member as chair of audit committee, proportion of institutional ownership had positive influence on firms' financial performance.

Lal C. Chugh et al (2009) on their research "Corporate governance and firm performance:

evidence from India" among 41 companies listed in NSE in India and found that there is a positive relationship between larger boards and financial performance. The study also found a negative relationship between autonomous board and financial performance and the researches did not found any relationship between CEO duality and financial performance.

Matama Rogers (2008) conducted a study on the topic "Corporate governance and financial performance of selected commercial banks in Uganda" among 4 banks covering 388 sample respondents and found that Corporate Governance predicts 34.5% of the variance in the general financial performance of Commercial banks in Uganda and the significant contributors to financial performance include openness and reliability. Openness and Reliability are measures of trust. The study also found that credit risk as a measure of disclosure has a negative relationship with financial performance.

Zahid Irshad Younas et al. (2010) conducted a study on the topic "Effect of firm performance on corporate governance a panel data analysis" among a sample of 52 firms listed on Karachi Stock Exchange from manufacturing sector of Pakistan over the period of 2006-2009 with an objective to investigate the impact of prior year firm's performance on subsequent year firm's corporate governance mechanism. Their results revealed that prior year firm's performance has positive relationship with board size but negative relationship with audit expenditure. Furthermore, any change in prior year firm's performance causes change in CEO duality.

Mamta Brahmbhatt, et al. (2012) conducted a study on the topic "An empirical investigation of corporate governance scenario in public vs private banks in India" among two banks each from public and private sector banks over the period of 2008-2011. The study found an existence of ambiguity in correlation between compliance of corporate governance parameters and net profit. Clause 49 as per SEBI rule was not been able to provide numerical value of importance to each parameter as it is debatable issue over years. Primary research revealed the importance of different parameters set from the perspective of investors and financial advisors.

Jatinder Kaur (2014) conducted a study on the topic "Corporate Governance and Financial performance: A Case of Indian Banking Industry" was an attempt to examine the relationship between corporate governance and the performance of Indian banks. Based on the regression results, it was found that different committees constituted by the banks are significantly related with their performance.

Sumaira Aslam, et al. (2012) conducted a study on the topic " Relating Corporate Governance with Market Valuation and Organisational performance : An Empirical Study on KSE Pakistan" with an objective to empirically test the impact of corporate governance measures on organizational performance of listed companies at 100-index of Karachi stock exchange (KSE) and the result revealed that there was a positive and significant relationship between organizational performance and corporate governance practices and there was positive and very significant relationship between company Valuation and corporate governance and the results are consistent with organizational theory and Agency theory of corporate Governance.

Data Analysis

The Table 1 shows the descriptive statistics of dependent and independent variables of our sample companies.

The Table 1 explains that the range of the CEO duality in BSE listed companies is 1, (Minimum 0 and Maximum 1), standard deviation is 0.505, and the Median is 1, the above descriptive statistics table also shows that the CEO duality has the mean equal to 0.52 and has the standard deviation of 0.505. Skewness of the data is -0.083(standard value of normal distribution is "0") and the Kurtosis is- 2.078 (standard value of normal distribution is "3") both value of the CEO duality variable shows that the data is approximately normally distributed. The following Figure1 explains our analysis:

Fig. 1: Shows the data distribution approximately give any normal distribution pattern.

Table 1: The descriptive statistics of dependent/ independent variables used for the study

		CEO Duality	Return on Asset	Earning Per Share	Calculated ROA	Current Ratio
N	Valid	50	50	50	50	50
	Missing	0	0	0	0	0
Mean		.52	-1.097109806	42.35540	.662665904	1.8318
Std. Error of Mean		.071	2.4477799305	7.340521	3.1103572532	.38050
Median		1.00	.645000000	26.46000	.625296459	.9204
Mode		1	.2900000	-.270[a]	-120.4092219[a]	.50[a]
Std. Deviation		.505	17.3084178773	51.905319	21.9935470566	2.69057
Variance		.255	299.581	2694.162	483.716	7.239
Skewness		-.083	-6.952	1.971	-1.876	3.495
Std. Error of Skewness		.337	.337	.337	.337	.337
Kurtosis		-2.078	48.888	4.137	25.732	12.945
Std. Error of Kurtosis		.662	.662	.662	.662	.662
Range		1	127.9041200	244.190	215.2003475	14.27
Minimum		0	-120.4041200	-.270	-120.4092219	.50
Maximum		1	7.5000000	243.920	94.7911256	14.77
Sum		26	-54.8554903	2117.770	33.1332952	91.59

The Table 1 exhibits that the range of the Return on Asset in BSE listed companies is 127.9041200, (Minimum -120.4041200 and Maximum 7.5000000), standard deviation is 17.3084178773, and the Median is .645000000, the above descriptive statistics table also shows that the Return on Asset has the mean equal to -1.097109806 and has the standard deviation of 17.3084178773. Skewness of the data is -6.952 (standard value of normal distribution is "0") and the Kurtosis is 48.888 (standard value of normal distribution is "3") both value of the Return on Asset variable shows that the data is not normally distributed. The following Figure 2 further explain our analysis;

Fig. 2: Shows the data distribution is not normally distributed.

The Table 1 explains that the range of the Earning Per Share in BSE listed companies is 244.190,(Minimum -.270 and Maximum 243.920) standard deviation is 51.905319, and the Median is 26.46000, the above descriptive statistics table also shows that the Earning Per Share has the mean equal to 42.35540 and has the standard deviation of 51.905319. Skewness of the data is 1.971 (standard value of normal distribution is "0") and the Kurtosis is 4.137 (standard value of normal distribution is "3") both value of the Earning per Share variable shows that the data is not normally distributed. The following Figure 3 further explain our analysis;
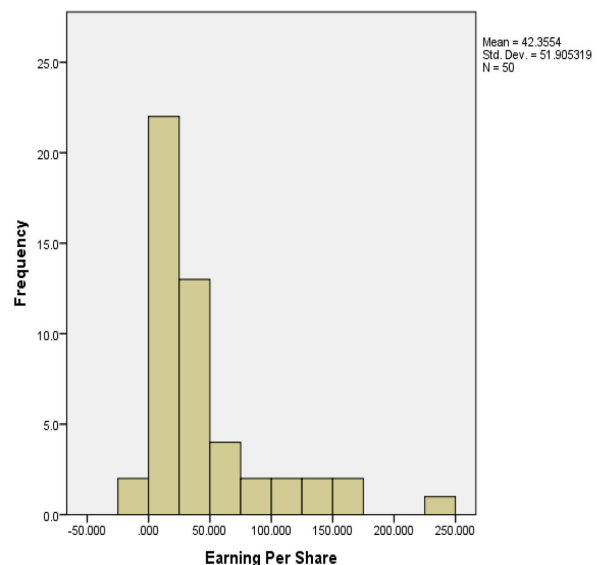
Fig. 3: Shows the data distribution is not normally distributed.

The Table 1 explains that the range of the Calculated ROA in BSE listed companies is 215.2003475, (Minimum -120.4092219 and Maximum 94.7911256) standard deviation is 21.9935470566, and the Median is .625296459, the above descriptive statistics table also shows that the Calculated ROA has the mean equal to .662665904 and has the standard deviation of 21.9935470566. Skewness of the data is -1.876 (standard value of

normal distribution is "0") and the Kurtosis is 25.732 (standard value of normal distribution is "3") both value of the Calculated ROA variable shows that the data is not normally distributed. The following Figure 4 further explains our analysis;
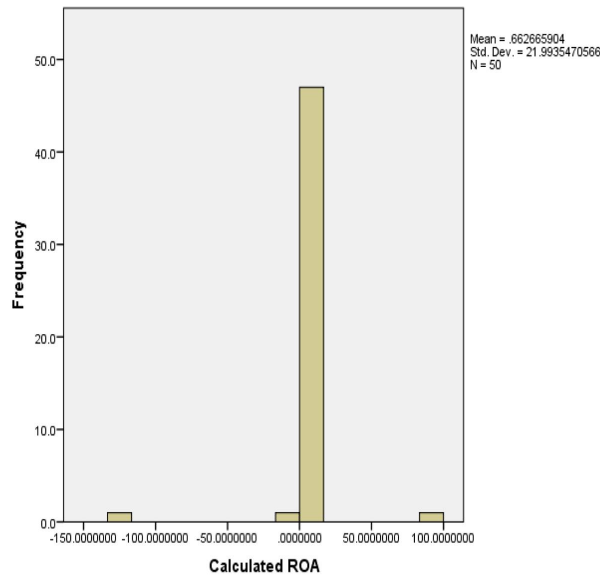
Fig. 4: The above diagram shows the data distribution is not normally distributed.

The Table 1 explains that the range of the Current Ratio in BSE listed companies is 14.27, (Minimum .50 and Maximum 14.77) standard deviation is 2.69057, and the Median is 0.9204, the above descriptive statistics table also shows that the Current Ratio has the mean equal to 1.8318 and has the standard deviation of 2.69057. Skewness of the data is 3.495 (standard value of normal distribution is "0") and the Kurtosis is 12.945 (standard value of normal distribution is "3") both value of the Current Ratio variable shows that the data is not normally distributed. The following Figure 5 further explain our analysis;
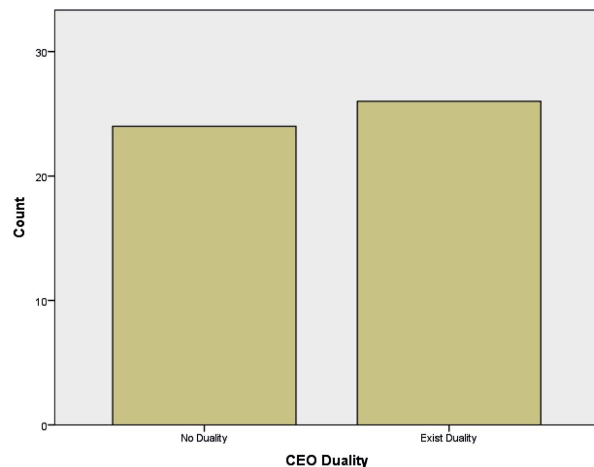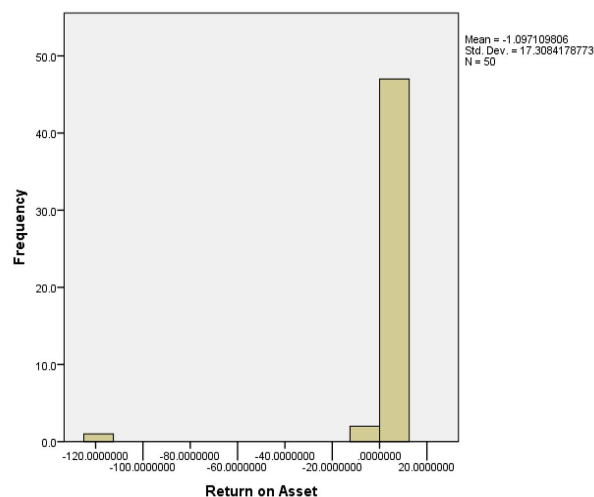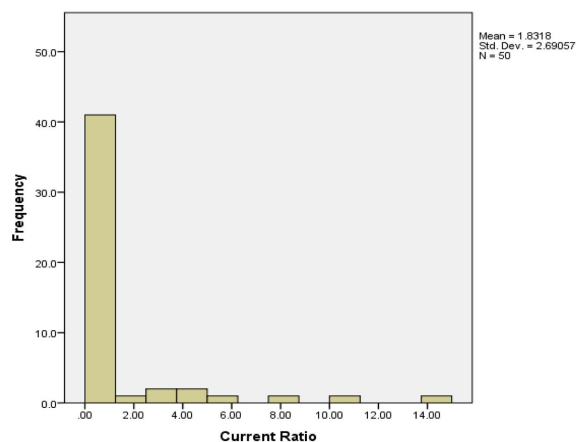

Fig. 5: Shows the data distribution is not normally distributed.

Relation between CEO Duality and Financial Performance
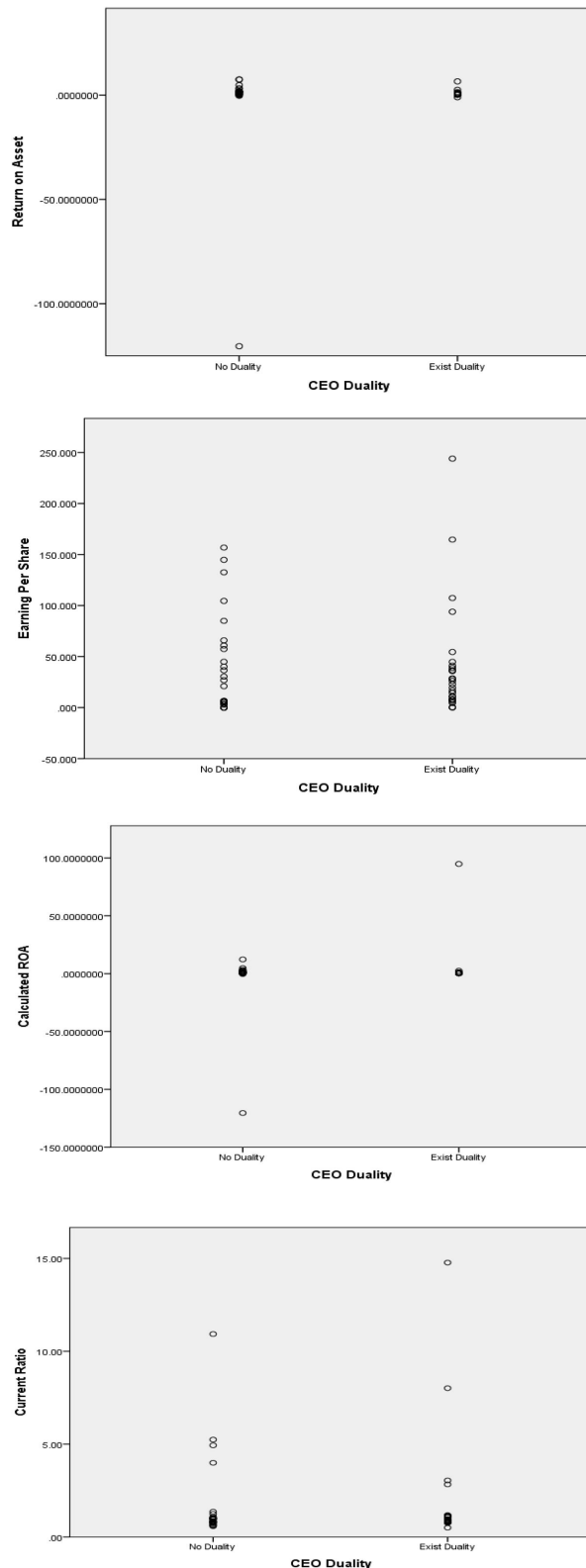
Fig. 6: Showing the association between CEO duality and financial performance variables.

The Figure 6 showing the association between CEO duality and financial performance variables (Return on Asset, Earning per Share, Calculated ROA and Current Ratio). The R2 (coefficient of determination) value for relation between CEO duality and return on asset is 0.115, for CEO duality and earning per share is 0.22, for CEO duality and calculated ROA is 0.170 and for CEO duality and

current ratio is 0.015, which states the level of strength for this linear relation.

Further, we applied Spearman rank correlation coefficient test on the values of both variables calculated for our sample of 50 companies. For the relation between CEO duality and return on assets we found the following results of Spearman correlation test.

Table 2: The Spearman correlation test for CEO duality and Return on Asset

			CEO Duality	Return on Asset
Spearman's rho	CEO Duality	Correlation Coefficient	1.000	-.377**
		Sig. (2-tailed)	.	.007
		N	50	50
	Return on Asset	Correlation Coefficient	-.377**	1.000
		Sig. (2-tailed)	.007	.
		N	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

As we can see from the correlation results that there is a significant negative relation between CEO duality and the return on asset, the significance level of our Spearman correlation coefficient test is 0.007 which is below the standard level of 0.05. So we can say this relation as significance. Hence the null hypothesis can be rejected, which states that there is no significant relation between CEO duality and

the return on asset, and accept the alternative hypothesis that there exist a significant relationship between CEO duality and the return on asset.

Now we are presenting the research results for the Spearman rank correlation coefficient test for the relation between CEO duality and Calculated ROA of the sample companies.

Table 3: The Spearman correlation test for CEO duality and Earing Per Share.

			CEO Duality	Earning Per Share
Spearman's rho	CEO Duality	Correlation Coefficient	1.000	.022
		Sig. (2-tailed)	.	.878
		N	50	50
	Earning Per Share	Correlation Coefficient	.022	1.000
		Sig. (2-tailed)	.878	.
		N	50	50

Table 4: The Spearman correlation test for CEO duality and Calculated ROA

			CEO Duality	Calculated ROA
Spearman's rho	CEO Duality	Correlation Coefficient	1.000	-.352*
		Sig. (2-tailed)	.	.012
		N	50	50
	Calculated ROA	Correlation Coefficient	-.352*	1.000
		Sig. (2-tailed)	.012	.
		N	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

As we can see from the correlation results that there is a weak positive relation between CEO duality and earning per share, the significance level of our Spearman correlation coefficient test is 0.878 which is beyond the standard level of 0.05. So we cannot say this relation as significance. Hence the null hypothesis cannot be rejected, which states that there is no significant relation between CEO duality and earning per share of the company.

Now we are presenting the research results for the Spearman rank correlation coefficient test for

the relation between CEO duality and Calculated ROA of the sample companies

Correlation results show that there is a significant negative relation between CEO duality and the Calculated ROA, the significance level of our Spearman correlation coefficient test is 0.012 which is below the standard level of 0.05. So we can say this relation as significance. Hence the null hypothesis can be rejected, which states that there is no significant relation between CEO duality and the Calculated ROA, and accept the alternative

hypothesis that there exist a significant relationship between CEO duality and the Calculated ROA.

The research results for the Spearman rank correlation coefficient test for the relation between CEO duality and current ratio of the sample companies is exhibited in the following Table 5.

Table 5: The Spearman correlation test for CEO duality and Current Ratio

			CEO Duality	Current Ratio
Spearman's rho	CEO Duality	Correlation Coefficient	1.000	.044
		Sig. (2-tailed)	.	.760
		N	50	50
	Current Ratio	Correlation Coefficient	.044	1.000
		Sig. (2-tailed)	.760	.
		N	50	50

As we can see from the correlation results that there is a weak positive relation between the number of CEO duality and current ratio, the significance level of our Spearman correlation coefficient test is 0.760 which is beyond the standard level of 0.05. So we cannot say this relation as significance. Hence the null hypothesis cannot be rejected, which states that there is no significant relation between CEO duality and current ratio of the company.

Summary of Findings and Conclusions

The below Table 6 gives a clear idea about our research findings:

Table 6: Association between Variables

Independent Variable: CEO Duality	Hypothesis	
Dependent Variables	Null: H0	Alternative: H1
Return on Asset	Rejected	Accepted
Earnings per Share	Accepted	Rejected
Calculated ROA	Rejected	Accepted
Current Ratio	Accepted	Rejected

According to the Spearman rank correlation coefficient test for the CEO duality as independent variable, all the null hypothesis are accepted except Return on Asset and Calculated ROA dependent variables. It means there exists a significant relation between CEO duality with Return on Asset and CEO duality with Calculated ROA.

Conclusion and Scope for Further Research

This part will answer the research question and summarize the crux of the study. This empirical research work examines the inter-relationship between CEO duality and financial performance of the BSE listed companies. The purpose of this research was to analyze the relationship between the CEO duality with the financial performance of the company listed in BSE.

Analysis on the relationship between CEO duality and firm's performance measures, it is found that there is no significant relationship between CEO duality with earning per share and current ratio. But the other two financial performance variable such as Return on Asset and calculated ROA show a significant relationship with CEO duality. There exists a significant negative relationship between CEO duality and Return on Asset and calculated ROA. It means that if Chairman and CEO are same, firms Return on Asset and calculated ROA decreases and vice versa.

Due to time constraint, we focused on impact of CEO duality on the financial performance of the BSE listed companies of India for one year i.e. 2014, which is a short period of time to analyze the comprehensive and complex data on impact of board composition on the financial performance. It is recommended that the researchers should extend this study for more than one year so that they can get more comprehensive results. This study focused on the impact of CEO duality on financial performance of the firm. Several other variables of corporate governance such as audit committee, disclosure practices etc. which should be considered by the researchers while analyzing the corporate governance with financial performance of the companies.

So, any prospective researcher should consider other myriad factors of corporate governance while analyzing the firm performance so that the study could be more meaningful and accurate.

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മലയാളം റിസേർച്ച് ജേണൽ
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യൂറോപ്പിനു പുറത്തുനിന്നുള്ള
സാഹിത്യ–സൈദ്ധാന്തിക സമീക്ഷകൾ

26

ഇഷ്യു എഡിറ്റർ:

അജയ് ശേഖർ

അസിസ്റ്റന്റ് പ്രൊഫസർ, ഇംഗ്ലീഷ് വിഭാഗം,
ശ്രീശങ്കരാചാര്യ സംസ്കൃത സർവകലാശാല,
കാലടി

ഉള്ളടക്കം

കെ. ജീവൻ കുമാർ

ലാറ്റിൻ അമേരിക്കൻ സാഹിത്യത്തിന്റെ സൈദ്ധാന്തിക പരിസരം

ലാറ്റിൻ അമേരിക്കൻ സാഹിത്യത്തിന്റെ ഗതി നിർണയിച്ചതോ വിപു ലമായ തോതിൽ സ്വാധീനിച്ചതോ ആയ തനതു സാഹിത്യസിദ്ധാന്ത ങ്ങളുടെ അഭാവം തികച്ചും അപ്രതീക്ഷിതമാണ്. സാഹിത്യത്തിലൂടെ ലാറ്റിൻ അമേരിക്കയെ അടുത്തറിയുവാൻ ശ്രമിച്ച ആർക്കും ഇത്തരം ഒരു ശൂന്യസാന്നിധ്യം വിസ്മയകരമായി തോന്നാം. സമഗ്രവും വ്യക്തി രിക്തവുമായ സാഹിത്യസിദ്ധാന്തങ്ങളുടെ ഇല്ലായ്മയുടെ കാരണം നീണ്ട കൊളോണിയൽ ആധിപത്യത്തിന്റെ ഫലമായി വികലമാക്ക പ്പെട്ട സംസ്കാരവും മൃതമായ ലാറ്റിൻ അമേരിക്കൻ ഭാഷകളുമാകാം. സ്പെയിനിന്റെയും പോർച്ചുഗലിന്റെയും അധീശത്വത്തിനു വിധേയ രായ ലാറ്റിൻ അമേരിക്കൻ രാജ്യങ്ങളിൽ ഇന്ന് പ്രധാനമായും സ്പാ നിഷ്-പോർച്ചുഗീസ് ഭാഷകൾമാത്രമേ നിലവിലുള്ളു. എങ്കിലും ലാറ്റിൻ അമേരിക്കൻ നിരൂപണം പിന്തുടരുന്ന രീതിശാസ്ത്രങ്ങളെ സങ്കീർണ വും സങ്കരവുമായ ചിന്താധാരകളുടെ വിചിത്രമായ സമന്വയമായിക്കാ ണാം. ഈ ചിന്താധാരകൾ സ്വീകരിക്കുന്ന നിരൂപകർ അവയെ

കെ. ജീവൻ കുമാർ, അസോസ്യേറ്റ് പ്രൊഫസർ, ഡിപ്പാർട്ട്മെന്റ് ഒഫ് ഇംഗ്ലീഷ്, ഹെൻട്രി ബേക്കർ കോളജ്, മേലുകാവ്.

വ്യത്യസ്തമായ സാമൂഹികശാസ്ത്രപരവും സാംസ്കാരികവും ചരിത്രപരവും പ്രത്യയശാസ്ത്രപരവുമായ വീക്ഷണങ്ങൾക്കും വിശകലനങ്ങൾക്കും വിധേയമാക്കുന്നു. വൈവിധ്യമാർന്ന ഈ പരിപ്രേക്ഷ്യങ്ങളും ചിന്താധാരകളുമാണ് 'ലാറ്റിൻ അമേരിക്കൻ സാഹിത്യ സിദ്ധാന്തം' എന്ന് ഈ ലേഖനത്തിൽ വിവക്ഷിക്കുകയും വിശദമാക്കുവാൻ ശ്രമിക്കുകയും ചെയ്യുന്നത്.

ഭൂപടത്തിന് അതീതമായ ഇടം

പത്തൊൻപതാം നൂറ്റാണ്ടിൽ മെക്സിക്കോയിൽ ആധിപത്യം ഉറപ്പിച്ച ഫ്രഞ്ച് സാമ്രാജ്യത്വമാണ് 'ലാറ്റിൻ അമേരിക്ക' എന്ന പേര് ആദ്യമായി ഉപയോഗിച്ചത്[1]. ആംഗ്ലോ-അമേരിക്ക എന്ന സങ്കൽപ്പനത്തിന് വിരുദ്ധമായും രാഷ്ട്രീയ ലാഭത്തിനായും സ്പാനിഷ് ആധിപത്യത്തിൽനിന്ന് വിമോചനം നേടിയ ദേശങ്ങളുമായുള്ള ചരിത്രപരവും ഭാഷാപരവുമായ സാദൃശ്യത്തിന് അടിവരയിടുന്നതിനുമായാണ് ഫ്രഞ്ചുകാർ ഈ സംജ്ഞ ആവിഷ്കരിച്ചത്. പല ലാറ്റിൻ അമേരിക്കൻ രാജ്യങ്ങൾക്കും റോമൻ സാമ്രാജ്യവുമായി യാതൊരു ബന്ധവും ഇല്ലെങ്കിലും ഈ പേര് പ്രചാരം നേടി. 'യൂറോപ്പ്' എന്ന പദം അതിലെ അംഗരാജ്യങ്ങളെ സൂചിപ്പിക്കുന്നതുപോലെ ലളിതമല്ല 'ലാറ്റിൻ അമേരിക്ക'യിൽ ഉൾപ്പെടുന്ന രാജ്യങ്ങൾ. രാഷ്ട്രമീമാംസയിൽ അത് ഒരു പ്രദേശത്തെയോ രാജ്യത്തെയോ ജനതയെയോ വംശത്തെയോ സൂചിപ്പിക്കുന്ന പദമായി ഉപയോഗിക്കാറുണ്ടെങ്കിലും സൈദ്ധാന്തികമായി 'ലാറ്റിൻ അമേരിക്ക' ഒരു സ്ഥലമെന്നതിന് ഉപരിയായി ഒരു ഇടമാണ്. ഭൂമിശാസ്ത്രപരമായിത്തന്നെ 'ലാറ്റിൻ അമേരിക്ക' വ്യത്യസ്ത അർഥങ്ങൾ ജനിപ്പിക്കുന്നു. സ്പാനിഷ് അമേരിക്ക, ഹിസ്പാനോഅമേരിക്ക (Hispanoamerica), ഇൻഡോ അമേരിക്ക, ഐബിരോ-അമേരിക്ക (Ibero- America) എന്നിങ്ങനെയുള്ള സൂചകങ്ങളും ഉപയോഗത്തിലുണ്ട്[2]. ഇതിൽ ആദ്യ രണ്ടു സംജ്ഞകൾ സ്പാനിഷ്ഭാഷ സംസാരിക്കുന്ന ജനതകളുള്ള രാജ്യങ്ങളെ സൂചിപ്പിക്കുന്നു. പക്ഷേ ബ്രസീൽ എന്ന ഏറ്റവും വിസ്തൃതമായ ലാറ്റിൻ അമേരിക്കൻ രാജ്യം അപ്പോൾ ഒഴിവാക്കപ്പെടുന്നു. ഇൻഡോ-അമേരിക്ക വംശത്തെയും ഐബിരോ-അമേരിക്ക ചരിത്ര പശ്ചാത്തലത്തെയുംകുറിക്കുന്നു. ഇവയൊന്നുംതന്നെ 'ലാറ്റിൻ അമേരിക്ക' എന്ന പേര് സൂചിപ്പിക്കുന്ന വിശാല അർഥം ഉൾക്കൊള്ളാത്തതിനാൽ ഈ കൊളോണിയൽ സംജ്ഞ ഇപ്പോഴും നിലനിർക്കുന്നു.

സാഹിത്യസംബന്ധിയായി 'ലാറ്റിൻ അമേരിക്ക' സ്പാനിഷ്ഭാഷ നിലനിർക്കുന്ന രാജ്യങ്ങളെയും ബ്രസീലിനെയും സൂചിപ്പിക്കുന്നു. പക്ഷേ ഈ രണ്ടു ഭാഷകൾക്കുമപ്പുറം (സ്പാനിഷ്, പോർച്ചുഗീസ്) ഇവയിലുള്ള കരീബിയൻ വംശജരും റെഡ് ഇന്ത്യൻ വംശജരും അതിൽ

ലാറ്റിൻ അമേരിക്കൻ സിദ്ധാന്തങ്ങൾ ചരിത്രവൽക്കരണവുമായി ബന്ധപ്പെട്ടിരിക്കുന്നു. സിദ്ധാന്തങ്ങളുടെ അഭാവം ഹുവാൻ വിയേഹസ് (Juan Villegas) ഇങ്ങനെ സൂചിപ്പിക്കുന്നു: "ലാറ്റിൻ അമേരിക്കൻ വിമർശ നാത്മക വ്യവഹാരങ്ങൾ യൂറോ കേന്ദ്രീകൃതമായ സിദ്ധാന്തങ്ങൾപോ ലെ ആധികാരികമായ തനതു സൈദ്ധാന്തിക മാതൃകകൾക്ക് രൂപമേകി യിട്ടില്ല."⁶ ഇതിനു പരിഹാരമായി വിയേഹസ് കാണുന്ന മാർഗം വ്യവ ഹാരങ്ങളുടെ ചരിത്രവൽക്കരണമാണ്. മാർകോ ഡി മരീനിയും സമാ നമായ അഭിപ്രായം പ്രകടിപ്പിക്കുന്നു. നാടകങ്ങളെ-പാഠത്തെയും അവ തരണത്തെയും-അവയുടെ യഥാർഥ സത്വം വെളിവാക്കുന്ന സാംസ്കാ രിക പശ്ചാത്തലത്തിൽ, അതായത് ഒരു സമൂഹത്തിന്റെയും ചരിത്ര ത്തിന്റെയും ഭാഗമായി വിവക്ഷിക്കണമെന്ന് ഡി മരീനി വാദിക്കുന്നു.

ലാറ്റിൻ അമേരിക്കൻ സൈദ്ധാന്തിക വ്യവഹാരങ്ങളുടെ അടിസ്ഥാ നപരമായ ഘടനയ്ക്കു രൂപമേകിയത് ഉറുഗ്വേയിലെ നിരൂപകനായ ആൻഹൽ റാമയാണ് (Angel Rama). എഴുത്തുകാരെയും സാംസ്കാ രിക പ്രവർത്തകരെയും ബുദ്ധിജീവികളെയും മഹത്തായ ലാറ്റിൻ അമേ രിക്കൻ സമൂഹത്തിന്റെ ശിൽപ്പശാലയിലെ നെയ്ത്തുകാർ എന്നാണ് അദ്ദേഹം വിളിക്കുക. ലാറ്റിൻ അമേരിക്ക എന്ന സങ്കൽപ്പനം അതിന്റെ സഹജമായ വൈവിധ്യം വെളിപ്പെടുത്തുവാനുള്ള ശ്രമവും ഈ സംജ്ഞ രൂപപ്പെടുത്തിയ പൂർവ വ്യവഹാരങ്ങളുടെ വിശകലനവും ആണെന്ന് അദ്ദേഹം കരുതുന്നു. വാക്കിന്റെ യാഥാർഥ്യം കൊളോണി യൽ-പോസ്റ്റ് കൊളോണിയൽ കാലഘട്ടങ്ങളിലെ സാംസ്കാരിക ജീവി തത്തിന്റെ സന്ദിഗ്ധത ആവാഹിക്കുന്നു. അത് ഒരേ സമയം അധി കാരത്തിനു വിധേയവും വികേന്ദ്രീകൃതമായ അധികാരഘടനകളിൽ നിന്ന് ഉരുത്തിരിയുന്ന വിധ്വംസക സാധ്യതകൾ ഉള്ളതുമാണ്. വാക്കും അതിന്റെ ശിൽപ്പപരമായ സാധ്യതകൾ ചൂഷണം ചെയ്യുന്ന എഴുത്തു കാരനും വാമൊഴി സംസ്കാരത്തെ തമസ്കരിക്കുന്നതോടൊപ്പം അടി ച്ചമർത്തപ്പെടുന്ന വാമൊഴി സംസ്കാരത്തിന്റെ രൂപാന്തരത്തിനു നിദാ നമായി അതിന്റെ അതിജീവനത്തിനു വഴിയൊരുക്കുന്ന ട്രാൻസ്കൾച്ച റേഷൻ (transculturation) എന്ന പ്രക്രിയയുടെ പ്രയോക്താവാകുന്നു വെന്നും റാമ പറയുന്നു.

ബ്രസീലിയൻ നിരൂപകനായ റോബെർട്ടോ ഷ്വാർസ് കൊളോണി യൽ ആധുനികത കൊണ്ടുവന്ന ആശയങ്ങൾ ലാറ്റിൻ അമേരിക്കയുടെ സാംസ്കാരിക പശ്ചാത്തലത്തിൽ അനുചിതവും സാങ്കൽപ്പികവുമാ മെന്ന് അഭിപ്രായപ്പെടുന്നു: "അനുചിത സ്ഥാനത്തു പ്രതിഷ്ഠിക്കുന്ന ആശയങ്ങൾ ശ്രേണീബദ്ധമായ ഒരു സമൂഹത്തിനു രൂപം കൊടു ക്കുന്നതിലൂടെ അത്തരമൊരു സമൂഹത്തിൽ വരേണ്യ വർഗവും സാധാ രണക്കാരുംതമ്മിലുള്ള അന്തരം സാംസ്കാരിക പ്രതിനിധാനങ്ങളെ അസാധുവാക്കുന്നു"⁷. ഷ്വാർസ് ബ്രസീലിയൻ സാഹിത്യത്തിലെ പ്രകൃ

ഷ്ട കൃതികളെ പ്രശ്നവൽക്കരിക്കുകയും അവ ജനപ്രിയസംസ്കാ രത്തെ പ്രാന്തവൽക്കരിച്ചുവെന്നു വാദിക്കുകയും ചെയ്യുന്നു.

ലാറ്റിൻ അമേരിക്കൻ സാംസ്കാരികരൂപങ്ങളുടെ ബഹുസ്വരതയും ബുദ്ധിജീവികളും അക്ഷരാഭ്യാസമില്ലാത്ത ജനതയുംതമ്മിലുള്ള അന്ത രവും തിരിച്ചറിയുന്ന ബ്രസീലിയൻ നിരൂപകരായ ഹരോൾഡോ ഡി കാമ്പോസും (Haroldo de Campos) സിൽവിയനോ സാന്റിയാഗോയും (Silviano Santiago) ലാറ്റിൻ അമേരിക്കൻ സാഹിത്യത്തിന്റെ മൗലികത വ്യക്തമാക്കുവാൻ 'in-betweenness,' 'translation' എന്നീ സങ്കൽപ്പന ങ്ങൾ ഉപയോഗിക്കുന്നു. "The In-Betweenness of Latin American Dis-course" എന്ന ലേഖനത്തിൽ ലാറ്റിൻ അമേരിക്കൻ എഴുത്തുകാരൻ വ്യതിരിക്തമായ ഓർമകളും ഭാഷകളും ചരിത്രങ്ങളും ശകലിതമാക്കിയ ബഹുസ്വരതയാർന്ന ഒരു ഇടമാണെന്ന് സാന്റിയാഗോ വാദിക്കുന്നു. കൊളോണിയൽ ഇടപെടലുകൾ കോളനിവൽക്കരിക്കപ്പെട്ട ജനതയ്ക്ക് ഒരു ഇതര ചരിത്രവും ഇതരസംസ്കാരവും പ്രദാനം ചെയ്യുന്നു. അവ തദ്ദേശീയമായ ഓർമകളെയും സംസ്കാരത്തെയും അകറ്റുന്നു. ഇത് ലാറ്റിൻ അമേരിക്കൻ സ്വത്വത്തിൽ ഒരു വൈദേശികഭാവം കലർത്തു ന്നു. പുതിയ സംസ്കാരം പൂർണമായും ആഗിരണം ചെയ്യാനാകാത്ത, തദ്ദേശീയമായ ഇടങ്ങളിൽ സ്ഥാനമില്ലാത്ത ലാറ്റിൻ അമേരിക്കൻ സ്വത്വ ത്തിന് അവശേഷിക്കുന്നത് ഇവക്ക് ഇടയിലുള്ള ഏതോ അയഥാർഥ മായ ഇടമാണ്. ഈ ഇടത്തിൽ അധിവസിച്ചുകൊണ്ട് വ്യക്തി തന്റെ പാരമ്പര്യത്തെയും സംസ്കാരത്തെയും സംബന്ധിക്കുന്ന വ്യാഖ്യാന ങ്ങളിൽ ഏർപ്പെടുന്നു. അനിവാര്യമായും വികലമായ യാഥാർഥ്യത്തെ പ്രതിഫലിക്കാനാവാത്ത ഈ വ്യാഖ്യാനങ്ങളെ translation എന്ന് സാന്റി യാഗോ വിശേഷിപ്പിക്കുന്നു. ഇത്തരം വ്യാഖ്യനങ്ങൾ നിഷ്കളങ്കമ ല്ലെന്നും അദ്ദേഹം പറയുന്നു.

ലാറ്റിൻ അമേരിക്കൻ സർഗശക്തിയെ 'transcreation' എന്ന സങ്കൽപ്പനത്തിലൂടെയാണ് ഡി കാമ്പോസ് വിശദമാക്കുന്നത്[10]. അത് സാഹിത്യ രചന എന്ന പ്രക്രിയ വൈദേശികമായ രചനാരീതികളുടെ/ ശൈലികളുടെ/ സാഹിത്യരൂപങ്ങളുടെ പുനരവതരണമാകുന്നതിനെ സൂചിപ്പിക്കുന്നു. അത് പരമ്പരാഗതവും തദ്ദേശീയവുമായ സംസ്കാ രത്തെ പുതിയൊരു സാംസ്കാരിക പശ്ചാത്തലത്തിലും ഭാഷയിലും പുനർനിർമിക്കുന്ന പ്രക്രിയയാകുന്നു. അതേസമയം സ്വന്തം സംസ്കാ രത്തെ അപരസംസ്കാരത്തിൽ പുനസൃഷ്ടിക്കുന്നതിലൂടെ അത് സ്വന്തം പാരമ്പര്യം വേറിട്ടൊരു സംസ്കാരത്തിൽ ആലേഖനം ചെ യ്യുന്ന പ്രക്രിയയായിത്തീരുന്നു. ബോർഹസിന്റെ കൃതികളാണ് ഇതിന് ഉദാഹരണമായി ഡി കാമ്പോസ് സൂചിപ്പിക്കുന്നത്. ഈ വിശകലന ങ്ങളിലെല്ലാം കൊളോണിയൽ വ്യവഹാരങ്ങളുടെ സ്വാധീനവും അതിനെ അതിജീവിക്കുവാനുള്ള ശ്രമങ്ങളും തികച്ചും വ്യക്തമാണ്. ലാറ്റിൻ അമേരിക്കൻ ആഖ്യാനങ്ങളുടെമേൽ കൊളോണിയൽ സംസ്കാ രത്തിനുള്ള ആധിപത്യം പ്രമുഖ നിരൂപകനായ റോബർട്ടോ ഗോൺസാ

ലസ് എച്ചെവാരിയ (Roberto Gonzalez Echevarria) ഇങ്ങനെ സംഗ്ര ഹിക്കുന്നു. "ലാറ്റിൻ അമേരിക്കൻ ആഖ്യാനങ്ങളിൽ പശ്ചാത്യ വ്യവ ഹാരത്തിന്റെ അധീശത്വം മൂന്നു തലങ്ങളിൽ പ്രകടമാണ്: കൊളോ ണിയൽ കാലഘട്ടത്തിലെ നിയമവ്യവസ്ഥിതിയിൽ, 19-ാം നൂറ്റാണ്ടിൽ തെക്കേ അമേരിക്കൻ ഭൂഖണ്ഡത്തിലാകമാനം ഉണ്ടായിരുന്ന അനേകം ശാസ്ത്രജ്ഞന്മാരുടെ വൈജ്ഞാനിക വ്യവഹാരങ്ങളിൽ, ലാറ്റിൻ അമേ രിക്കയുടെ സാംസ്കാരിക സവിശേഷതകളുടെ വ്യാഖ്യാനം ചമയ് ക്കുന്ന നരവംശ ശാസ്ത്രപരമായ വ്യവഹാരങ്ങളിൽ"[11].

അക്ഷരനഗരം

കൊളോണിയൽ ഭരണകാലത്ത് ലാറ്റിൻ അമേരിക്കയിലെ നഗര ങ്ങൾ പണിതുയർത്തിയത് പാശ്ചാത്യമായ മാതൃകാവ്യവസ്ഥിതി രൂപീ കരിക്കുവാനും പ്രതിഫലിപ്പിക്കുവാനും അതുവഴി ലാറ്റിൻ അമേരി ക്കൻ ജനതയ്ക്ക് സ്പാനിഷ് രാജവംശത്തോടും കത്തോലിക്കാസഭ യോടും ആഭിമുഖ്യം ഉളവാക്കുവാനും ആണെന്ന് *The Lettered City* യിൽ ആൻഹൽ റാമ വാദിക്കുന്നു. കൊളോണിയൽ നഗരത്തിന്റെ ഘടന "മനുഷ്യമനസ്സിന്റെ സൃഷ്ടിയും സാമൂഹികവ്യവസ്ഥയുടെ പ്രതി ഫലനവുമാണെന്ന്"[12] അദ്ദേഹം പറയുന്നു. പക്ഷേ ഈ സാമൂഹിക വ്യവസ്ഥ എഴുത്തിലൂടെയാണ് നിർമിച്ചെടുത്ത്. ഔദ്യോഗിക പദ വിയുള്ള അക്ഷരാഭ്യാസം സിദ്ധിച്ചവർ(*letrados*-lettered men) അടി ച്ചേൽപ്പിച്ച ശ്രേണീബദ്ധമായ സാമൂഹികവ്യവസ്ഥ ബഹുഭൂരിപക്ഷം പൗരന്മാരെയും- തദ്ദേശീയരും നിരക്ഷരുമായവരെ-പൊതുമണ്ഡല ത്തിൽ നിന്നും ഒഴിവാക്കി. അതിലൂടെ പൊതുഇടങ്ങളുടെ വിനിയോഗം നിർണയിക്കുന്നതിലും രാഷ്ട്രത്തിന്റെ ദിശ നിർണയിക്കുന്നതിലും അവർക്ക് യാതൊരു പങ്കും ഇല്ലാതെ വന്നു. ഇത് ലാറ്റിൻ അമേരിക്ക യിൽ ആകമാനം "ഏകശിലാരൂപമായ ഭരണവർഗ്ഗത്തിന്റെ അധികാ രത്തെ അഭിമുഖീകരിച്ച വ്യക്തിയുടെ നിസ്സഹായത രൂക്ഷമാക്കി"[13].

എഴുത്തിലൂടെ ഉരുത്തിരിയുന്ന നഗരം മറ്റെല്ലാ വ്യവസ്ഥകളെയും അപ്രസക്തമാക്കി. പക്ഷേ അത് ഏകശിലാരൂപമായ ഒരു സങ്കൽപ്പന മല്ല. ആധുനികതയും കൊളോണിയൽ വ്യവസ്ഥിതിയും സാർവദേശീ യതയുമെല്ലാം അതിന് നിറം കൊടുക്കുന്നു. എഴുത്തും നഗരവൽക്കര ണവും ഭരണകൂടവുംതമ്മിലുള്ള പാരസ്പര്യം സാംസ്കാരിക അധി നിവേശത്തെ എങ്ങനെയാണ് ബലപ്പെടുത്തുന്നതെന്ന് റാമ വിശദീക രിക്കുന്നു. അധിനിവേശകരുടെ നഗരനിർമിതിയിൽ അക്ഷരസംസ്കാരം (lettered culture) വെറും അക്ഷരാഭ്യാസമല്ല. മറിച്ച്, ഭാഷയെ അല്ലെ ങ്കിൽ എഴുത്തിനെ വിജ്ഞാപനങ്ങളിലൂടെയും റിപ്പോർട്ടുകളിലൂടെയും ഔദ്യോഗിക രേഖകളിലൂടെയും സാമ്രാജ്യത്വത്തെ നിലനിർത്തുവാ

നുള്ള ബോധപൂർവമായ ശ്രമമാണ്. ഇന്ന് ഈ എഴുത്തുകൾ ആർക്കൈ വുകളിലെ കൊളോണിയൽ സ്മരണകളായി അവശേഷിക്കുന്നു.

അക്ഷരനഗരത്തിൽ (lettered city) എഴുത്ത് ദൈനംദിനചര്യയാ കുന്നു. ഭരണപരവും നിയമപരവുമായ രേഖകൾ, കോളനിയും മാതൃ രാജ്യവുമായി നടന്ന ആശയവിനിമയങ്ങൾ, ജനനവും മരണവും വിവാ ഹവും സൂചിപ്പിക്കുന്ന സഭാരേഖകൾ, സ്വകാര്യ കത്തിടപാടുകൾ എന്നി വയെല്ലാം ഇതിൽ ഉൾപ്പെടുന്നു. 1880 മുതൽ 1920 വരെയുള്ള കാലഘ ട്ടമാണ് റാമ സൂക്ഷ്മമായി പരിശോധിക്കുന്നത്. ഇക്കാലയളവിൽ അക്ഷരനഗരം ഗ്രാമങ്ങളിലേക്കു പടരുകയും ഗ്രാമദൃശ്യങ്ങളെയും നാടോടി സംസ്കാരത്തിന്റെ വാമൊഴി വഴക്കങ്ങളെയും രേഖപ്പെടു ത്തി അവയെ കൊളോണിയൽ സംസ്കാരത്തിന്റെ ഭാഗമാക്കുവാൻ ശ്രമിച്ചു. അങ്ങനെ അക്ഷരനഗരം ജനപ്രിയ സംസ്കാരരൂപങ്ങളെ വിക ലമാക്കി അവയുടെമേൽ അധീശത്വംനേടുകയും ചെയ്തു. ലാറ്റിൻ അമേ രിക്കൻ സാഹിത്യത്തിലെ വിസ്മയവൽക്കരണവും (exoticization) ഈ പ്രക്രിയയുടെ പ്രതിഫലനമാണ്.

കൊളോണിയൽ ആധിപത്യത്തിന്റെ ആരംഭത്തിൽ അക്ഷര സംസ്കാരം നേടിയവരുടെ (letrados) എണ്ണം പരിമിതമായിരുന്നു. അവരെല്ലാം വെളുത്ത വർഗക്കാരായ പുരുഷൻമാരും ഭരണകൂടത്തിന്റെ ഭാഗവുമായിരുന്നു. പക്ഷേ ക്രമേണ വിദ്യാഭ്യാസം വ്യാപകമാകുകയും എല്ലാം വംശജരും കൊളോണിയൽ ഭരണകൂടത്തിന്റെ ഘടകങ്ങളായ തോടെ അക്ഷരനഗരം അതിരുകൾ തിരിച്ചറിയാനാകാത്ത ഒരു സങ്കൽപ്പനമായി മാറി. അതിൽ ആരെല്ലാം ഉൾപ്പെടുന്നുവെന്നത് സന്ദി ഗ്ധമായ ഒരു പ്രശ്നവുമായി. നഗരം/ഗ്രാമം, അകം/പുറം എന്നീ ദ്വന്ദ ങ്ങളെ ആശ്രയിച്ചിരുന്ന ഈ സങ്കൽപ്പനത്തിന്റെ സുനിശ്ചിതത്വം അ തോടെ നഷ്ടമായി. പക്ഷേ ഈ സങ്കൽപ്പനം ഉളവാക്കിയ സാമൂഹിക ശ്രേണി നിലനിൽക്കുകയും ചെയ്തു.

ആദർശനഗരം അല്ലെങ്കിൽ മാതൃകാനഗരം എന്ന പാശ്ചാത്യ സ്വപ്നം യാഥാർഥ്യമാക്കി മാറ്റുവാൻ അനുയോജ്യമായ ഇടമായി ലാറ്റിൻ അമേരിക്കൻ രാജ്യങ്ങൾ മാറി. അങ്ങനെ കൊളോണിയൽ യുക്തി ബോധത്തിന്റെയും വ്യവസ്ഥിതിയുടെയും പ്രതിഫലനമായി ലാറ്റിൻ അമേരിക്ക. നഗരത്തിന്റെ ക്രമനിബദ്ധതയ്ക്കു സമാനമായി വ്യവഹാ രങ്ങളുടെ ക്രമനിബദ്ധത ഉയർന്നു വന്നു. *The Order of Things*-ൽ മിഷേൽ ഫൂക്കോ അവതരിപ്പിച്ച ജ്ഞാനിമം (episteme) എന്ന സങ്ക ൽപ്പനത്തെ അടിസ്ഥാനപ്പെടുത്തിയാണ് റാമ ലാറ്റിൻ അമേരിക്കയിലെ കൊളോണിയൽ അധികാര വ്യവഹാരം വികാസംകൊണ്ടതിന്റെ രൂപ രേഖ തയ്യാറാക്കുന്നത്. ഫൂക്കോ നിരീക്ഷിച്ചതുപോലെ ക്ലാസിക്കൽ ജ്ഞാനിമം സാധ്യമാക്കിയത് അതിന് ക്രമനിബദ്ധതയുടെ ജ്ഞാനിമ വുമായുള്ള അനിവാര്യമായ ബന്ധമാമെന്ന് റാമ പറയുന്നു¹⁴. റാമയെ സംബന്ധിച്ചിടത്തോളം ഈ ബന്ധം സ്പാനിഷ് അമേരിക്കൻ ബാരക്ക് (Baroque) പാരമ്പര്യത്തിന്റെ സവിശേഷതയും അതിലൂടെ പാശ്ചാത്യ

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കെ. ജീവൻ കുമാർ
ലാറ്റിൻ അമേരിക്കൻ
സാഹിത്യത്തിന്റെ
സൈദ്ധാന്തിക...

മലയാളം റിസർച്ച് ജേണൽ
വാല്യം 9, ലക്കം 3
സെപ്റ്റംബർ-ഡിസംബർ 2016

നാഗരികതയുടെ ലാറ്റിൻ അമേരിക്കയിലേക്കുള്ള കടന്നു കയറ്റവും ആകുന്നു.

സ്പാനിഷ്–അമേരിക്കൻ നഗരങ്ങളും അവയിൽ അധിവസിക്കു വാനുള്ള സമൂഹവും അവയുടെ അക്ഷരജ്ഞാനമുള്ള വ്യാഖ്യാതാ ക്കളും (lettered interpreters) ഒരേ സമയം ഉടലെടുത്തു. അതോടൊപ്പം സാമൂഹിക ശ്രേണിക്ക് അനുസൃതമായ നാഗരിക ഇടങ്ങളും ശ്രേണീ ബദ്ധതയും നിലവിൽ വന്നു. പക്ഷേ മാതൃകാനഗരം എന്ന സങ്കൽപ്പ നവും യഥാർഥ നഗരങ്ങളുംതമ്മിലുള്ള പൊരുത്തമില്ലായ്മ ചിഹ്നങ്ങ ളും വസ്തുക്കളുംതമ്മിൽ പാശ്ചാത്യ സംസ്കാരത്തിൽ പ്രകടമായ വിച്ഛേദത്തിന്റെ പ്രതിഫലമാണെന്നും റാമ പറയുന്നു[15].

അക്ഷരജ്ഞാനമുള്ള സംസ്കാരസമ്പന്നരായ ഉപരിവർഗം എങ്ങ നെ രൂപപ്പെട്ടുവെന്നു വിശദീകരിക്കുന്നതിനോടൊപ്പം പാശ്ചാത്യ സാഹിത്യത്തിലെ മുഖ്യധാരയായി വർത്തിക്കുന്ന പ്രാമാണിക ഗ്രന്ഥ സമുച്ചയരൂപീകരണത്തിന് വിരുദ്ധമായി ലാറ്റിൻ അമേരിക്കയിൽ പ്രക ടമാകുന്ന എതിർപ്പിന്റെ സ്വരങ്ങളെ അടയാളപ്പെടുത്തുകയും ചെയ്യുന്നു റാമയുടെ അക്ഷരനഗരം. റൊമാൻ ഡി ലാ കാംപ പറയുന്ന പ്രകാരം റാമയുടെ കൃതി "ലാറ്റിൻ അമേരിക്കൻ സാംസ്കാരികചരിത്രത്തിലെ പ്രാന്തങ്ങളുടെയും പരിശിഷ്ടങ്ങളുടെയും അവശിഷ്ടങ്ങളുടെയും സാധ്യതകൾ ആരായുക"[16]കൂടി ചെയ്യുന്നു.

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Modification of the electrical, optical and thermal properties of L-Arginine Perchlorate single crystals by 5 kGy and 8 kGy electron beam irradiation for optoelectronic devices

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Prince Thomas [a], R. Santhosh Kumar [b], G. Sreekanth [c], Bitto John [a], Ganesh Sanjeev [d], Ginson P. Joseph [a],*

[a] Department of Physics, St.Thomas College, Palai, Kottayam, Kerala 686574, India
[b] Department of Physics, St. George's College, Aruvithura, Kottayam, Kerala 686122, India
[c] Department of Basic Sciences and Humanities, Mangalam College of Engineering, Ettumanoor, Kottayam, Kerala 686631, India
[d] Microtron Centre, Department of Physics, Mangalore University, Mangalagangotri, Karnataka 574 199, India

ABSTRACT

This paper attempts to elucidate the effect of 5 kGy and 8 kGy electron irradiation on the optical, thermal and electrical properties of a prominent amino acid crystal, L-Arginine Perchlorate (LAPCl) grown by low-temperature solution growth technique. Optical absorption studies revealed that the UV lower cut-off wavelength shift towards the higher wavelength region (Red shift), the optical band gap of LAPCl were found to be decreasing while the Urbach energy was found to be increasing with increasing the dosage of irradiation. Fourier Transform Infrared (FT-IR) spectroscopic result showed that peak intensities corresponding to typical bonding increase with the increase in electron beam irradiation dosage. Electrical studies revealed that the dielectric constant, loss and conductivity of the sample increases with increasing the dosage of irradiation. The behaviour of electrical properties on temperature and thermal properties has also been investigated.

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1. Introduction

In this era of information and communication technology, scientists are very much attracted towards the developments in nonlinear optical (NLO) materials due to its potential applications in the field of optical modulation, optical switching, frequency shifting and optical data storage [1,2]. Among the NLO crystals, amino acid family crystals much-attracted crystal growers since these crystals have the advantages of high optical nonlinearity of organics and flattering physico-chemical properties of inorganic solids. The chiral carbon atom, the proton donor carboxyl group (–COOH) and the proton acceptor amino group (NH$_2$) present in the amino acid family crystals aids them to crystallize in noncentrosymmetric space group and makes them suitable for NLO applications [2]. Semi organic amino acid complex single crystals possess enhanced physico-chemical properties compared to the amino acid single crystals in its pristine form. L-Arginine

Perchlorate (LAPCl) is a prominent semi organic nonlinear optical crystal belongs to the LAP family, having all the above-mentioned properties. LAPCl crystallizes in the orthorhombic crystal system with noncentrosymmetric space group P2$_1$2$_1$2$_1$ [3,4]. The growth of large size single crystals of LAPCl and a few physical properties were studied and reported by Tapati Mallik and Tanusree Kar [5]. L-Arginine Phosphate (LAP) and its chemical analogues were firstly studied by Monaco et al. [6].

Physical properties of a solid material can be altered by irradiating it with electron beams of suitable energy [7]. Organic solids are sensitive to the energy deposited in their electronic system through irradiation. Electrons do not cause impurity production directly but they can cause impurity production indirectly through chemical bond breakage. These impurities in a crystal can alter its electrical and mechanical properties [8]. Previous studies show that electron beam with MeV range of energy can induce defects in crystals [9–11]. The shift of the optical absorption edge towards the longer wavelength region was observed in some semi organic crystals upon electron beam irradiation. The reduction in band gap and the changes in dielectric properties with graded dosages of electron beam were also observed in some semi organic single crystals [12,13].

From the literature survey, we came to know that many amino acids have already been reported to have NLO property. But a very few works have been reported on the effect of electron irradiation on the physico-chemical properties of the amino acids crystal. Hence in this paper, attempts have been made to investigate the effect of electron irradiation on the electrical, thermal and optical properties of the L-Arginine Perchlorate (LAPCl) for the first time.

2. Experimental procedure

L-Arginine Perchlorate (LAPCl) was synthesized by slow solvent evaporation technique using the reagents L-Arginine (Lobachemie) and Perchloric acid (Merck) in the stoichiometric ratio of 1:1. The chemical reaction between L-Arginine and Perchloric acid is as follows.

$$NH_2CNHNH(CH_2)_3CHNH_2COOH + HClO_4$$
$$\rightarrow NH_2CNH_2^+NH(NH_2)_3CHNH_3^+COO^-, ClO_4^-$$
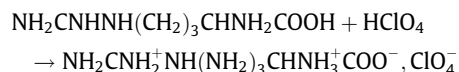
L-Arginine was added to the perchloric acid dissolved in Millipore water (18.2 MΩ.cm at 25 °C) slowly. The mixed reactants were stirred at room temperature for two hours to get a homogeneous mixture. Then the solution was filtered and transferred into a beaker with perforated lid. The pH of the solution was maintained to 3. Transparent tiny crystals were formed with in a period of 5–6 days and defect free crystals were taken as seed crystals for growing bulk crystals. Transparent crystals having dimension $20 \times 5 \times 3$ mm^3 were harvested after 3 weeks. The photograph of as grown crystal of LAPCl is shown in Fig. 1.

Good transparent crystals having various dimensions were chosen and exposed to 8 MeV electron beams produced in Microtron having beam current-50 mA (max), beam size-3 mm $\times$ 5 mm, pulse repetition rate-250 Hz (max), pulse width-2.5 μs, microwave source-Magnetron, Magnetron power-2 MW, operating frequency-2998 MHz and dosage rate at 30 cm is 2 kGy/min (max) [8]. The irradiation was carried out with two different dosages of 5 kGy and 8 kGy at room temperature. The LAPCl samples were sealed in thin transparent polyethene bags and placed at a distance of 30cm from the beam exit port. The pristine and electron beam irradiated LAPCl samples were subjected to FT-IR and UV–VIS spectroscopic studies. The FT-IR spectra of the samples were recorded using Shimadzu IRAffinity-1S FT-IR spectrometer in the wavenumber range 400–4000cm^{-1}. The UV–Vis studies were conducted within the spectral range 200–700 nm using Shimadzu UV-1800 spectrophotometer and the absorption spectra were recorded. Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC) of the samples were carried out simultaneously by using PerkinElmer STA 6000 Simultaneous Thermal Analyser. Dielectric measurements were conducted with the help of HIOKI 3532-50 LCR HiTESTER and current conduction through the sample was measured using Kiethley 6485 picoammeter.
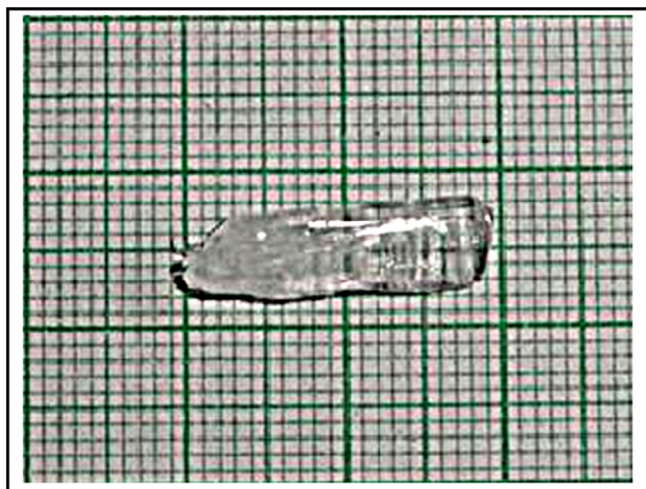
3. Results and discussion

3.1. Optical properties

The chemical changes due to electron beam irradiation were identified by comparing the FT-IR spectrograms of the irradiated samples with the pristine and the same is illustrated in Fig. 2. The absorption peaks observed at 3481 cm^{-1}, 3473 cm^{-1} and 3470 cm^{-1} for pristine, 5 kGy and 8 kGy respectively are attributed to O–H stretching vibration [4]. From the spectrogram, it is also clear that the intensity of this peak increases with increase in the dosage of the electron beam. The NH$_3^+$ symmetrical bending peak at 1487 cm^{-1}, CH$_2$ wagging at 1323 cm^{-1} and –COO$^-$ stretching at 1265 cm^{-1} were found to be increased with increase in the dosage of the electron irradiation. The area of the peaks at 2014 cm^{-1} and 1679 cm^{-1} were found to be increasing with irradiation dosage as compared to unirradiated sample. This may be due to the enhancement in the bond order of the pristine crystals due to irradiation. The chemical composition of the crystal doesn't change on irradiation but the presence of some minor changes in the absorption peaks are due to the increasing amorphous nature of the sample with increasing irradiation dosage. The list of peak assignments and their changes due to EB irradiation are tabulated and presented in Table 1.

The absorption spectra of irradiated and unirradiated LAPCl single crystals were recorded in the range of 200–700 nm, which is shown in Fig. 3. No absorption is seen above 240 nm and there is a large transmission window between 240 nm and 700 nm. It is an important quality for a good NLO material [14]. The unirradiated LAPCl single crystal shows its characteristic absorption peak at about 227 nm, which is almost similar to the reported value [5]. It can be seen from the graph that the absorption edge of the irradiated LAPCl crystals show a small shift towards the longer wavelength region (red shift) with increasing dosage (Fig. 3) which indicates the decrement in the bandgap.

Fig. 1. Photograph of as grown crystal of LAPCl.
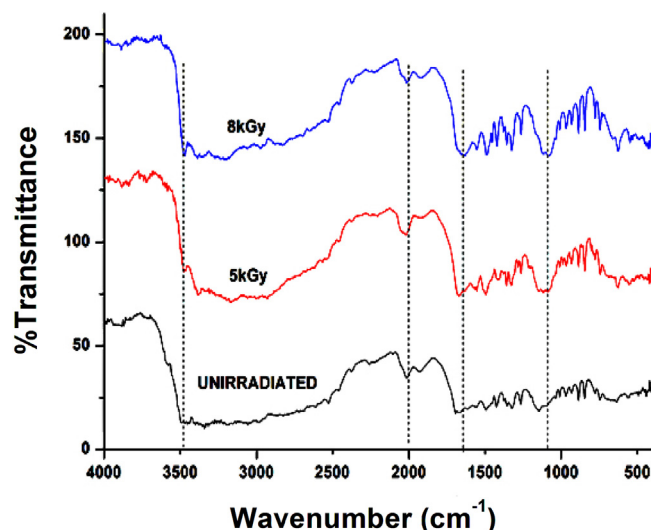
Fig. 2. FT-IR spectra of LAPCl and electron beam irradiated LAPCl single crystals.

Table 1
Comparison of the FT-IR spectral data of pristine with irradiated LAPCl single crystals.

WAVENUMBERS (cm^{-1})			ASSIGNMENT
Pristine Sample	IRRADIATED		
	5 kGy	8 kGy	
3481.3765	3473.8950	3470.2322	O—H stretching vibration
2014.2099	2017.1714	2015.8660	Combination of NH$_3^+$ torsional oscillation and its symmetrical bending
1679.9403	1677.4270	1677.5828	C=O stretch of —COO$^-$
1487.3314	1492.7672	1493.5855	NH$_3^+$ symmetrical bending
1323.0314	1325.3499	1327.3177	CH$_2$ wagging
1265.6345	1263.7447	1263.4329	—COO$^-$ stretching
637.8341	627.0405	626.4950	O—H out-of-plane deformation, —ClO$_4^-$ vibration

Fig. 4. Plot of extinction coefficient (K) versus absorption coefficient (α) for pure and irradiated LAPCl single crystals.

Fig. 3. Absorption spectra of unirradiated and EB irradiated LAPCl single crystals.

Fig. 5. Plot of $(\alpha h\nu)^2$ versus hν for unirradiated and EB irradiated LAPCl single crystals.

The linear absorption coefficient, α is calculated using the relation [15]

$$\alpha = \frac{(2.303 * A)}{t} \tag{1}$$

where 'A' is the absorbance measured and 't' is the thickness of the sample. The amount of attenuation of photon energy (hν) through the material can be understood by calculating the extinction coefficient, K using the relation [16]

$$K = \frac{\alpha\lambda}{4\pi} \tag{2}$$

where 'λ' is the wavelength used.

Fig. 4 depicts the variation of extinction coefficient as a function of absorption coefficient. The extinction coefficient is directly related to the absorption coefficient and the internal efficiency of the optical device depends on absorption coefficient [17]. From the graph, it is seen that the extinction coefficient exhibits almost same behaviour with a slight variation with electron beam irradiation.

The optical band gap of the material is determined by applying the Tauc's model and Davis and Mott model [18,19]. The variation of $(\alpha h\nu)^2$ versus photon energy (hν) in the fundamental absorption region is plotted for pure and irradiated samples and the energy

band gap Eg is determined by extrapolating the linear portion of the plot. From Fig. 5 one can easily be seen that the band gap of LAPCl decreases with increase in the dosages of the electron beam. The band gap of the pure, 5 kGy and 8 kGy dossed LAPCl crystals are 5.56 eV, 5.42 eV and 5.39 eV respectively. The electron irradiation induced defects in the LAPCl sample caused to increase the width of localized states, which led to the reduction in the band gap of the material [20]. A similar type of behaviour has also been seen in the iminodiacetic acid doped ferroelectric triglycine sulphate crystals and L-Threonine single crystals [9,13].

The defects caused by the irradiation on the LAPCl samples are estimated by calculating Urbach energy of unirradiated and irradiated samples. The exponential nature of the absorption coefficient near the band edge can be understood from the Urbach energy calculation. The Urbach rule can be expressed as,

$$\alpha = \alpha_0 e^{\frac{h\nu}{E_u}} \tag{3}$$

where 'α_0' is the characteristic crystal parameter, 'hν' is the incident photon energy and 'E_u' is the Urbach energy, which is the width of
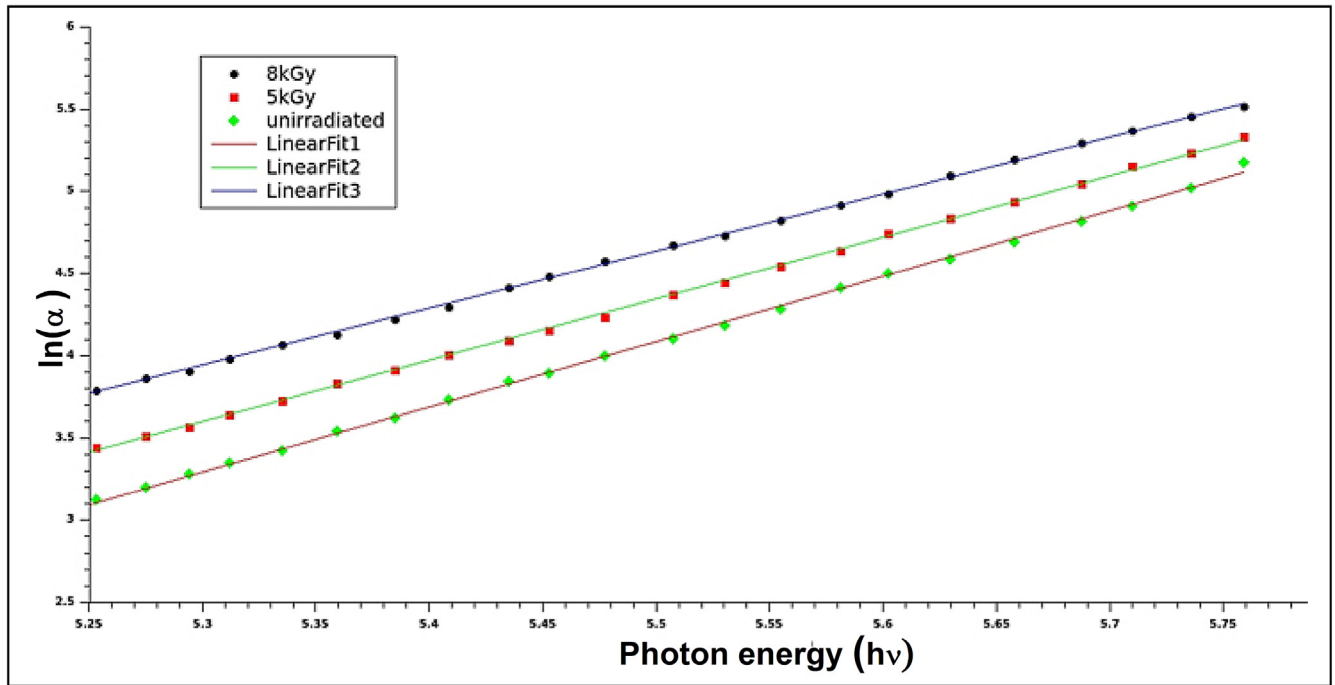
Fig. 6. Plot of ln(α) versus hν for unirradiated and EB irradiated LAPCl single crystals.

Table 2
Cut-off wavelength, energy band gap and Urbach energy for unirradiated and EB irradiated LAPCl single crystals.

LAPCl Sample	Cut-off wavelength (nm)	Bandgap energy, E_g (eV)	Urbach energy, E_u (meV)
Unirradiated	227	5.56	252
Irradiated (5 kGy)	229	5.42	268
Irradiated (8 kGy)	232	5.39	289

Fig. 8. TGA curves of unirradiated and EB irradiated LAPCl single crystals.
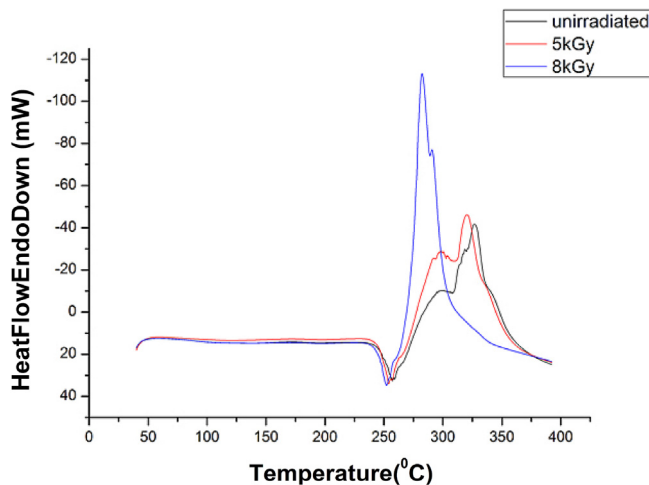
Fig. 7. DSC thermograms of unirradiated and EB irradiated LAPCl single crystals.

the tail states in the band gap associated with the structural defects and disorders within the crystal [21]. The Urbach energy is calculated by plotting ln(α) as a function of photon energy (hν) and it is illustrated in Fig. 6. The reciprocal of the slope of the straight line fit of the liner portion below the optical band gap gives the Urbach
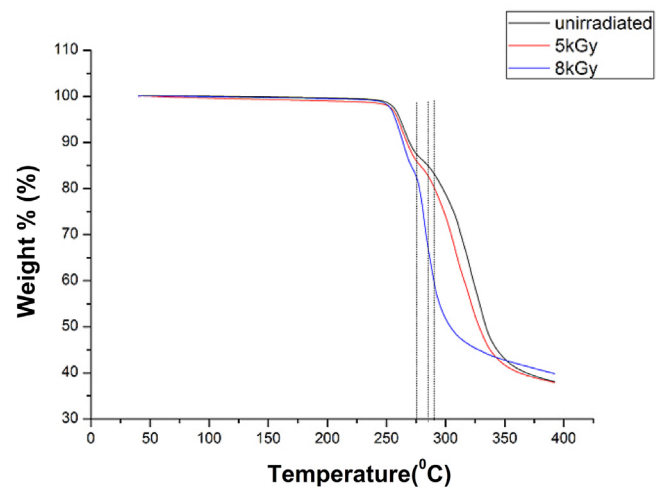
energy. The defect band states create a band tail on both sides of the valence band maximum and conduction band minimum. The measure of the width of the defect bands formed is the value of the Urbach energy [22]. The Urbach energy found to be increased with the increase in the dosage of the electron beam, and it is due to the increase in defect concentration made by the high energy electron beam irradiation.

The calculated values of cut-off wavelength, band gap and Urbach energy are listed in Table 2. These obtained results can be explained that the passage of the high energy electron beam through the crystal led to the displacement of atoms from their usual lattice sites. During the passage of electron beams through the crystal, there is the possibility of the liberated electrons being trapped at various lattice imperfections which may cause permanent changes in the specific properties of the crystal [23]. Generation of free

Table 3
Values of decomposition temperature of unirradiated and EB irradiated LAPCl single crystals.

LAPCl Sample	Initial decomposition temperature in °C	Decomposition temperature (2nd step) in °C
Unirradiated	257	290
Irradiated (5 kGy)	254	285
Irradiated (8 kGy)	251	275

radicals is expected due to the breakage of chemical bonds by electron beam irradiation. Due to these internal perturbations in the crystal structure made by irradiation, a slight shift can be seen in the cut-off wavelength towards the longer wavelength region (red shift) [24]. The electron irradiation induced defects in the LAPCl sample caused to increase the width of localized states, which led to the reduction in the band gap of the material [20]. The defect band states create a band tail on both sides of the valence band maximum and conduction band minimum. The measure of the width of the defect bands formed is the value of the Urbach energy [22]. From the table, it is clear that the Urbach energy increases in increasing the dosage of electron irradiation and it is due to the increase in defect concentration made by the high energy electron irradiation.

3.2. Thermal studies

The Thermo Gravimetric Analysis (TGA) – and Differential Scanning Calorimetry (DSC) were carried out between 40 °C to 400 °C in nitrogen atmosphere. The heating rate employed was 10 °C/min. DSC trace (Fig. 7) shows a small endothermic peak followed by

an exothermic peak. The endothermic peak present at 257 °C corresponds to the first decomposition temperature of pristine whereas for irradiated crystals as expected there is a slight decrement in the value. It is evident from the DSC traces that the decomposition temperature of the LAPCl sample decreases with increase in irradiation dosages. This phenomenon is due to the reduction in the crystallinity of the sample and the increase in amorphousness with an increase in dosage. From the TGA trace, it is obvious that LAPCl single crystal exhibits almost bistaged decomposition (Fig. 8). The decomposition temperature of the second stage reduced with an increase in irradiation dosage as seen in the TGA plot. The results obtained in the thermal analysis are listed in Table 3.

3.3. Electrical studies

From the measured values of capacitance (C), the real part of dielectric constant (ε') can be calculated using the relation

$$\varepsilon' = \frac{Cd}{\varepsilon_0 A} \tag{4}$$

where 'd' is the thickness of the sample, 'ε_0' is the permittivity of free space and 'A' is the area of the sample.

Figs. 9 and 10 show the variation of ε' and Dielectric loss or loss tangent (tan δ) with frequency for the pristine and the irradiated LAPCl samples at room temperature. The ε' and dielectric loss decreases with increase in frequency. This is due to the inability of dipolar molecules to change their orientation with the increase in frequency. According to the Miller's rule, the decreasing nature of the dielectric constant at higher frequencies is a suitable parameter for the enhancement of nonlinear optical properties of the
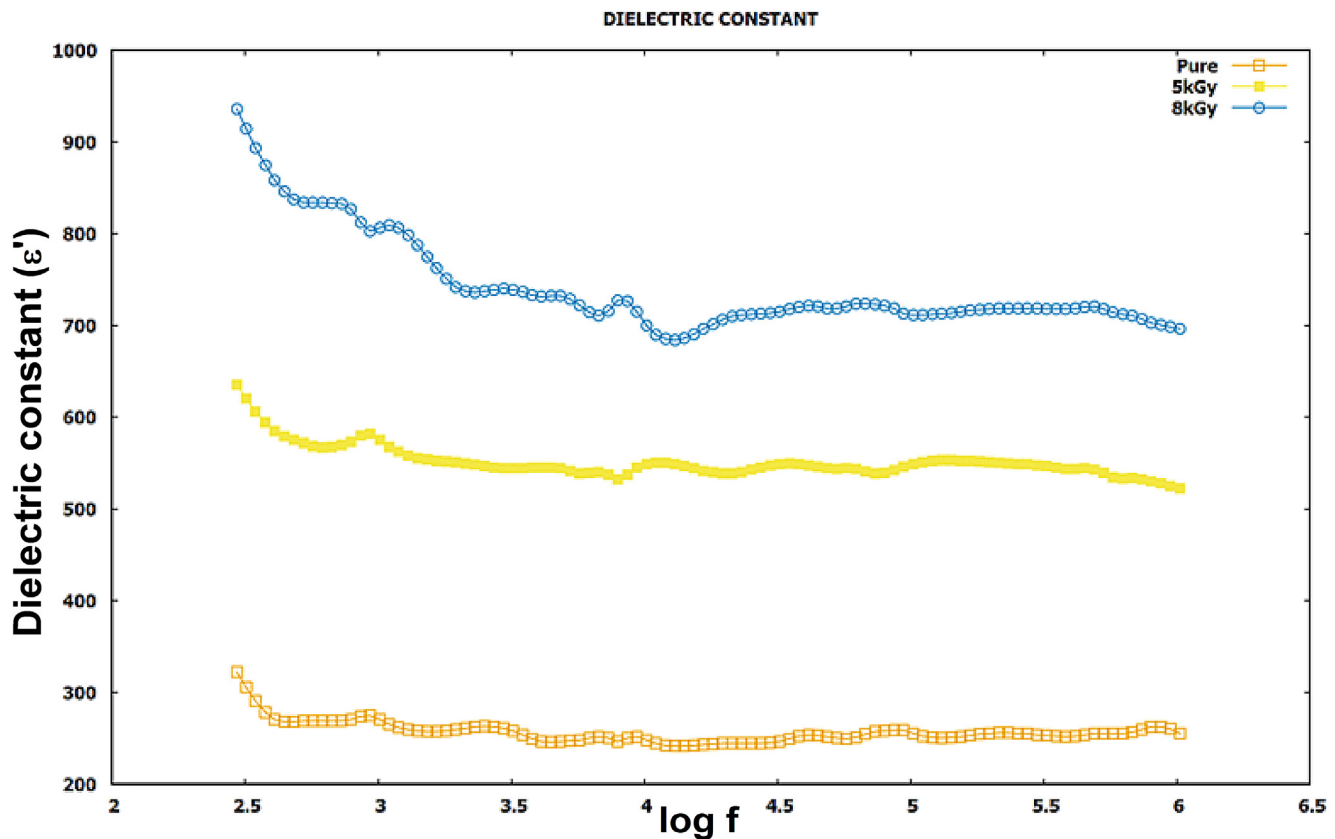
Fig. 9. Effect of EB irradiation on dielectric constant as a function of frequency.
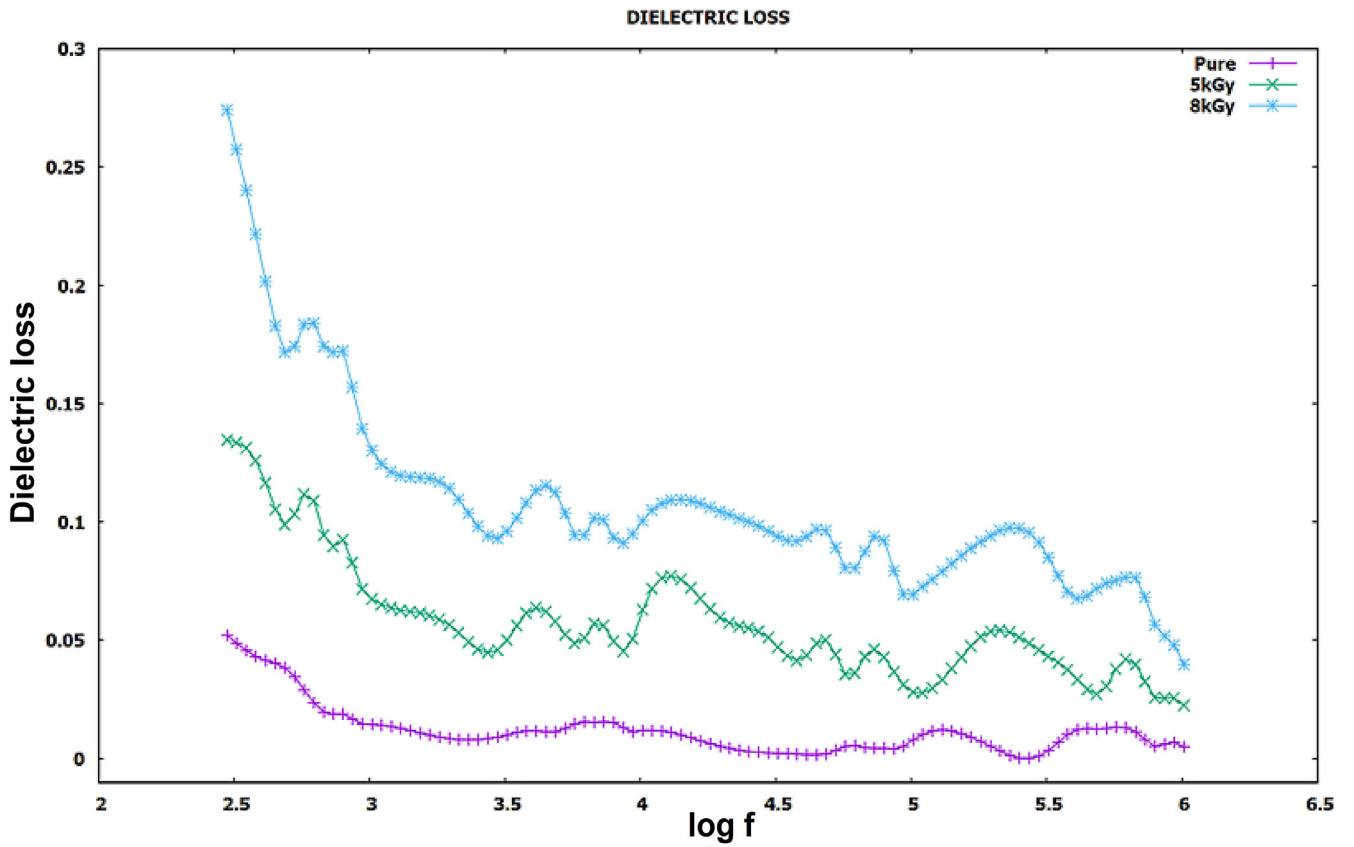
Fig. 10. Effect of EB irradiation on dielectric loss as a function of frequency.
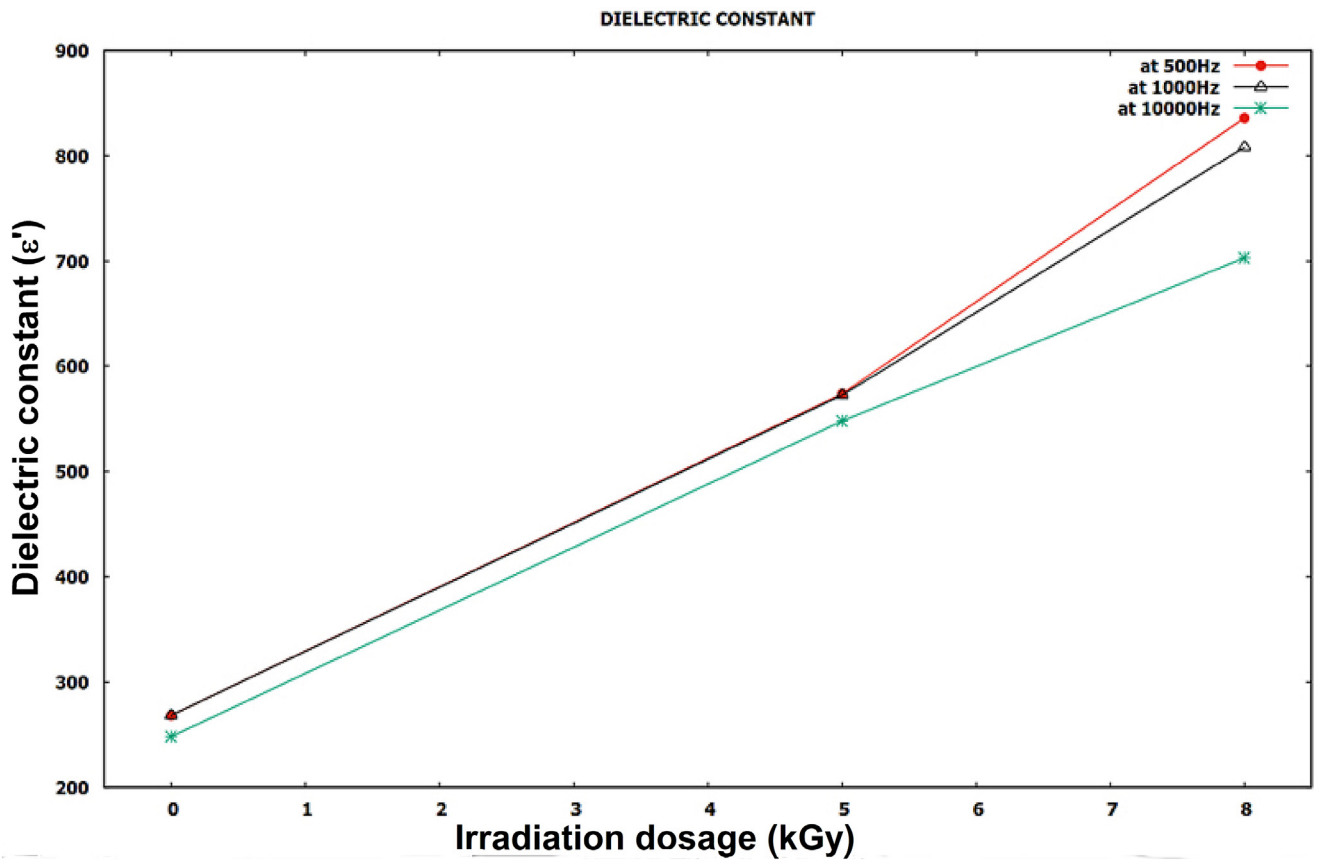
Fig. 11. Irradiation dosage Vs dielectric constant at different frequencies.
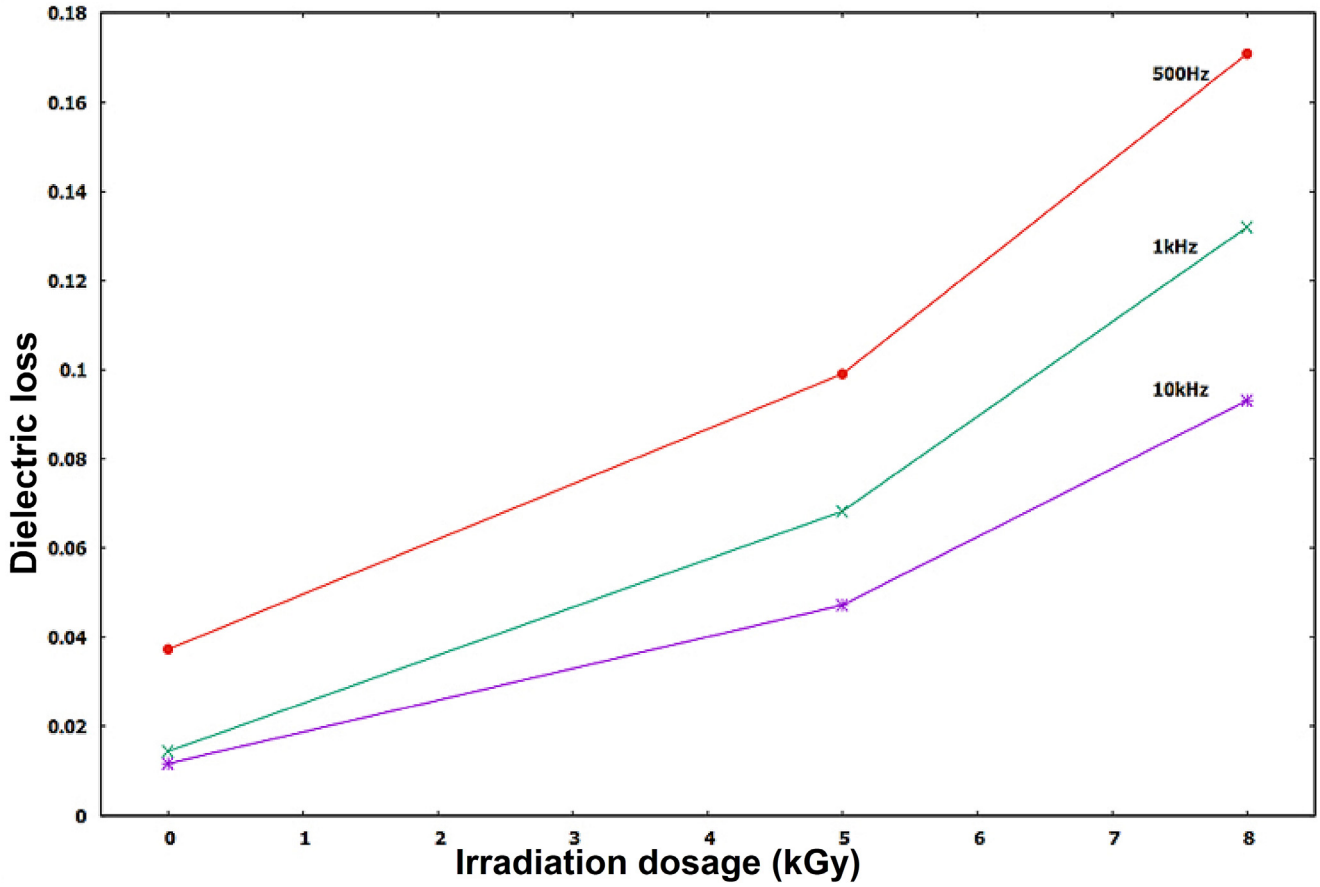
Fig. 12. Irradiation dosage Vs dielectric loss at different frequencies.
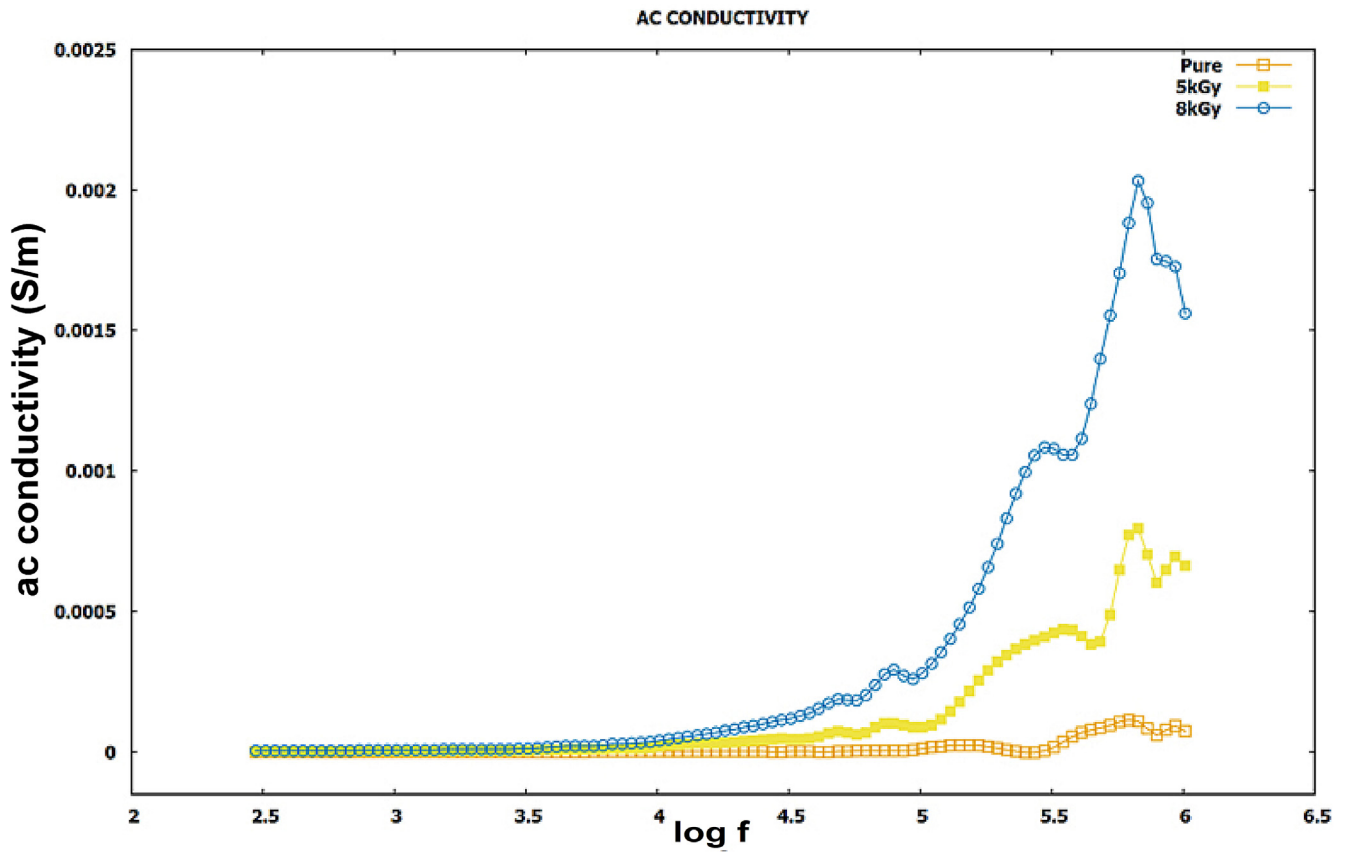
Fig. 13. Effect of EB irradiation on ac conductivity as a function of frequency.
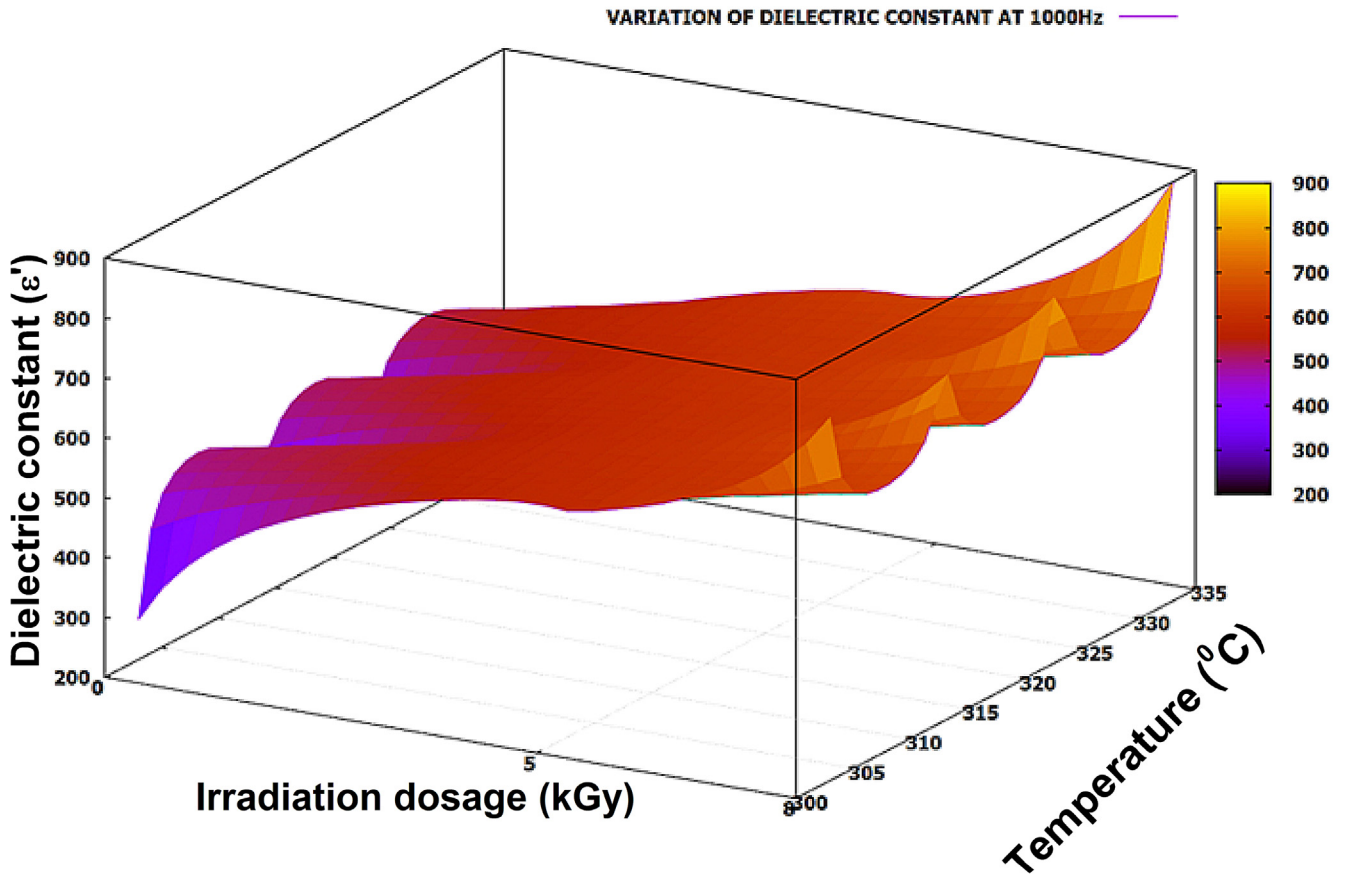
Fig. 14. Variation of dielectric constant with Irradiation dosage and Temperature for a fixed frequency.
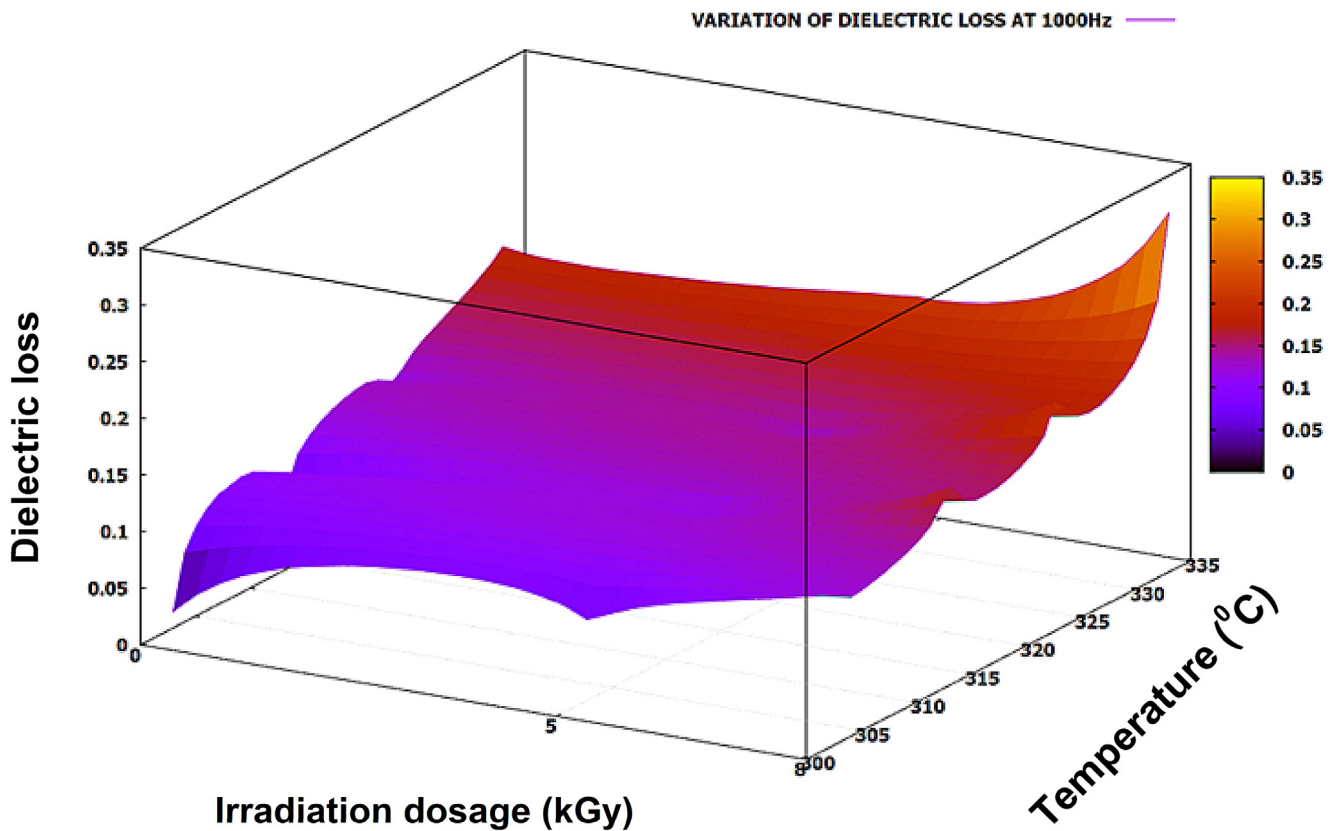
Fig. 15. Variation of dielectric loss with Irradiation dosage and Temperature for a fixed frequency.
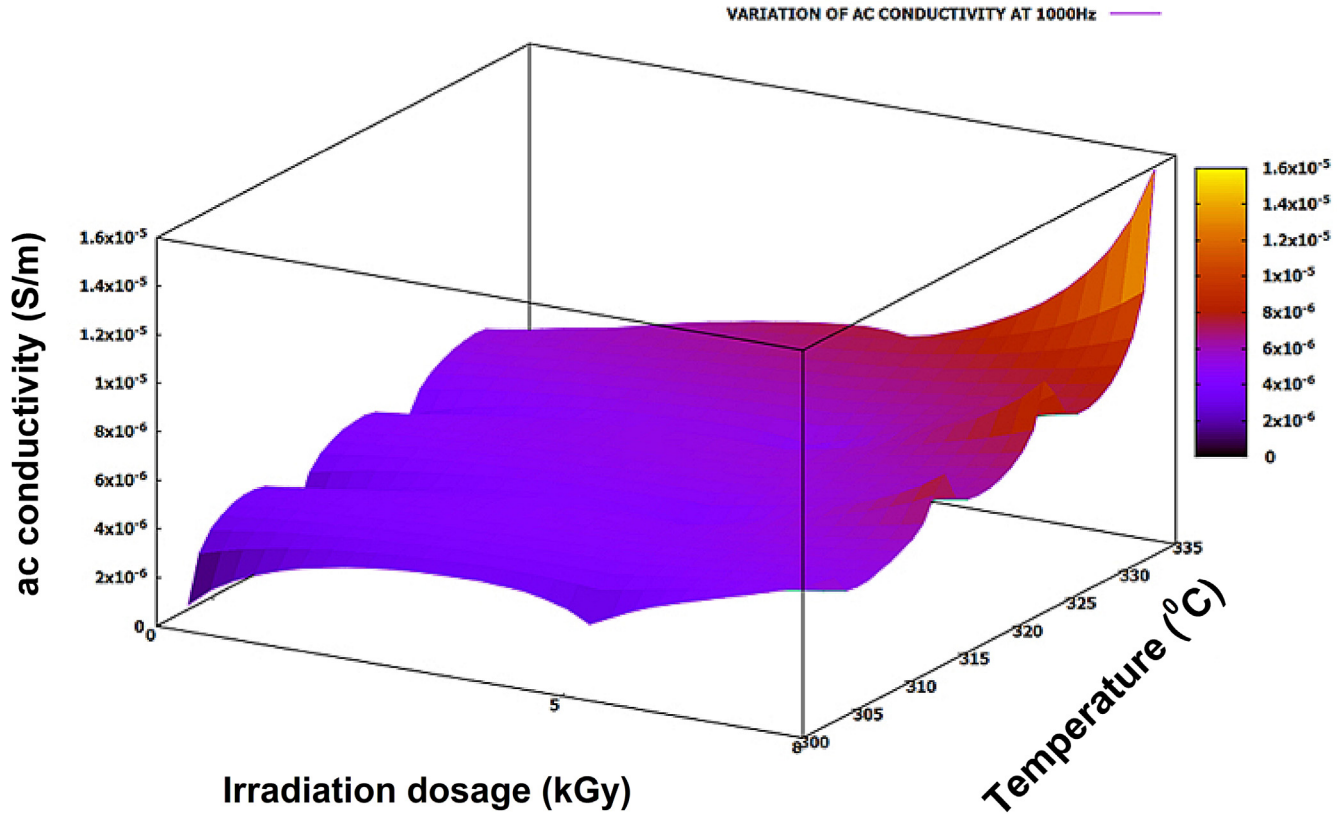
Fig. 16. Variation of ac conductivity with Irradiation dosage and Temperature for a fixed frequency.
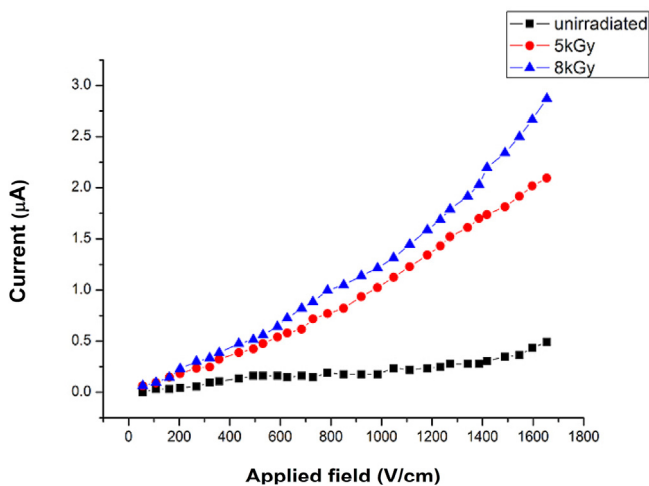
Fig. 17. Effect of EB irradiation on current conduction with applied field.

material [25]. Figs. 11 and 12 show the dielectric constant and dielectric loss of the LAPCl at a different frequency for different dosages and it is evident that the dielectric constant and dielectric loss enhanced by increasing the dosage of the electron beam. The values of dielectric constant at 10 kHz for 5 kGy and 8 kGy are 548 and 702 respectively.

The ac conductivity (σ_{ac}) of the crystal was calculated using the relation

$$\sigma_{ac} = 2\pi f \varepsilon_0 \varepsilon' \tan\delta \qquad (5)$$

where 'ε_0' is the permittivity of free space, 'ε'' is the dielectric constant, 'f' is the applied frequency and 'tanδ' is the loss tangent.

The plot of ac conductivity versus frequency for pristine and irradiated samples is shown in Fig. 13. It is evident from the plot that the conductivity increases with increase in frequency and irradiation dosage. At higher frequencies, the space charge polarization decreases and therefore the ε' decreases with increase in frequency while σ_{ac} increases with increase in frequency. The temperature dependence of the dielectric properties the LAPCl of irradiated and unirradiated samples are also shown in Figs. 14–16. The conductivity of the LAPCl crystals increases with increasing the dosage of the irradiation as well as the temperature. With Kiethly 6485 picoammeter, the increase in current due to the increase in the number of charge carriers was found out. Fig. 17 shows the effect of electron beam irradiation on the increase of charge carriers in the LAPCl sample. It is clearly seen from the plot that current increases with increase in irradiation dosage. The high energy electron beams cause the generation of free radicals and reduction in crystallinity of the material and enhancement of the amorphous regions which lead to the participation of more charge carriers in the conduction process [26,27].

4. Conclusion

LAPCl single crystals grown by slow evaporation technique were irradiated with 5 kGy and 8 kGy of electron beam from 8 MeV Microtron. The usefulness of an NLO material mainly depends on its conversion efficiency and optical transparency range. Above studies show that the absorption and thereby the optical transparency range can be changed considerably through the high energy EB irradiation. The change in the absorption coefficient leads to the shift in the band gap energy and corresponding Urbach energy change. The reduction in the value of bandgap energy and an increase in Urbach energy show that these irradia-

tion dosages are capable of making changes in the optical absorption character of the material. Fourier Transform Infrared spectra show an increase in intensities at 1487 cm^{-1}, 1323 cm^{-1} and 1265 cm^{-1} vibrations and a slight shift in wave numbers with increasing the irradiation dosage. As a component in an optical device as well as at the time of device fabrication, the material confronts to mechanical stress and high temperature. Hence studying the variation of the thermal properties with EB irradiation is also important. Thermal studies revealed that the reduction in crystallinity and increase in amorphousness of LAPCl crystal with irradiation dosage. Electrical properties such as dielectric constant, ac conductivity and current conduction of the material increase with irradiation dosage, indicates that the production of free radicals and increase the number of charge carriers in the material after irradiation. Thus Microtron induced changes in the optical, thermal and electrical properties may help material scientists to mould LAPCl crystals for optoelectronic device fabrication.

Acknowledgement

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Factors Influencing Customer Adoption of Mobile Banking Services With Special Reference To Ernakulam District

Ambily Jose[1], Dr. G.S. Gireesh Kumar[2], Dr. Roshna Varghese[3]

[1](Research Scholar, Bharathiar University, Coimbatore, India)
[2](Professor, Henry Baker College, Melukavu, India)
[3](Assistant Professor, Rajagiri College of Social Sciences, Cochin, India)

Abstract: *Mobile communication technologies provide immense additional scope for consumers' banking transactions due to their always-on functionality and the option to access bank's facilities anytime and anywhere. Mobile banking is a subset of electronic banking which underlies not only the determinants of the banking business but also the special conditions of mobile commerce. This study aims to analyse certain aspects of the customer adoption of mobile banking. A survey research was conducted among the 150 customers who are residing in Ernakulam District, by means of a questionnaire that was designed in a Likert scale format. Data analysis was carried out by use of regression and ANOVA to statistically produce the relationship between the independent and dependent variables. From the findings, the researcher concludes that the regression effect was statistically significant indicating a reliable prediction of the dependent variable. The study was significant to the banking sector since mobile banking is a phenomenon that has take off and can't be washed away.*

Keywords:
Anytime and anywhere, Customer adoption, Mobile banking.

I. Introduction

Banking is one of the most regulated industries in the world. The banks from both public and private sector, reached a remarkable position due to its high level of technology, core banking and aggressive marketing strategies. The latest technology had a major impact in banking service, that helped the customers to access their banks at anytime through Internet banking. However the biggest limitation of the internet banking is the requirement of a PC with an internet connection, not a big obstacle in developed countries, but definitely it is a barrier in a developing country like India. To overcome these limitations recent innovations in communications have enabled the launch of new access methods for banking services; one of these is mobile banking; whereby a customer interacts with bank via mobile device (Barnes & Corbitt, 2003). Mobile banking is a way for the customer to perform banking actions through mobile phone. It is a quite popular method of banking that fits in well with a busy, technologically oriented lifestyle.

The banking activities you can do in your cell phone depend on the banking institutions. Some banks offer the basic activities such as text alert, in which the customers will get a message alert in each of the activities like deposits, withdrawals using credit and ATM cards. The most involved type of mobile banking allows the users to log into his or her account from a cell phone, and they can do the activities like making payments, checking balances, transferring money between accounts, notifying the bank of a lost or stolen credit card, stopping payment on a check, receiving a new PIN, or viewing a monthly statement, among other transactions. This type of banking is meant to be more convenient for the consumer than having to physically go into a bank. The banks in India are racing to use this latest technology to reduce their operational cost and increase customer base (Peterson, 2009). In India the transactions have been increased after the launch of mobile banking. Round the clock availability and ease of transactions are the main attracting factors of mobile banking.

The current mobile adoption figures are good news for the economy as well as the banks. Experts believe improved applications by banks have helped Mobile banking gain acceptance among users. Reserve Bank of India guidelines for m-banking state that, "Information Security is critical to the business of mobile banking services and its underlying operations. Therefore, the technology used for mobile banking must be secure and should ensure confidentiality, integrity, authenticity, and non-reputability." These lines are the reflective of possible concerns of the customer that have critical influence on their adoption tendencies. Besides security, fear of network failures resulting in failed transactions poses a serious impact on customer adoption trends (Paul Leishman, 2009).

II. Literature Review

Literature review is instrumental to explore previous studies and research in the related areas of the subject because it helps to bridge the research gaps that already exists. The collection of reviews has been made from various studies undertaken by the academicians, practitioners, researchers from time to time. It also provides a theoretical base for the research and helps the researcher to conceptualize the problem and to choose the design of the present study.

During January 2008, ICICI bank started the first mobile service in India (Mr.V. Vaidyanathan) and SMS alerts started in 2005-06 (Alpesh Patel, 2013). According to Chugh (2014), The RBI operative guidelines indicate that only those banks which are licensed and supervised in India and have a physical presence in India will be permitted to offer Mobile banking services. The following section contains a list of studies conducted in the area of Mobile banking both Worldwide and in India. The reviews are presented in a chronological order.

Roger's (1995) innovation diffusion model which has used attributes like compatibility, complexity, relative advantage has been used in their study. The findings indicate that compatibility, relative advantage, ease of use has a significant effect on attitude to adopt Mobile banking services. An important suggestion made by them is to reduce complexity to increase mobile adopters. The customers will have a positive belief about the relative advantage of Mobile banking only if they have a favourable attitude towards adopting Mobile banking services. Yang A. S (2009), in his empirical study investigated the factors associated with adopting and resisting Mobile banking technologies in Taiwan. The primary factors associated with resistance included concerns over system configuration security and basic fees for Mobile banking web connections. The research found out that security and cost connection to the internet was a hindrance to the adoption of Mobile banking facilities among students in Taiwan. Financial cost is an important attribute according to Singh, Srivastava and Srivastava (2010), as it has a negative effect on the intention to use Mobile banking. Kumar, Ravindran (2012), in their study have suggested that there is a strong linkage between perceived service quality, satisfaction and continuance intentions. The study also confirmed that after adoption of the technology, the customer finds satisfaction in the quality parameters of the service. Continuance intentions were found solely dependent on satisfaction in the m-banking context in Kerala. Customers are highly satisfied with mobile banking system due to several reasons. It has positive impact on behavioural intentions of customers' acceptance of mobile banking. According to Angamuthu (2012) the public sector banks have contributed to the overall growth of M-Banking in the banking sector of India better than the private and foreign sector banks. Perceived obstacles for non-acceptance of M-Banking consists of insufficient guidance, high risk, possibility of occurring errors, spend more time, small display size of mobile phone, unavailability of large number of benefits and preference of other financial information mediums. Samudra, Phadtare (2012), in their study used the UTUAT model to examine the adoption of Mobile banking services in Pune city and have suggested that Mobile banking services should be promoted to middle level managers whose salary are in the range of 1-6 lakh and the age group is 25-30. The reason suggested in their study is; this is the most active age groups of 3G mobile. They have used five factors of UTUAT model to study the adoption, among these factors facilitating conditions is the major factor that influence Mobile banking adoption in this study. Utharaja and Kumar (2014) highlighted OHCs positive attitude and intention to use mobile banking channel. It will also help the bankers in aligning or promoting mobile banking channel apart from understanding these needs of the special customers. The information sourced through this research will provide input into banking service design and process that will include special segment while also aiding policy decisions. Singh (2014) in his study says that the mobile banking is increasing rapidly but it has not become as popular as the use of ATM. Hence this is a challenge the Bank managers have to face while designing the different features of mobile banking and ensuring the reliability and safety/security of mobile banking transaction. Higher education level in National Capital Region Delhi provides the opportunity to the banks to create awareness and promote the use of mobile banking. Dash,Bhusan (2014),their study says that, innovation attributes i.e. trial ability and compatibility has significant impact on the attitude whereas the relative advantage is not significant in the Indian context as previous research carried out in different countries have revealed the significance of relative advantage toward the attitude. According to Mathew, Sulphey, and Prabhakaran (2014), usefulness exerted more influence in discriminating between a mobile banking user and non-user. Risk perception was found to be the major impediment to mobile phone banking adoption. Juwairiya and Binoosa (2014), mobile banking services are cheaper than traditional banking services. The awareness of local m-banking service is quite low and usage level is reasonable. A high percentage of respondents do not trust the security level of M –Banking services. According to Islam (2014), a key challenge with gaining user adoption of mobile banking and payments is the customer's lack of confidence in security of the services. Raju (2014), studied about influence of technology in banking. Among the MB-related problems, inconvenience of keyboard and small display of mobile phones, restricted amount of transaction and restricted delivery of services during off time are the major problems. Makongoro(2014), suggested that perceived risk, relative advantage and convenience are the determinant factors in influencing consumers' adoption decisions. It's been recommended that banks in Tanzania invest massively in mobile banking and other information technology innovations in

order to further promote efficient service delivery and increase adoption of mobile banking services. Malalakshmi, Kalaiyarasi (2016), studied on mobile phone banking adoption. The respondents were not bothered by the complexity of the technology, the mobile compatibility and mobile phone experience. Yadav (2016), shows that the influencing factors were significantly and positively related to the intention to use mobile banking services; financial risk was the only factor found insignificant. Bhatt A, Bhatt S (2016), m-banking customer in India is a young and literate male, belonging to the middle-income strata. The usage patterns of the customers suggest that as the frequency of transactions increases, people prefer the usage of ATMs. Security issues have deterred the customers from resorting to e-banking and m-banking options. Moreover, customers using m-banking find that the advantages lie in time-effectiveness, convenience, safety, operational simplicity and ease of navigation. These help in enriching their mobile-banking experience and have the potential to increase adoption of mobile banking. Agarwal, Mehrotra (2017), investigated the banking channel usage pattern of the Indian customers and it shows an increasing trend in the usage of mobile banking as a channel of banking, especially by the people in the age group of 46-60 years, with balance enquiry being the most common reason for using mobile banking. Accessibility is found to be the most important factor, whereas security is observed to be the least important in affecting customer's choice of a banking channel.

From the above reviews of both empirical and conceptual work, it is clear that different authors have approached various self-service technology-enabled financial information mediums including M-Banking in different ways in varying different levels of analysis. These different approaches helped in the emergence of more and more literature on the subject over the time. It gives an idea on extensive and diverse works on M-Banking.

III. Objectives Of The Study
• To investigate the important aspects of adoption of mobile banking in the Indian context.
• To ascertain the factors that influence the decision to use mobile banking.

IV. Research Methodology
This study is based on both primary and secondary data sources. It is based on data collected through Questionnaire with Mobile banking User. The methodology adopted in the present study is given under the following headings.

4.1 Research Design
The data can be grouped into two main categories – primary and secondary data. The secondary data have been compiled from newspaper, journals, magazines, web links and research papers. The primary data have been collected through Questionnaire with users of mobile banking.

4.2 Population
According to Saunders (2007) Population refers to full set of groups from which a sample is taken. According to Mugenda and Mugenda (1999) target population is the unit of whatever nature that a researcher indends to study. The study targeted 150 mobile banking users in Ernakulam district.

4.3 Sampling Strategy
150 questionnaires were distributed. According to Struwig & Stead (2001) "If a sample process has been correctly followed then the sample size of 150-200 can be considered acceptable and reflect the whole population." This study used a non – probability sampling methods. Hair et al (2003) suggested that, convenience sampling can help the researcher to complete large tasks in a short amount of time and cost effectively but suffer from bias due to the differences that exist in the target population. The sampling technique used in this study was convenience sampling.

4.4 Data Collection Instruments
The researcher used a questionnaire to collect primary data from the respondents of the Mobile banking users in Ernakulam district. Closed ended questions were used for the study. The closed – ended questions were developed on a five point likert scale ranging from 5 (strongly agree) to 1 (strongly disagree). Secondary data was collected from both unpublished and published data such as, articles from journals and internet which were related to the variables. To ensure validity of the research instruments, the instrument was presented to the supervisors who are research experts. This aided in ensuring that the instrument was well refined for data collection and eventual analysis.

4.5 Data Processing and Analysis

The analysis of data was done with the help of the Statistical Package for Social Sciences (SPSS). Descriptive statistics such as frequency tables were used to assess the demographic profile of the respondents to make the analysis more meaningful, clear and easily interpretable. The findings were presented using percentages, frequency and statistically generated tables. Regression analysis was used to show the relationship between mobile banking and customer adoption.

V. Data Findings And Discussions

5.1 Respondents Profile

TABLE 1: Demographic Profile of Respondents

Sl. No.	Groups	Class	Frequency	Percentage	Cumulative Percentage
1	Gender	Male	77	51.3	51.3
		Female	73	48.7	100
		Total	**150**	**100.0**	
2	Age	Upto 25 years	53	35.3	35.3
		26-35 years	72	48.0	83.3
		36-45 years	16	10.7	94
		46-55 years	7	4.7	98.7
		Above 55 years	2	1.3	100.0
		Total	**150**	**100.0**	
3	Qualification	Up to plus two/Diploma	2	1.3	1.3
		Graduate	76	50.7	52.0
		PG/Professional	72	48.0	100
		Total	**150**	**100.0**	
4	Occupation	Student	23	15.3	15.3
		Business	6	4.0	19.3
		Employee	76	50.7	70.0
		Professional	41	27.3	97.3
		Others	4	2.7	100.0
		Total	**150**	**100.0**	
5	Monthly Income	Up to 15000	24	16	16
		15001-30000	27	18	34
		30001-45000	53	35.3	69.3
		45001-60000	24	16	85.3
		Above 60000	22	14.7	100.0
		Total	**150**	**100.0**	
6	Long	Less than 1yr	24	16	16
		1-2 years	47	31.3	47.3
		2-3years	28	18.7	66
		3-4years	20	13.3	79.3
		Above 4yeras	31	20.7	100.0
		Total	**150**	**100.0**	
7	Period	Every time	19	12.7	12.7
		Usually	44	29.3	42
		Frequently	39	26	68
		Occasionally	34	22.7	90.7
		Rarely	14	9.3	100.0
		Total	**150**	**100.0**	

Table 1 shows the profile of respondents. The sample shows that the number of male (51.3%) respondents is higher than the number of female (48.7%) respondents. If we look at the age group, the majority of the respondents falls in the age group of 26-35 years (48%) followed by the upto 25 years (35.3%). If we combine these two age group, 83.3% respondents will fall under this category. The majority of the respondents were either graduate (50.7%) or post graduate (48%). This is clearly indicate the education lays an important and significant role in adoption of the mobile banking. On the basis of the income maximum respondents fall in the 30001-45000 category (35.3%) followed by 15001-30000 (18%). On the basis of period of use maximum respondents fall in the group of 1-2 years (31.3%) followed by the 2-3 years (18.7%). If we look at the periodicity of use, the majority of respondents are usually using mobile banking (29.3%) followed by frequently using (26%).

The profile of the respondents indicates they are young, educated and decently employed, which also the new generation who are tech savvy and wants the service at the click of the button. This generation has adopted the technology application as their way of life, which represent a significant opportunity to the banking sector to enhance their service by use of mobile, internet or other technological application.

5.2 Cronbach's Alpha Reliability Analysis

Table 2 shows the results of reliability analysis. To ensure the reliability of the measurement scales, Cronbach's alpha was used in the calculation. Where by a higher value of above 0.6 indicated that the variables were reliable while the values above 0.9 are regarded as most reliable but anything below 0.6 was regarded inconsistent with the reliability scales as according to George & Mallery,(2003) who suggested that in order for a scale to be reliable, the Cronbach's alpha value should be above 0.6. Thus the construct measures are deemed reliable.

TABLE 2: Reliability Analysis Results

Constructs	Cronbach's Alpha	N of Items
PU	.742	7
PEOU	.751	3
PS	.702	2
RT	.815	6
EFF	.765	4

5.3 Correlation Analysis

Pearson correlation coefficient was adopted to study the significant relationship between the constructs. The results shows the correlations are low, in which the values are not higher than 0.8 as proposed by Bagozzi (1994). This indicates that the constructs are distinct from one another and deemed as an acceptable level of discrimination. Table 5 shows the correlation analysis between variables.

TABLE 3: Pearson's Correlation coefficient between Research Variables

		pu	peou	ps	rt	eff	adop
Pu	Pearson Correlation	1	.619**	.511**	.448**	.470**	.585**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	150	150	150	150	150	150
peou	Pearson Correlation	.619**	1	.506**	.495**	.447**	.638**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	150	150	150	150	150	150
Ps	Pearson Correlation	.511**	.506**	1	.410**	.470**	.435**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	150	150	150	150	150	150
Rt	Pearson Correlation	.448**	.495**	.410**	1	.708**	.456**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	150	150	150	150	150	150
Eff	Pearson Correlation	.470**	.447**	.470**	.708**	1	.452**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	150	150	150	150	150	150
adop	Pearson Correlation	.585**	.638**	.435**	.456**	.452**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	150	150	150	150	150	150

**. Correlation is significant at the 0.01 level (2-tailed).

5.4 Regression Analysis

The regression analysis is conducted to reveal how different factors affect the adoption of mobile banking. The main objective of regression analysis is to explain the variation in one variable (called dependent variable) based on the variation in one or more other variables (called independent variables). If multiple independent variables are used to explain the variation in a dependent variable, it is called multiple regression model. The output of the multiple regression analysis is used to test the hypotheses.

TABLE 4: Model Summary of Regression Analysis – Adoption of Mobile Banking

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.638a	.407	.403	.47429	
2	.682b	.466	.458	.45177	
3	.694c	.481	.470	.44672	1.782

a. Predictors: (Constant), peou

b. Predictors: (Constant), peou, pu

c. Predictors: (Constant), peou, pu, eff

d. Dependent Variable: adop

Table 5 shows that 40.3 per cent of variation (model 1) in adoption of mobile banking is explained by PEOU alone, 45.8 per cent of variation (model 2) is explained by PEOU and PU, and 47 per cent of the variation (model 3) is explained by PEOU, PU, and EFF.

The Durbin – Watson statistic test for autocorrelation. As a rule of Thumb, the value should be between 1.5 and 2.5 to indicate independence of observations (Garson, 2010). As shown in Table 5 the value of the test is 1.782 which indicates independence of observations.

ANOVA table showing the regression model fit presented in Table 6 shows that all the three models are statistically significant at 5 per cent significant level.

TABLE 5: ANOVA[a] Table Showing the Regression Model fit – Adoption of MB

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.862	1	22.862	101.633	.000[b]
	Residual	33.293	148	.225		
	Total	56.155	149			
2	Regression	26.152	2	13.076	64.068	.000[c]
	Residual	30.003	147	.204		
	Total	56.155	149			
3	Regression	27.019	3	9.006	45.132	.000[d]
	Residual	29.136	146	.200		
	Total	56.155	149			

*Significance at 5 per cent level
a. Dependent Variable: adop
b. Predictors: (Constant), peou
c. Predictors: (Constant), peou, pu
d. Predictors: (Constant), peou, pu, eff

TABLE 6: Coefficients[a] Significance of PEOU , PU and EFF to Adoption of MB

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.678	.256		6.549	.000		
	peou	.608	.060	.638	10.081	.000	1.000	1.000
2	(Constant)	.764	.334		2.290	.023		
	peou	.426	.073	.447	5.829	.000	.617	1.621
	pu	.401	.100	.308	4.015	.000	.617	1.621
3	(Constant)	.662	.334		1.985	.049		
	peou	.392	.074	.411	5.278	.000	.586	1.706
	pu	.342	.103	.263	3.327	.001	.570	1.754
	eff	.131	.063	.144	2.084	.039	.739	1.352

*Significance at 5 per cent level.
a. Dependent Variable: adop

All the Independent variables viz., PEOU (t=5.278, p=0.000), PU (t= 3.327, p = 0.001) and EFF (t = 2.084, p = .039) are statistically significant at 5 per cent significance level and hence hypothesis that PEOU, PU and EFF have no significant effect on adoption of mobile banking are rejected. PEOU, PU and EFF have positive effect on the adoption of mobile banking. The beta (β) coefficients give a measure of the contribution of each variable. Higher the beta value, the greater is the effect of independent variable on the dependent variable. PEOU has highest beta coefficient (β= 0.392) and therefore it has greater effect on adoption of mobile banking followed by PU (β = .342) and EFF (β = .131).

VI. Conclusion And Recommendations

The profile study of respondents revealed that majority of mobile banking users are males. It is also found that majority of the users are below the age of 35 years, well educated with graduate or postgraduate, employees, with monthly income between ☐15000 and ☐45000. Analysis on factors influencing the adoption of mobile banking that PEO, PU and EFF are push factors on adoption of mobile banking. These findings refer to the fact that customers use MB from the benefits they get in comparison to other banking delivery channels, especially banking at physical branches. These findings lead to the conclusion that when MB is perceived as easy to use, efficient and useful, adoption of mobile banking among customers would be greater. Practical implication of these results is that mobile banking service providers need to highlight the benefit of mobile banking among the customers and also make MB interface simple and easy to use. Based on the study findings, the researcher acknowledged different milestones that mobile banking has managed to change the way banking used to be conducted and therefore concluded that mobile banking is key for the socio-economic development of the country at large. It has brought services closer to the people thus making it easy to transact without delays and restrictions of time limits. Reflecting the findings it is recommended that since a number of respondents thought that mobile banking is not fully accessed anytime and anywhere due to the network non-availability in some parts of the country, it will be important for the banking sector in liaison with the mobile service providers to ensure that network coverage is all over the country in order to comfortably serve all corners of the country with mobile banking.

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BETWEEN CONFRONTING IDEOLOGIES AND COLONIAL MODERNITY: SITUATING SYRIAN CATHOLICS IN THE 19TH CENTURY KERALA.

Beena Paul

Traditional Kerala society underwent drastic changes with the arrival of British colonial administrators and the Protestant missionaries.[1] During the early phase of colonial administration, society was suspicious and reluctant to adapt to the ongoing changes. The traditional society had to confront modern ideas and institutions, Christian doctrines and beliefs as well as western norms of morality. Each community had different challenges to face. It is in this context, the study of Syrian Catholic community is taken up. Syrian Catholics are the traditional Christians of Kerala, who had acknowledged the papal jurisdiction and are also known as Romo-Syrians, *Pazhayacoor* or they themselves calls Catholics. Here the attempt is to trace how the Protestant ideology confronted with the Catholic ideology in a colonial space, which was a continuum of the religious conflict in Europe. This paper also looks into the ideology of the Raj which club the colonial rule with religious activities. The Latin prelates in Kerala were also suspicious of the possible conversion to the other Syrian faction here. In this background, the study Syrian Catholics, under the Latin jurisdiction, till the fag end of 19th century is significant. More over the mechanisms employed by the ecclesiastical authorities to evade all sorts of other indoctrinations, especially through modern institutions like schools is quite interesting.

Missionary activities had a fresh start in the beginning of the 19th century. The Charter Act of 1813 granted permission to missionaries to work in India and began their proselytizing activities.[2] Although Christianisation was not in the colonial agenda, a nexus between government officials and missionaries came to be established during this period. Within the government a strong lobby favoured encouragement to missionary pursuits, not only as a religious enterprise but also as a possible prop for the permanence of the empire, as they believed that evangelization would help ensure loyalty. The conduct of these officials gave the impression that the missionaries were acting in collaboration with the government.[3]

The British brought with them new technology, institutions, knowledge, beliefs and values. They slowly laid the foundation of a modern state by surveying land, settling revenue, creating modern bureaucracy, army and police, instituting law courts, codifying the law; developing communications — railways, post and telegraph, roads and canals; and

establishing schools and colleges.[4] In fact the colonial state apparatus functioned as instruments of ideological dissemination and the institutions functioned as ideological instruments aiding political control. The ideological dissemination was inherent in every policy pursued by the British in India.[5] The cultural agency for the colonial consolidation was the new education system in schools, colleges and universities.[6] The colonial administrators and missionaries engaged in proselytization and conversion choose the same institution, the school as the instrument of spreading their culture and religion. Schools and colleges gradually acquired the status of agencies for modern education, learning English became a necessary means for upward social mobility and entry into echelons of power.[7]

With the coming of the British, the traditional Christians of Kerala, who came under the Roman Catholic Church through the Portuguese intrusion, had to face challenges from the colonizers. British began to take so much interest in the case of separated Syrians or the Jacobite Syrians, saying, "Latin Catholics and the Romo-Syrians had European missionaries to keep them up to the mark, but the separated Syrians had been under a series of hereditary rulers who let their church sink into apathy and ignorance".[8] The design was "to raise the prostrate Church from its degraded condition and weed it of the errors and superstitions which the Church of Rome has introduced into it."[9] The explicit understanding of this plan drew away the Syrian Catholics from the protestant missionaries and their accomplishments in Kerala, who were under the *Propaganda Fide*[10] at that time. The educational institutions started by the missionaries gave both secular and religious education. Secular education was seen as the best means to educate the other communities in Christian ways.[11] But the main objective of the mission arrived at Travancore at the initiative of Col. Munroe was "to improve the spiritual condition of the Syrian Christian population."[12] With the British support the Syrian Jacobite Christians were the earliest to take to modern education, and so gain job opportunities.

Improving the spiritual condition of a sect, separated from the Roman Church meant a stand against the Catholic Church and collaboration with a dissenting faction. P. Cherian has noted: "Though Munroe showed special favour to *Puthenkur* Syrians (i.e., the non-Roman Syrian Christians), he seem to have done nothing of this kind for the Roman Syrians."[13] This was deemed necessary to acquire the support of native Christians and to furnish a group always loyal to the British. Munro looked forward for securing for the Raj "the support of a respectable body of Christian subjects, connected with the mass of the people, by a community of language, occupations and pursuits and united to the British government by the stronger ties religion and mutual safety."[14] Intervention of the native Christian life for the sake of spiritual

formation was actually the best way to communicate the Protestant Christian faith.[18] Thus the Catholic-Protestant encounter in Europe had a follow up in colonies and this is illustrative of the Kerala church.

The ideology of the Raj to get the native support as well the dissemination of the protestant doctrines estranged the Syrian Catholics from the modern educational institutions started by the British and had least participation in the colonial administrative apparatus. This was in fact to maintain the Catholic belief and practices in Kerala, which was established by the *Padroado regime*[16] in the 16th century and later on continued by the *Propaganda Fide* till the end of the 19th century.

The Portuguese and Dutch missionaries who preceded the English rather concentrated on the religious hegemony over the Syrian catholics and their spiritual formation than the secular education. The seminaries started by the Catholic missionaries in different parts of Kerala, especially the Ambazhakad seminary by the Jesuits with library and press[17] had influenced the spiritual life through the books printed and circulated among the priestly class. The books printed at Ambazhakad, were used in their services, and since no other works were available at that time.[18] A clear change in the spiritual life and liturgy of the St. Thomas Christians occurred during this period. The ancient way of prayer life has slowly changed to many pious practices. Rosary, novenas, devotion to saints and scapular, and other pious devotions of Europe were imported to Kerala. In the course of centuries, these practices were firmly established among the St. Thomas Christians.[19] The Catholic ideology and practices evolved within the Syrian Christians were rather more influenced by the *Propaganda* than the *Padroado*. This ideology was working throughout their lives, or to them nineteenth century amalgamated tradition, Catholicism and modernity.

The fear of Protestant indoctrination and ideological difference between the two mainstream Christian doctrines was the major reason that alienated the Syrian Catholics from the British machinery, in the early phase of colonial modernity. The Carmelite missionaries, in order to protect their interests in Kerala viewed the Protestants with suspicion. The Carmelites had not done anything in the educational sector[20] and Catholic educational institutions were absent at that time. Even then, they forbade the Syrian Catholics in entering any school run by non-Catholics and thereby modern English education was denied to them. Commenting on the attitude and approach of the Latin Carmelite Missionaries, Mar Mathew Makkil wrote:

"Though the Carmelites here ruled the Syrian Christians for more than 200 years with great glory, they have established no educational institutions among this people for their secular development and education ...At the time of the arrival of Bishop Charles Lavigne (1887), the number of

Syrians who had learned or had been learning English in this vicariate might not be more than hundred".[21]

Though Catholics do not seem to have much interest in educating the Catholics in pre-British period, reason for the indifference of Carmelite missionaries towards the educational needs of the community, in the nineteenth century seems to have been, "perhaps most of the clergy being men of other nationalities than the English, that they found it extremely difficult to take part in English education."[22]

Thus in the latter half of the 19th century the Syrian Christians were in between the confronting Christian ideologies and colonial modernity. One and the same time, they wanted to preserve the Catholic faith and to cope up with the socio-cultural changes in Travancore and Cochin. The efforts were taken up by an indigenous Catholic priest, Fr. Chavara Kuriakose Elias, who later became the first Vicar General of the Syrian Catholics. A great visionary of the Catholic Church, he was the first Keralite to start a school (1834) and a press (1846), the press being the third in Kerala.[23] The press was to print necessary prayer books and materials needed for religious practices. He founded a Sanskrit school in Mannanam and entry into school was irrespective of caste and creed. A number of schools for lower castes were also started by him.

In 1865, a circular was issued by Archbishop Bernadinos at the instance of Fr. Chavara, the Vicar General of Syrian Catholics, calling upon all parish churches under his jurisdiction to start schools attached to each of them (*Pallikorupallikoodam*) and threatened to close down the churches that failed to comply with his orders.[24] Syrian Catholics, so far educationally backward, fearing the possibility of Protestant indoctrination; conversion to or entry into the other Syrian faction, were asked to study in schools attached to their parishes as it was necessary to educate, guide and control young ones, so that they will hold firm in Catholic ideology.

The other side of the picture was that, in the 19th century the Catholics under the ecclesiastical jurisdiction of the Carmelite missionaries were trying to free themselves from their dominance and attain autonomy. The Carmelite presence in Kerala was a hedge against the Protestant influence over the community. The Carmelite anxiety about the proselytization and evangelization of the Protestants had a remarkable influence over the Catholics. They were fighting for the autonomy of the indigenous church since 17th century and the Syrian church was separated from the Latin jurisdiction of missionaries by Pope Leo XIII and two separate Syro-Malabar vicariates, i.e. Kottayam and Trichur were created in 1887.[25] Later in 1896, the Roman Catholic Church granted their demand for autonomy. Three Apostolic Vicariates of Trichur, Ernakulam and Changanacherry were created with Rev. John Menacherry,

Rev. Fr. Louis Pazheparambil and Rev. Fr. Mathew Makil as Vicars Apostolic, respectively.[26] Disruption of the traditional church by the colonizers in the name of civilizing mission, evangelization and proselytization was an eye opener to the Syrian Catholics. They were conscious about the further intrusions and more than that they themselves were caught hold of the Catholic ideology.

Years of struggle for autonomy have created community consciousness among the Syrian Catholics but in the phase of colonial modernity, a conscious effort has taken to build the community within the Catholic mould and also the material development of the community. Even before the establishment of the autonomous church, efforts were taken by the native priests with the support of the Carmelite authorities to establish seminaries, printing press, Catholic schools and religious congregations for men and women.

Education is conceived as the most effective tool for cultural construction.[27] In order to construct a firm Catholic base, education under the control of the church was a necessity. The most important means to develop a community was to educate the children. Female education was deemed inevitable, since it is easy for mother, to influence and form children. To hand over the Christian doctrines to the next generation education of women was considered important. Giving education to girls through female teachers was given equal importance. The Catholic clergy was not ready to compromise with the education imparted through the Protestant and other educational institutions. The establishment of indigenous religious congregations for men and women as well as women education in convent schools has to be understood in this context.

The changes within the community, in the latter part of the 19th century were also due to the material prosperity of the community. Though some historians maintain that the Syrian Christians had been a community of traders in Kerala, the overwhelming majority of them in Travancore were, in fact, agriculturists, mostly inhabiting the midland regions in North Travancore.[28] When compared, Catholics took to agriculture rather than other communities and from 1820 onwards their land holdings began to increase.[29] In the latter half of the 19th century Syrian Roman Catholics took to agriculture while Syrian Protestants went to education and government jobs. The Jacobites and Mar Thomites used their educational opportunities to increase their trade, commerce and small enterprises like printing presses besides improved agriculture.[30] The lack of education estranged the Catholics from the main stream and they turned to agriculture.

Epoch-making events which were destined to exercise a decisive influence on the Christians were the *Pattom* Proclamation of 1865 and 1867.[31] abolition of slavery and the encouragement of the government to cultivate

waste lands and forest lands. This provided a fillip to the rise of Syrian Catholics as a strong class of peasant farmers in Travancore.[32]

The flowering of the Catholic ideals among the Syrian Catholics and the introduction of Protestant ideals and Christian morality through Protestant missionaries occurred simultaneously in Kerala. As echelons of power the Protestants had an upper hand in implanting Christian ideals and morality than the Catholics. The Christian virtues and morality spread through modern institutions and state machinery, initiated by the British and the missionary activities, were taken as a threat to Syrian Catholics. To counter these efforts as well as to cope with the changing situations and accustom to the modern institutions, materially prospered Syrian Catholics started to build their own institutions within the ambit of Catholic doctrines. By early decades of the 20th century, Syrian Catholic faction owned one third of the educational institutions of Kerala and began to claim proportional representation in civil service,[33] which amply demonstrate the solidarity with which the community worked for higher education and sought for higher job opportunities.

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Suzaku observation of the eclipsing high mass X-ray binary pulsar XTE J1855-026

JINCY DEVASIA[1,2,*] and BISWAJIT PAUL[1]

[1]Raman Research Institute, Bangalore 560 080, India.
[2]Henry Baker College, Melukavu, Kottayam 686 652, India.
*Corresponding author. E-mail: jincydevasia@yahoo.com

Abstract. We report results from analysis performed on an eclipsing supergiant high mass X-ray binary pulsar XTE J1855-026 observed with the X-ray Imaging Spectrometer (XIS) on-board Suzaku Observatory in April 2015. Suzaku observed this source for a total effective exposure of ∼87 ks just before an eclipse. Pulsations are clearly observed and the pulse profiles of XTE J1855-026 did not show significant energy dependence during this observation consistent with previous reports. The time averaged energy spectrum of XTE J1855-026 in the 1.0–10.5 keV energy range can be well fitted with a partial covering power law model modified with interstellar absorption along with a black-body component for soft excess and a gaussian for iron fluorescence line emission. The hardness ratio evolution during this observation indicated significant absorption of soft X-rays in some segments of the observation. For better understanding of the reason behind this, we performed time-resolved spectroscopy in the 2.5–10.5 keV energy band which revealed significant variations in the spectral parameters, especially the hydrogen column density and iron line equivalent width with flux. The correlated variations in the spectral parameters indicate towards the presence of clumps in the stellar wind of the companion star accounting for the absorption of low energy X-rays in some time segments.

Keywords. X-ray: neutron stars—X-ray binaries: individual (XTE J1855-026).

1. Introduction

Supergiant High Mass X-ray Binary systems (SgH-MXBs) are a sub-class of High Mass X-ray Binary systems (HMXB) consisting of a massive, late type companion star and a neutron star, orbiting about the common center of mass. In most cases, the basic source of power is by the accretion of material via the stellar wind of the binary companion. In wind-fed system, the dense stellar wind of the massive star is partly intercepted by the strong gravitational field of the compact companion and accretion takes place. The orbital period of these systems is in the range of P_{orb} ∼1–42 days. The massive stars in these systems which are of OB spectral type exhibit strong radiatively-driven stellar winds with mass loss rate of the order of ∼ $10^{-6} M_\odot \, \text{yr}^{-1}$ and wind terminal velocities of ∼1500 km s^{-1}. The observed X-ray luminosity from these sources ranges from L_x ∼ 10^{35}–10^{36} ergs s^{-1}, which modifies the stellar wind significantly.

Generally two kinds of sgHMXBs are observed: classical sgHMXBs and heavily obscured sgHMXBs, in which the latter ones are much more absorbed in X-rays ($N_{\text{H}} > 10^{23} \, \text{cm}^{-2}$) on average, ten times larger than in classical systems (Manousakis *et al.* 2014). SgHMXBs are known to be persistent sources on longer timescales, although exhibiting significant variabilities on short timescales (Haberl *et al.* 1989). These variabilities are generally attributed to the inhomogeneities in the stellar wind. Eclipsing SgHMXBs are suitable candidates for determining the orbital parameters of the binary system. Apart from that, it also helps in understanding the nature of the circumstellar material of the companion star, especially by analysing the data during eclipse ingress/egress when much of the emission from the compact object is eclipsed and only the reprocessed emission is detectable.

XTE J1855-026 is an eclipsing SgHMXB discovered with *Rossi X-ray Timing Explorer (RXTE)* satellite

in 1998 while scanning across the Scutum region of the Galactic plane. Follow up observations with *RXTE*-PCA instrument revealed the compact object to be a neutron star with a spin period of 361.1 ± 0.4 s and a periodic intensity modulation of 6.1 days interpreted as the orbital period of the system. The source was then identified as a supergiant wind accretion-driven system. The X-ray spectrum of this source above $\sim$3 keV was fitted with an absorbed power-law model with a high energy cut-off and a Gaussian line for accounting iron flourescent emission line at 6.4 keV (equivalent width $\sim$360 eV) (Corbet *et al.* 1999). The pulse timing studies of the source using observations made with *RXTE*-PCA obtained a mass function of $\sim 16 M_\odot$ for the companion star and constrained the eccentricity to $e \leq 0.04$ (Corbet & Mukai 2002). Analysis of the spectra of the optical counterpart taken in August 2003 with the 4.2-m WHT (La Palma) showed it to be a B0Iaep luminous supergiant (Negueruela *et al.* 2008). In 2010, *INTEGRAL*-IBAS detected a bright flare from this source in the 20–40 keV X-ray energy range. They observed three flares separated by a spin period of 360 s. Each flare lasted for 130 s, 55 s and 80 s with a peak luminosity of 0.9 Crab, 0.7 Crab and 0.3 Crab, respectively (Watanabe *et al.* 2010). Then in 2012, the *Swift*-BAT hard X-ray transient monitor reported an outburst from this source during which the X-ray intensity increased from its normal level of $\sim$10 mCrab in the 15–50 keV band to a level of $\sim$50 mCrab over a period of one day (Krimm *et al.* 2012). Using archival *INTEGRAL* dataset, the eclipse duration was estimated to be 1.08 ± 0.03 days (Falanga *et al.* 2015). Gonzalez-Galan (2015) updated the spectral type of the mass donor to a BN0.2 Ia supergiant and found the mass amd radius of the donor star to be $\sim 13 M_\odot$ and $\sim 27 R_\odot$ respectively.

Here, we present furthur studies on this source by using observations made with XIS instrument on-board *Suzaku* Observatory. The observation was carried out in the last stages of the *Suzaku* mission. XTE J1855-026 was observed in 2015 April when the source was just before an eclipse. The following sections focus on the results obtained by studying the pulse profiles and spectral characteristics of this source.

2. Observations and analysis

Suzaku (Mitsuda *et al.* 2007) is a joint Japanese–US mission launched in 2005 and covers a broad energy range from 0.2 to 600 keV. The mission is declared complete in 2015 after it was successfully operated for about 10 years. The scientific payload comprises of two
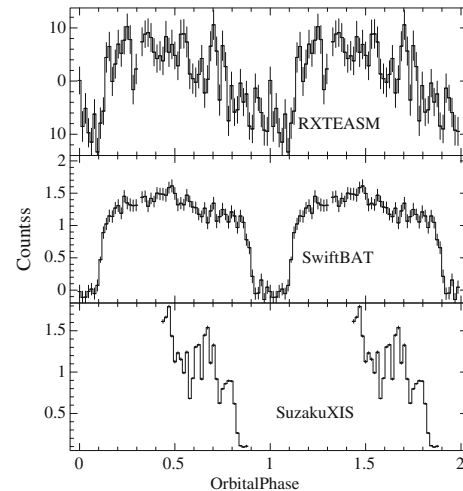
Figure 1. The *top panel* shows the *RXTE*-ASM light curve of XTE J1855-026 in the 2–15 keV energy band, the *middle panel* shows the 15–50 keV light curve from the *Swift*-BAT all sky monitor and the *bottom panel* shows the *Suzaku*-XIS light curve in the energy range 0.3–12 keV light curve, all folded with a bin size same as the orbital period of the binary system.

co-aligned instruments: the X-ray Imaging Spectrometer (XIS: Koyama *et al.* 2007) sensitive in the energy band of 0.2–12 keV, and the Hard X-ray Detector (HXD: Takahashi *et al.* 2007) sensitive in the energy band 10–70 keV. The XIS consists of four imaging CCD cameras, each located at the focal plane of an X-ray Telescope (XRT). Three CCD cameras (XIS0, XIS2, XIS3) are front-illuminated and one CCD camera (XIS1) is back-illuminated, out of which three XIS units (XIS0, XIS1 and XIS3) are currently operational. The HXD consists of two instruments – silicon PIN diodes (HXD/PIN) and GSO crystal scintillators (HXD/GSO), working in 10–70 keV and 40–600 keV ranges respectively. For the analysis discussed in this paper, we have used data obtained with the *Suzaku*-XIS instrument. Unfortunately, the HXD data was not available for this particular observation as the HXD instrument was turned off due to decline in the electric power supply.

Suzaku observed XTE J1855-026 from 2015-04-22T17:06:19 (MJD 57134.71271991) to 2015-04-25T 08:17:15 (MJD 57137.34531250). The observation was performed in XIS nominal pointing in standard data mode with an effective exposure of $\sim$87.5 ks. XIS detectors were operated in the 'normal' clockmode with '1/4' window option providing 2 s time resolution. We have used publicly available archived data from HEASARC with ObsId-409022010. The analysis discussed in this paper was performed using HEASOFT software package version 6.19 and CALDB database released on
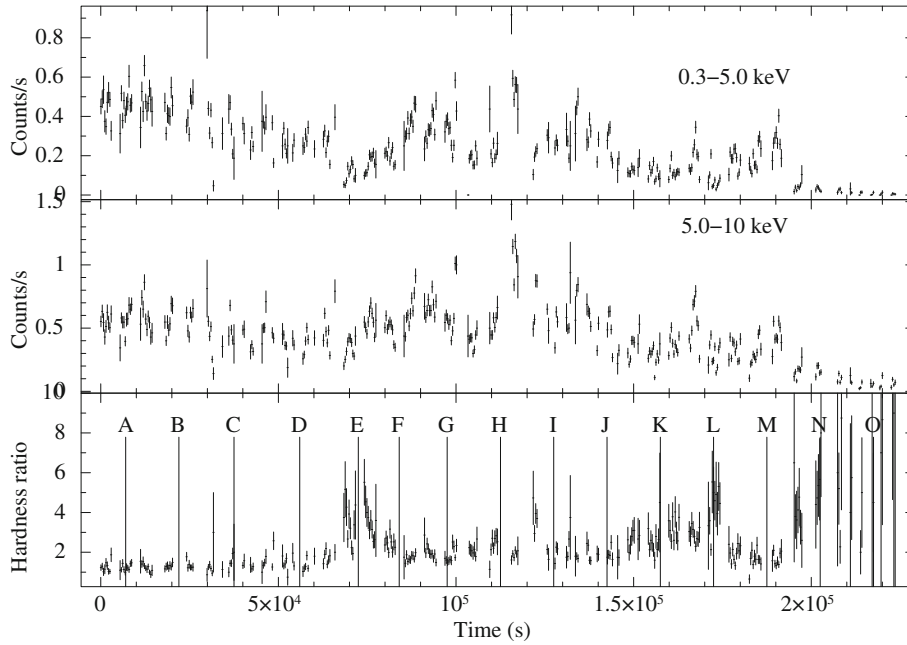
Figure 2. The background subtracted light curves of XTE J1855-026 observed with *Suzaku*-XIS. The *top panel* shows the XIS light curve plotted in the 0.3–5 keV energy range, the *middle panel* shows the XIS light curve plotted in the 5–12 keV energy range, and the *bottom panel* shows the hardness ratio plot in these two energy ranges.

2016-06-07. We have used filtered cleaned event files which are obtained using the pre-determined screening criteria as suggested in the *Suzaku* ABC guide[1]. For extracting XIS light curves and spectrum from the cleaned XIS event files, circular regions of 1.2 arcmin (72 arcsec) radius around the source centroid is chosen. The background light curves and spectra were also extracted by using the same selection criteria as for the source by choosing regions devoid of source photons.

Figure 1 shows the orbital intensity light curve of XTE J1855-026 folded with the orbital period of the pulsar, 6.074 days with mid-eclipse epoch chosen to be T_{mid} = MJD 55079.055 (Coley *et al.* 2015). The Suzaku light curve plotted with the *RXTE*-ASM and *Swift*-BAT long-term light curves indicates that the *Suzaku* observation was carried out when the source is just before an eclipse covering the binary orbital phase range roughly from 0.45–0.85. The long-term light curves show significant energy dependence and we noticed significant reduction in source flux even before the source is eclipsed. The top panel in Fig. 1 shows the *RXTE*-ASM light curve in the 2–10 keV band, the middle panel shows the *Swift*-BAT light curve in the 15–50 keV band and the bottom panel displays the Suzaku-XIS light curve in the 0.2–12 keV band.
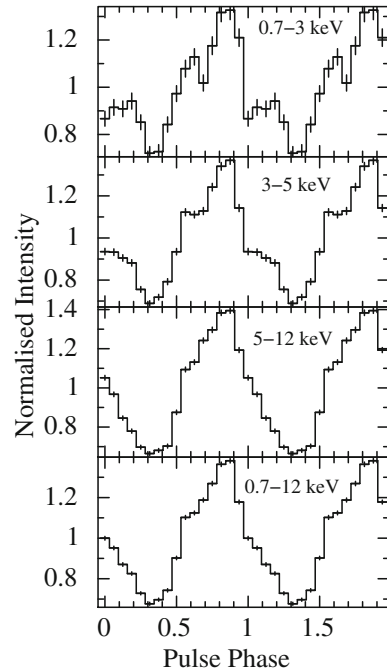
Figure 3. Energy-resolved pulse profiles of XTE J1855-026 in different energy bands folded with a pulse period of 360.01 s.

3. Timing analysis

For performing timing analysis for this dataset, we have applied barycentric corrections to the XIS cleaned event

Table 1. Best-fitted time averaged spectral parameters of XTE J1855-026. Errors quoted here are for 90% confidence limits.

Parameter	Value
$N_{H1}(10^{22}$ atoms cm^{-2})	5.90 ± 0.05
$N_{H2}(10^{22}$ atoms cm^{-2})	$16.82^{+0.82}_{-0.53}$
Cvfract	$0.63^{+0.007}_{-0.005}$
P_{index}	1.12 ± 0.01
P^a_{norm}	8.26 ± 0.0004
kT_{BB} (keV)	$0.12^{+0.0009}_{-0.002}$
kT_{norm}	$1.82 \times 10^{-2} \pm 0.002$
E_{Fe} (keV)	6.42 ± 0.005
Fe^b_{norm}	7.70 ± 0.000006
Iron line eq. width (eV)	90 ± 6
Total flux (1.0–10.5 keV)^c	5.28
Red-χ^2/d.o.f	1.2/795

$^a \times 10^{-3}$ photons cm^{-2} s^{-1}; $^b \times 10^{-5}$ photons cm^{-2} s^{-1}; $^c \times 10^{-11}$ ergs cm^{-2} s^{-1}.

files using the ftool *aebarycen*. The light curves were then extracted with a time resolution of 8 s. The background subtracted light curves from all three XIS units were combined together for further analysis. The XIS light curve for this observation indicates that the count rate dropped by a large factor towards the end of the observation. We created background subtracted light curves and plotted with a bin size equal to the spin period of the pulsar ∼360 s in two different energy ranges, 0.3–5 keV and 5–12 keV, respectively as shown in Fig. 2 along with the hardness ratio. Light curves

show significant variations by a factor of up to 5 displaying increase in hardness ratios at certain intervals and towards the end of the observation.

We then searched for pulsations in the background subtracted light curves using the ftool *efsearch* by pulse folding and chi-square maximization technique. The pulse period was found to be 360.01 s. We then created energy resolved pulse profiles in four different energy ranges 0.7–3, 3–5, 5–12 and 0.7–12 keV respectively by folding the light curves with a period of 360.01 s and is shown in Fig. 3. The pulse profiles show little dependence with energy. The pulse profiles below 3 keV consist of an additional peak at phase 0.2 and a dip at phase 0.7 which gradually disappears above 5 keV and changed to a single peaked pulse profile similar to the averaged pulse profile 0.7–12 keV.

4. Spectral analysis

4.1 *Time averaged spectral analysis*

For analysing the energy spectrum of XTE J1855-026, after subtracting the background, spectrum from all the three XIS units were simultaneously fitted in the energy range 1.0–10.5 keV. Before fitting, each spectrum is grouped using ftool *grppha* in order to have a minimum of 20 counts per bin. The 2048 channel XIS spectra were further rebinned by a factor of 6 from 1 keV to 5 keV, by a factor of 2 from 5 to 7 keV and by a factor of 14 from 7 to 10.5 keV energy range. While
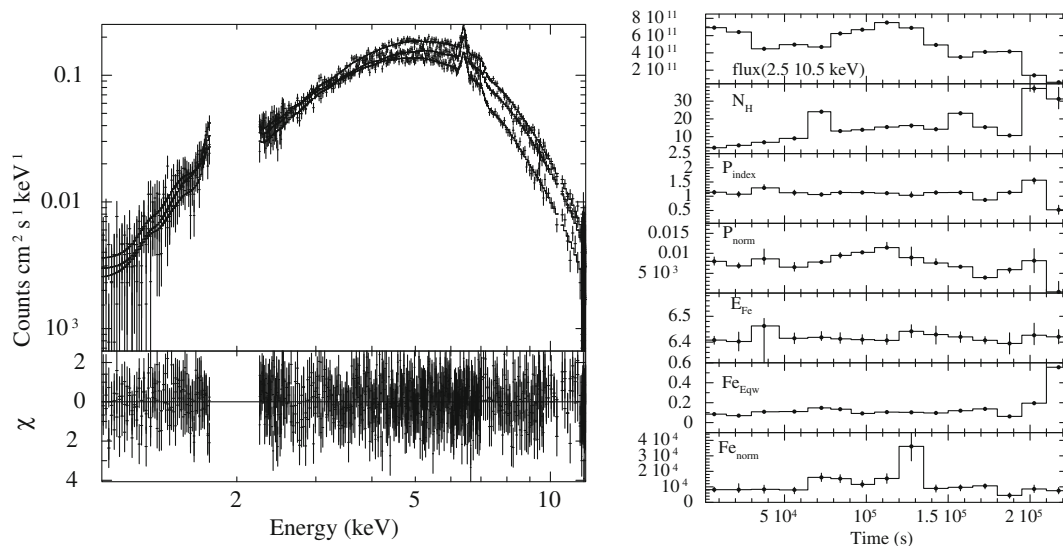
Figure 4. *Left panel*: The time-averaged energy spectrum of XTE J1855-026 with the best-fitted model components and the residuals obtained with the *Suzaku*-XIS detectors. *Right panel*: Variation in the spectral parameters with time is shown.
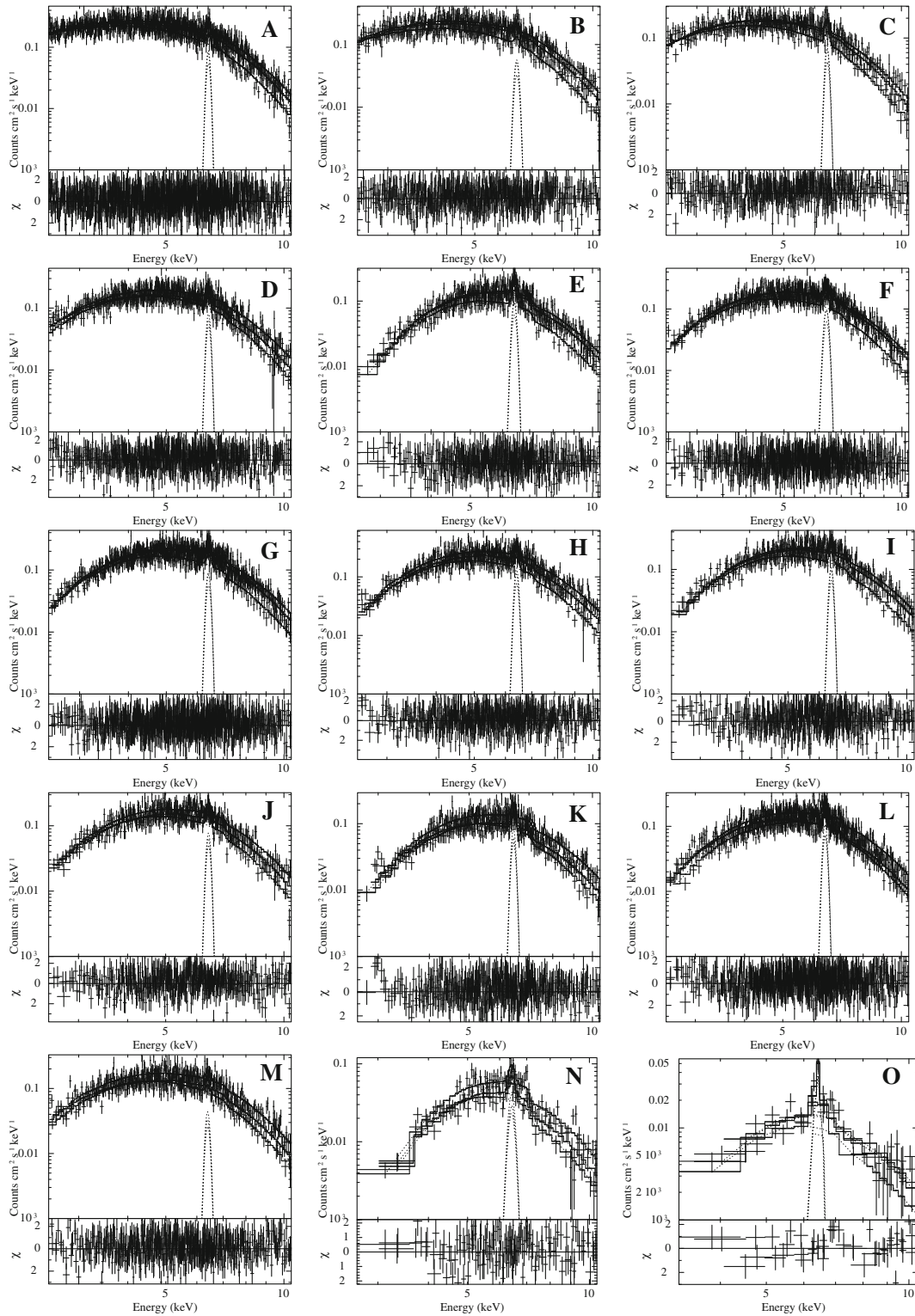
Figure 5. Time-resolved spectrum of XTE J1855-026 for different segments in the 2.5–10.5 keV energy range along with best-fitted spectral model and the residuals is shown.

fitting, all the spectral parameters other than the relative instrument normalization were tied together for all the three detectors. XIS spectra is known to have instrumental artifacts in the energy range 1.75–2.23 keV

and is ignored while fitting the spectrum. We first tried to fit the 1.0–10.5 keV energy spectrum with a model consisting of a simple absorbed power law model. This did not give a satisfactory fit with red-χ^2 of 3.8.

Residuals at 6.4 keV indicate the presence of iron fluorescence line emission and a Gausian function is included which gave a better fit. A low energy excess is obvious and a black body component was added (red-χ^2 of 1.65). A partial covering absorption component is added whcih significantly improved the fit (red-χ^2 of 1.22). We find that the energy spectrum of XTE J1855-026 in the energy range 1.0–10.5 keV was well fitted with a model consisting of partial covering power-law model, a black-body component for soft excess and a Gaussian function accounting for the iron fluorescence line emission and interstellar absorption. The best fitted spectral parameters of XTE J1855-026 are given in Table 1. The time averaged energy spectrum of XTE J1855-026 with the best-fitted model components and the residuals is shown in Fig. 4.

4.2 *Time-resolved spectral analysis*

The hardness ratio plot shown in the bottom panel of Fig. 2 indicates significant absorption of soft X-rays at different times. To investigate the spectral variations in detail, we carried out time-resolved spectral analysis by dividing the entire Suzaku observation duration into 15 segments and created energy spectrum sepatately. Among these 15 segments, the last two segments N and O, are during the eclipse ingress. The duration of each segment is variable taking into account the variability of the hardness ratio carefully and are marked in Fig. 2. For fitting energy spectrum of each segment, we ignored the energy range below 2.5 keV due to limited statistics and hence the black body and partial covering component are not required. So the time-resolved spectrum for each segment is fitted with a simple absorbed power-law model and a gaussian function for iron fluorescence line emission. The variation of spectral parameters with time are shown in Fig. 4. We see that the column density and iron line equivalent width parameters vary significantly with time. An increase in hydrogen column density and iron line equivalent width is noticed with significant correlation with the variations observed in the hardness ratio plot. The variation in the hydrogen column density and iron equivalent width provide us with more insight into the distribution of the matter surrounding the system. The time-resolved energy spectrum of XTE J1855-026 for each segmentwith the best-fitted model components and resolution is shown in Fig. 5.

Figure 6 shows the variation in the shape of the continuum spectrum in three different segments B, E and N plotted together in a single panel showing the extremes
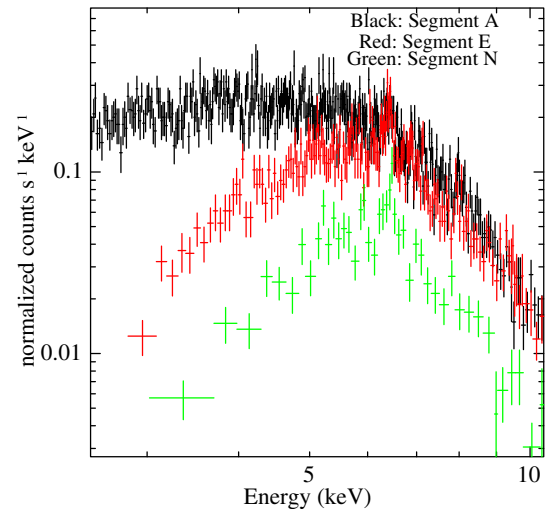
Figure 6. Variation in the shape of the continuum due to significant absorption of soft X-rays in three different segments obtained from the time resolved spectroscopic analysis.

of variation in the absorption of soft X-rays. The segments N and O are during eclipse ingress and show very low flux and very large equivalent width of iron line.

5. Discussion

In the previous sections, we have presented a detailed analysis performed on the *Suzaku*-XIS data of XTE J1855-026. The important results obtained give insight into the distribution of the surrounding matter. In stellar wind-driven accreting systems, the neutron star may be embedded in the material lost by the donor star and the inhomogeneties in the distribution of material in the form of clumps which will cause significant absorption of soft X-rays, especially when the system is in eclipse ingress or egress phase. The emitted X-ray radiation from the primary star can affect the structure and ionization of the stellar wind which in turn affect the velocity and density profile of outflows from the massive stars.

The important outcomes of the analysis are

- Even though the pulse profiles do not show significant energy dependence above 3 keV, at energies ≤3 keV, the pulse profile is characterized with an additional small peak along with the main peak. A little energy dependence and sharp features in the pulse profiles of XTE J1855-026 during flares using observations carried out with *RXTE*-PCA was reported by Corbet *et al.* (1999).

- The long-term orbital intensity profiles of XTE J1855-026 (Fig. 1) show significant energy dependence (Falanga *et al.* 2015). We noticed that the X-ray emission from the primary star got significantly reduced, even before the source went into eclipse. The very large N_H in the last two segments are probably due to the line-of-sight to the neutron star coming very close to the companion star surface where the stellar wind density is high. In segment E in which the X-ray intensity is low and N_H is high, as seen in Fig. 4, it is probably due to a clump in front of the neutron star. This indicates the presence of dense absorbing material in the near by surroundings and inhomogeneities in the stellar wind. Asymmetries in eclipse ingress and egress are reported in other supergiants like 4U 1700-37, Vela X-1, 4U 1538-52, OAO 1657-415 (Falanga *et al.* 2015 and references therein). The energy dependent light curves of the eclipse ingress/egress of the classical sgHMXBs reveal details of the OB stellar wind structure where it can be caused by accretion wakes.

- Classical sgHMXBs are known to show significant variations in the spectral parameters which indicates the presence of dense stellar wind surrounding the compact object. Flaring activity and short off-states have been observed in Vela X-1 which were interpreted as the effect of a strongly structured wind, characterizing the X-ray variability of Vela X-1 with a log-normal distribution, interpreted in the context of a clumpy stellar wind (Fürst *et al.* 2010). Few known sources with clumpy stellar wind are OAO 1657-415 (Pradhan *et al.* 2014), 4U 0114+65 (Pradhan *et al.* 2015), Cen X-3 (Naik *et al.* 2011), Vela X-1 (Fürst *et al.* 2010) and GX 301-2 (Islam & Paul 2014). Time-resolved spectral parameters of XTE J1855-026 showed significant variations with time, especially for the equivalent hydrogen column density ($4-36 \times 10^{22}$ atoms cm^{-2}) and iron line equivalent width (84–509 eV). In accretion powered pulsars, the Fe Kα line is produced by the reprocessing of the hard X-ray emission in the relatively low ionized and cool matter surrounding the pulsar. The increase in line equivalent width corresponds to the increase in the number of scattering on

passing through the dense matter. The presence of soft excess is detected in the phase averaged energy spectrum of XTE J1855-026. The soft excess is modelled with a black-body component which requires a temperature of 0.12 keV. Several other known sources which shows the presence of soft excess include SMC X-1, LMC X-4, RX J0059.2-7138 and X Per (Paul *et al.* 2002).

From this *Suzaku* observation, it is evident that the companion wind characteristics of XTE J1855-026 are similar to Vela X-1, OAO 1657-415, etc.

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Electron irradiation induced effects on the physico-chemical properties of L-Arginine Maleate Dihydrate (LAMD) single crystals

Prince Thomas[a], S.D. Dhole[b], Ginson P. Joseph[a],*

[a] Department of Physics, St. Thomas College, Palai, Kerala 686574, India
[b] Department of Physics, University of Pune, Pune 411007, India

ABSTRACT

Single crystals of L-Arginine Maleate Dihydrate (LAMD) have been synthesized by slow solvent evaporation technique and irradiated with 6 MeV electrons at fluences of $0.5 \times 10^{15} e/cm^2$, $1.0 \times 10^{15} e/cm^2$ and $1.5 \times 10^{15} e/cm^2$. The Powder X-ray Diffraction (PXRD) studies showed that the intensity of the diffraction peaks of the Electron Beam (EB) irradiated crystals decreases with irradiation fluence. The electron irradiation induced effects on the optical parameters such as cut-off wavelength, band gap, Urbach energy and refractive index have been studied and the results are tabulated. The electronic parameters such as valence electron plasma energy, $\hbar\omega_p$, Penn gap, E_p, Fermi energy, E_F and Electronic polarizability, α for pure and irradiated LAMD crystals are calculated. The electrical and thermal properties of the pure and irradiated LAMD crystals are also investigated.

1. Introduction

Nonlinear optical materials based on amino acid complexes are intrigued by materials scientists due to high optical susceptibilities, ultrafast response, and high optical thresholds for lasers as compared with inorganic materials. The push-pull effect owing to proton donor carboxyl acid (–COO) group and the proton acceptor amino (–NH$_2$) group is the countenance of amino acid complexes. The –COO group gives its proton to the amino group to form $CH_3CHCOONH_3^+$ and thereby creates a dipolar nature. The donor and acceptor groups provide the ground state charge asymmetry of the molecule, which is essential for second-order nonlinearity [1–4]. The α-amino group and guanidyl group present in the LAMD structure are protonated and the $C-N$ bond present in the guanidyl group is conjugated. The planar ring present in the LAMD structure is formed by sharing one hydrogen (H) atom between the oxygen (O) atoms in the carboxyl groups of the maleate anion. LAMD formed by the reaction of L-Arginine and Maleic acid belongs to the triclinic crystal system with cell parameters a = 5.2710 Å, b = 8.0481 Å, c = 9.7942 Å, α = 106.155°, β = 97.265° and γ = 101.649° [5]. L-Arginine Maleate Dihydrate (LAMD) is one of the prominent crystals of L-Arginine family having the SHG efficiency 1.5 times greater as compared to KDP crystals [6]. The nonlinear optical character of the LAMD is due to the intrinsic hyperpolarizabilities of the L-Argininium cations, Maleate anions and intermolecular hydrogen bonds [5]. The fundamental characterizations of LAMD have been already reported [6–11].

Recently, materials scientists are fascinated by the electron irradiations on solid samples because of its capability of tailoring the desired properties by varying the dosage or energy of the electron bombardment. The hardening and softening of metals are possible by electron irradiation [12]. M. J. Makin, and T. H. Blewitt [13] have successfully hardened the copper (Cu) single crystal by 4 MeV EB irradiation. The bombarded electrons may be trapped in various lattice imperfections and cause permanent changes in the material [14]. Electron beam irradiation enhanced the glide dislocations in GaAs single crystals [15]. The reduction in the optical band gap of iminodiacetic acid doped ferroelectric triglycine sulphate (IDATGS) is also observed with graded dosages of electron beam [16]. The SHG efficiency of 4-amino-5-mercapto-3-[1-(4-isobutylphenyl)ethyl]-1,2,4-triazole (AMIT) single crystals increased with increasing the dosages of electron irradiation [17]. From the literature survey, we came to know that the optical band gap, photoluminescence, thermal and electrical properties of crystalline materials, nanoparticles and polymer electrolytes can be tuned by EB irradiation [18–27]. Hence in this paper, an attempt has been made to modify the electrical, thermal and optical properties of LAMD crystals using electron irradiation by varying the irradiation fluence.
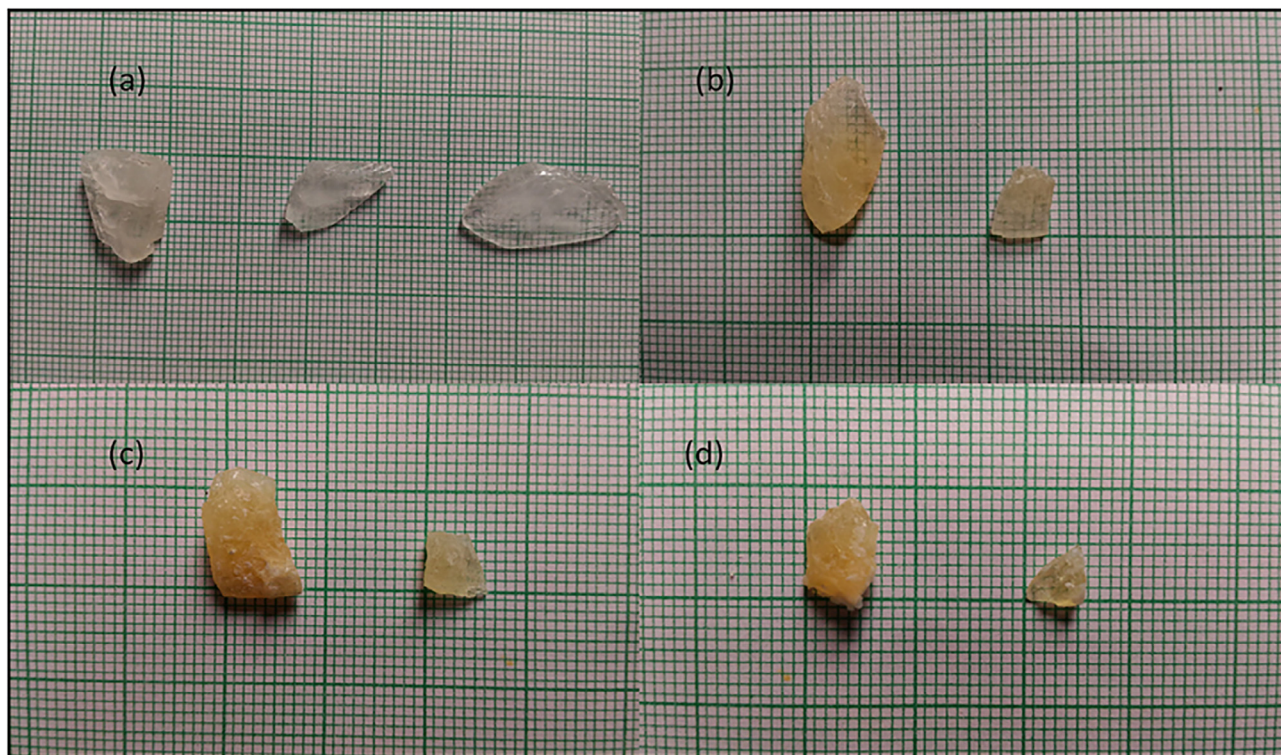
Fig. 1. (a): Pure LAMD crystal, Fig. 1(b–d). Irradiated LAMD crystals.
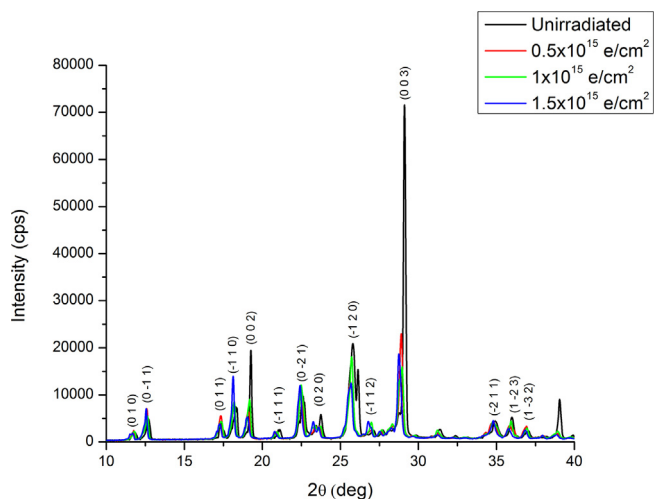
Fig. 2. X-ray diffraction patterns of unirradiated and irradiated LAMD single crystals.

2. Experimental procedure

2.1. Synthesis of the crystal

The LAMD single crystals are synthesized using slow solvent evaporation method. The high purity (AR grade) reactants L-Arginine and Maleic acid are taken in an equimolar ratio according to the following reaction [6].

$$NH_2CNHNH(CH_2)_3CH(NH_2)COOH + HOOCCHCHCOOH + 2H_2O$$
$$\rightarrow (H_2N)_2^+CNH(CH_2)_3CH(NH_3)^+COO^-HOOCCHCHCOO^-2H_2O$$
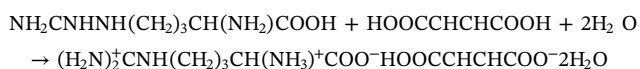
The reactants are dissolved in Millipore water (resistivity-18.2 MΩ) and stirred for six hours to get a homogeneous solution. Then the solution is filtered using Whatman filter paper and transferred into a beaker having a perforated lid. The embryo of LAMD crystals formed after one week and defect-free crystals are chosen as the seed crystals for further growth. Good quality, transparent size of $14 \times 11 \times 3 \, mm^3$ crystals are harvested after 33 days. The photograph of as grown LAMD crystals are shown in Fig. 1 (a).

2.2. Electron irradiation

The good quality LAMD crystals are irradiated with high energy electron beam (6 MeV) with different fluences using Race- Track microtron facility. The irradiation fluences used for the experiment are $0.5 \times 10^{15} e/cm^2$, $1.0 \times 10^{15} e/cm^2$ and $1.5 \times 10^{15} e/cm^2$. The pristine and irradiated crystals are shown in Fig. 1 (a–d). The transparent pristine crystals are changed into golden yellowish colour after EB irradiation.

3. Characterizations

The Powder X-ray diffraction (PXRD) data of pristine and EB irradiated LAMD single crystals are collected using the Rigaku Miniflex PXRD diffractometer with CuK$_\alpha$ ($\lambda = 1.5418 \, Å$) radiation at room temperature. The Diffuse Reflectance Spectra (DRS) of irradiated and unirradiated samples are measured by Jasco V 670 spectrophotometer in the range 200 nm to 1100 nm to study the linear optical character of the material. Horiba Fluorolog Fluorescence Spectrometer is employed to perform the Photoluminescence (PL) spectra of the LAMD crystals. The HIOKI LCR HiTESTER is made use to study the dielectric measurements of the unirradiated and EB irradiated LAMD. Thermogravimetric analysis (TGA) and Differential Scanning Calorimetry (DSC) of LAMD samples are carried out using PerkinElmer STA 6000 Simultaneous Thermal Analyser in the range of 35 °C to 700 °C at a heating rate of 10 °C/min in the nitrogen atmosphere.

Table 1
Variations of 2θ and Intensity of X-ray diffraction peaks before and after irradiation.

Irradiation Fluences ⇨ Peaks ⇩	Unirradiated		0.5×10^{15} e/cm^2		1.0×10^{15} e/cm^2		1.5×10^{15} e/cm^2	
	2θ (deg)	Intensity (cps)	2θ (deg)	Intensity (cps)	2θ (deg)	Intensity (cps)	2θ (deg)	Intensity (cps)
0 1 0	11.78	1416.77	11.72	1614.68	11.77	1687.46	11.61	1273.23
0 −1 1	12.67	4499.92	12.57	6016.14	12.60	4753.65	12.52	5574.12
0 1 1	17.36	3057.26	17.31	4770.57	17.32	3693.12	17.23	2996.71
−1 1 0	18.27	6157.25	18.12	6474.76	18.16	7511.391	18.11	12525.81
0 0 2	19.25	18768.91	19.07	5836.26	19.13	7936.52	19.01	4587.83
−1 1 1	21.07	1909.05	20.88	1508.94	20.92	1371.12	20.81	1469.53
0 −2 1	22.58	8215.38	22.45	9798.15	22.49	10947.98	22.39	10884.96
0 2 0	23.64	3504.87	23.49	2769.37	23.43	2580.71	23.33	2613.35
−1 2 0	25.81	18046.12	25.63	11619.44	25.69	15304.16	25.60	10931.47
−1 1 2	28.82	4548.76	28.08	1677.66	27.63	1602.92	27.41	1486.99
0 0 3	29.11	69667.05	28.88	20769.07	28.88	13851.57	28.77	16769.43
−2 1 1	34.91	3207.02	34.75	3344.15	34.82	3307.42	34.76	3122.41
1 −2 3	35.98	4289.47	35.89	2653.4	35.9	3256.72	35.78	2098.29
1 −3 2	36.99	1501.04	36.87	2610.7	36.91	2091.77	36.83	1861.63

Table 2
Lattice parameters of unirradiated and EB irradiated LAMD crystals.

Lattice Parameters	Pristine	0.5×10^{15} e/cm^2	1.0×10^{15} e/cm^2	1.5×10^{15} e/cm^2
a (Å)	5.2692	5.2679	5.2744	5.2553
b (Å)	8.0533	8.0601	8.0483	8.0552
c (Å)	9.7945	9.8097	9.7963	9.8103
α (deg)	106.226	106.179	106.116	106.124
β (deg)	97.240	97.451	97.460	97.649
γ (deg)	101.670	101.595	101.661	101.448
Volume (Å^3)	383.3857	384.1498	383.5515	383.1357
Calculated Density (g/cm^3)	1.4133	1.4105	1.4127	1.4142
Space group	P1	P1	P1	P1
Crystal system	Triclinic	Triclinic	Triclinic	Triclinic
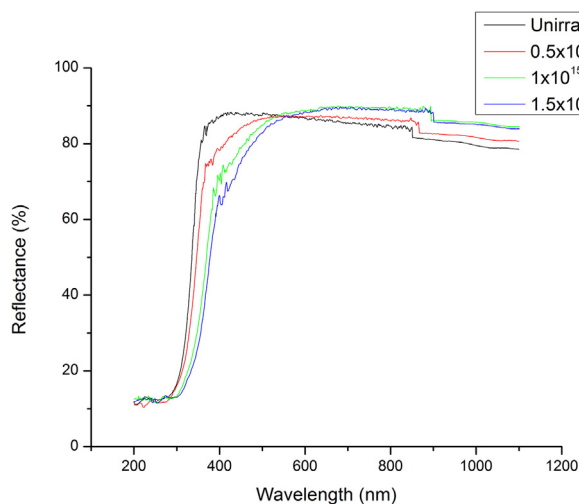
Fig. 3. Reflectance spectra of unirradiated and EB irradiated LAMD single crystals.
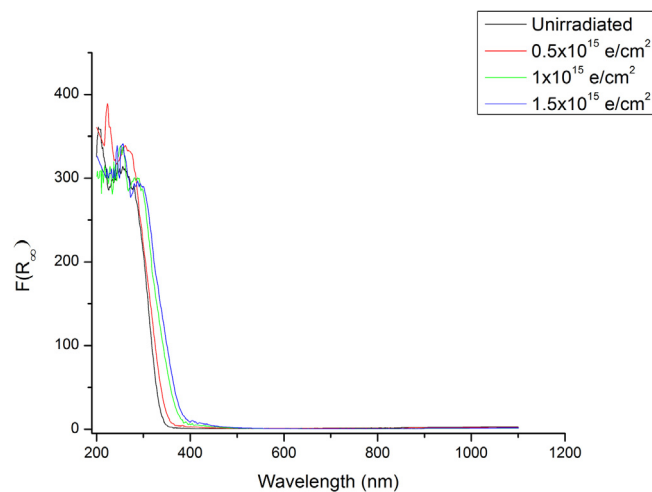
Fig. 4. $F(R)$ versus wavelength curve of unirradiated and EB irradiated LAMD single crystals.

4. Results and discussion

4.1. Powder X-ray diffraction (PXRD) study

The PXRD diffractograms of the pristine and irradiated LAMD are presented in Fig. 2. The peaks observed on the diffractogram are indexed using EXPO 2014 [28] program. The LAMD single crystal belongs to the triclinic crystal system with noncentrosymmetric space group P1. The calculated lattice parameters of the unirradiated and irradiated LAMD samples are shown in Table 2. From the PXRD profile, it is

observed that the (0 0 3) peak has the highest intensity and it decreases with increasing the irradiation dosage. The centre of the peaks has also been changed with the irradiation dosages. The variations in the intensity and the peak centers may be due to the decrease of crystalline perfection by the bombardment of the high energy electrons. Irradiating with high energy EB on crystals induces point defects and variations in the crystallinity of the material. A crystalline-to-amorphous transition is observed when electron beam impinges on β-SiC single crystals [18]. The variations in the peak centers and intensity of the indexed peaks with irradiation dosage are tabulated in Table 1
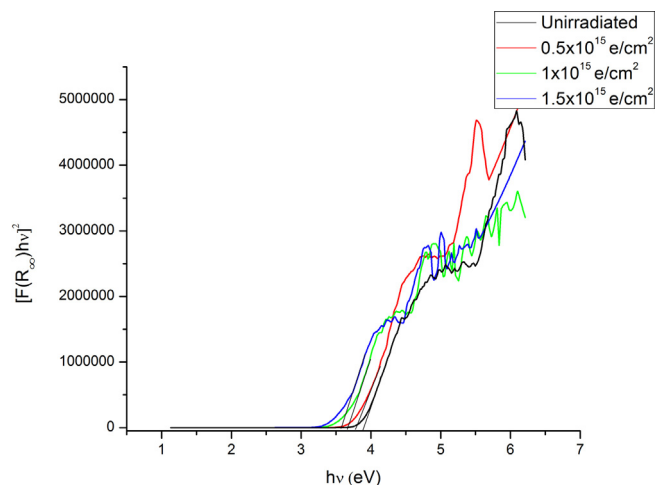
Fig. 5. Tauc's plot of unirradiated and EB irradiated LAMD single crystals.
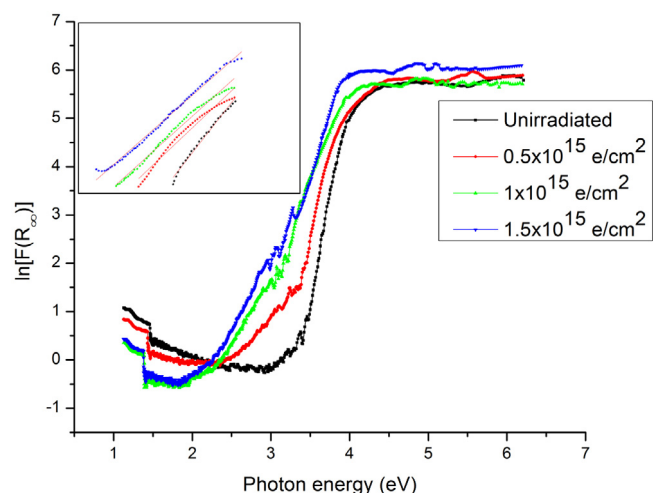
Fig. 6. Plot of $ln[F(R)]$ versus photon energy. Inset plot shows the linear fit.

4.2. Optical studies

The study of the absorption nature of the sample in the UV–Vis region of the electromagnetic spectrum gives the information about the electronic transition in the material. In the case of organic compounds, most of the absorption takes place due to the electronic transition from the ground state of σ and π orbitals to the higher energy states [29]. Structural studies of LAMD crystal show that the arginine molecule exists as a positively charged zwitter ion in which the guanidyl and amino groups are protonated and the carboxyl group is deprotonated. So there is a probability of $\pi-\pi^*$ transition of electrons in the carboxylate and guanidyl groups [8]. Diffuse Reflectance Spectra (DRS) is used to study the optical characteristics of pure and irradiated LAMD crystals and the calculations are made by the theory developed by Kubelka and Munk [30]. If the layer thickness is enough to ensure that a further increase in thickness will not change the reflectance, then this
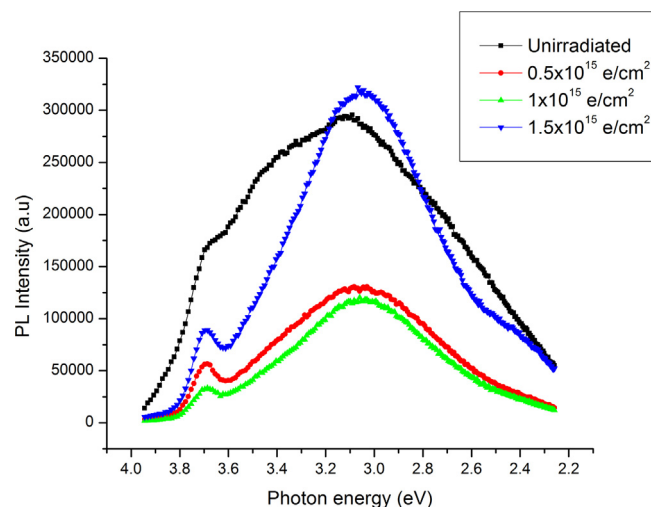
Fig. 7. PL spectra for unirradiated and EB irradiated LAMD crystals.

reflectance is denoted by the term $R_\infty \left(R_\infty = \frac{R_{sample}}{R_{standard}} \right)$ [31]. Kubelka and Munk constructed a relation using the parameters scattering coefficient (S), absorption coefficient (K), and R_∞.

$$\frac{K}{S} = \frac{(1-R_\infty)^2}{2R_\infty} \equiv F(R_\infty) \tag{1}$$

where $F(R_\infty)$ is the remission or Kubelka-Munk function. From the Figs. 3 and 4, it is clear that the cut-off wavelength is shifted towards the longer wavelength region (optical red shift).

Change in the optical bandgap due to EB irradiation is calculated using the Tauc's plot [32]. For direct inter band transitions, the absorption coefficient is given by

$$(\alpha h\vartheta)^2 = C_1(h\vartheta - E_g) \tag{2}$$

where C_1 is a parameter which depends on transition probability, α is the linear absorption coefficient, h is the Plank's constant, ϑ is the frequency and E_g is the optical bandgap. If the material scatters in perfectly diffuse manner or when it is illuminated at 60° incidence the Kubelka–Munk absorption coefficient, K becomes equal to 2α (K = 2α) [33]. Thus Tauc's equation using the Kubelka–Munk function, $F(R_\infty)$ become'

$$[F(R_\infty)h\vartheta]^2 = C_2(h\vartheta - E_g) \tag{3}$$

From Fig. 5 one can easily see that the band gap of the LAMD crystals decreases with increasing the fluence of the irradiation. The bandgaps of the unirradiated, irradiated LAMD crystals of fluences $0.5 \times 10^{15}/cm^2$, $1.0 \times 10^{15}/cm^2$ and $1.5 \times 10^{15}/cm^2$ are 3.90 eV, 3.77 eV, 3.68 eV and 3.58 eV respectively. The reduction in the optical band gaps due to the electron irradiation were also reported in iminodiacetic acid doped ferroelectric triglycine sulphate (IDATGS) [16]. The defects induced by irradiation caused to increase the width of localized states, which led to the reduction in the band gap [34].

The refractive index of a material is the measure of the transparency of the material to the incident photon [35]. The first semi-empirical relation between refractive index and the band gap is put forward by

Table 3
Optical parameters of LAMD before and after irradiation.

LAMD Sample	Cut-off Wavelength (nm)	Bandgap energy, E_g (eV)	Urbach energy, E_u (meV)	Refractive index, (n)
Unirradiated	300	3.90	130	2.57
Irradiation fluence (0.5×10^{15} e/cm^2)	308	3.77	181	2.59
Irradiation fluence (1.0×10^{15} e/cm^2)	327	3.68	188	2.61
Irradiation fluence (1.5×10^{15} e/cm^2)	332	3.58	193	2.63
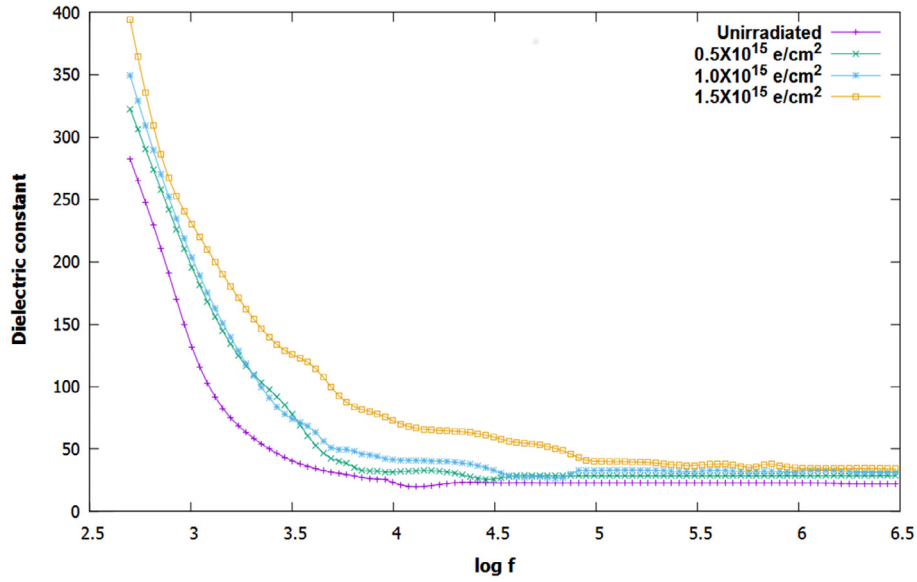
Fig. 8. Effect of EB irradiation on dielectric constant as a function of frequency.
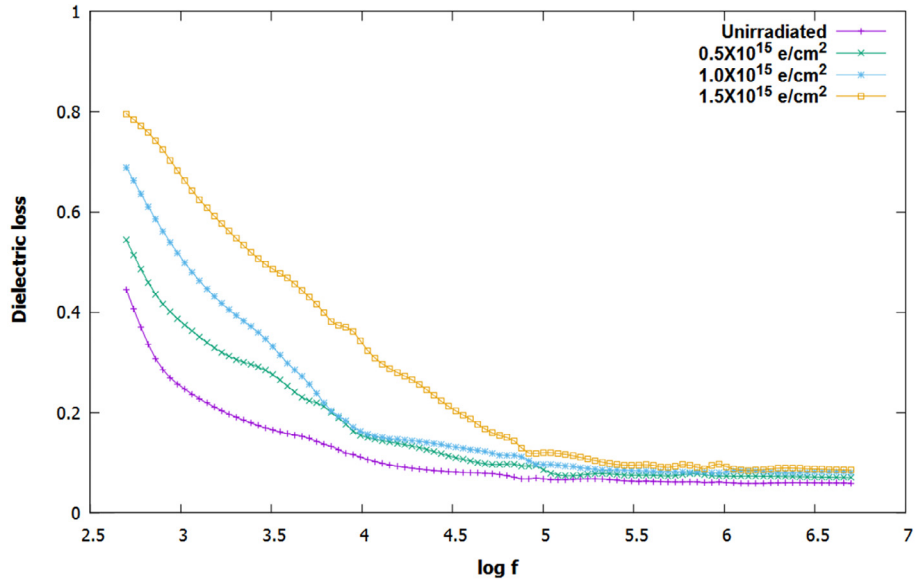
Fig. 9. Effect of EB irradiation on dielectric loss as a function of frequency.

Moss [36,37].

$$n^4 E_g = 95 \text{ eV} \tag{4}$$

where n^4 is the fourth power of refractive index and E_g is the band gap energy. The relation proposed by Ravindra et al. [38] could not give the accurate values of refractive index for small ($\leqslant 0.3$ eV) and large ($\geqslant 3.5$ eV) energy gaps and all these relations are mainly for semiconductors. A more general relation which is applicable to all type of material is put forward by R.R. Reddy and Y. Nazeer Ahammed [39], which is given by

$$n^4 (E_g - 0.365) = 154 \tag{5}$$

Where n^4 is the fourth power of refractive index and E_g is the band gap. The refractive indices obtained using Eq. (5) is 2.57, 2.59, 2.61 and 2.63 respectively. The changes made in the refractive index of the crystal by varying the fluence of the electron irradiation aid the material scientists to tune the LAMD crystals for optical wave guide fabrication.

The degree of material imperfection or point defects made by the EB

irradiation is estimated using the method proposed by Urbach. The EB irradiation causes the formation of defect bands as an intermediate state in the band gap. These defect band states create band tails in the edges of the valence band and conduction band. The spectral dependence of the absorption coefficient, α or $F(R)$ in the spectral region where the transitions involving the band tail states can be described using the Urbach rule [40], which is given by

$$\alpha = \alpha_0 e^{\frac{h\vartheta}{E_u}} \tag{6}$$

where α_0 is a constant, $h\vartheta$ is the photon energy and E_u is the Urbach energy which shows the structural disorder or the width of the exponential absorption edge. The reciprocal of the slope of the linear portion, below the optical bandgap, in the $\ln[F(R)]$ versus $h\vartheta$ curve gives the value of Urbach energy (Fig. 6) [41]. The calculated values of Urbach energy according to the increase in EB irradiation fluence are 130 meV, 181 meV, 188 meV and 193 meV respectively. The calculated values of cut-off wavelength, band gap energy, refractive index and Urbach energy are listed in Table 3.
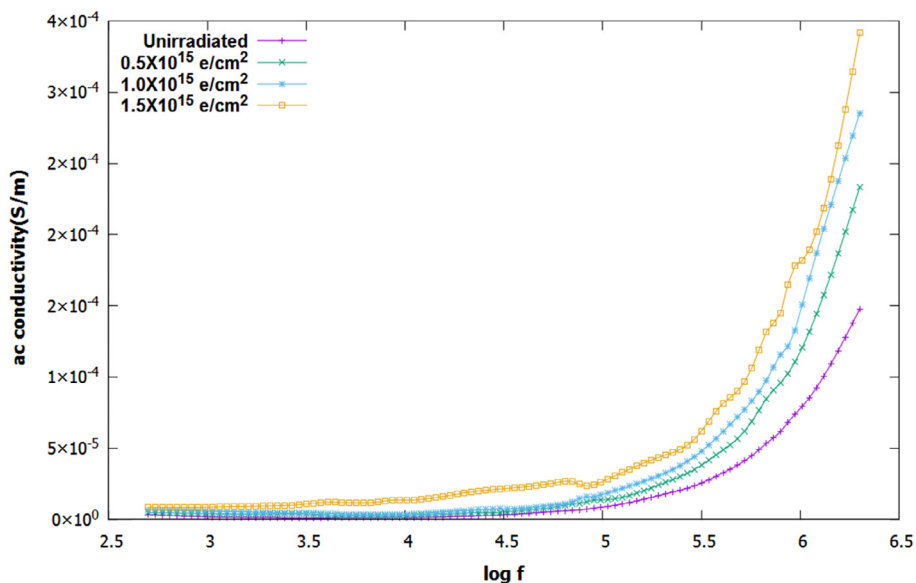
Fig. 10. Effect of EB irradiation on ac conductivity as a function of frequency.
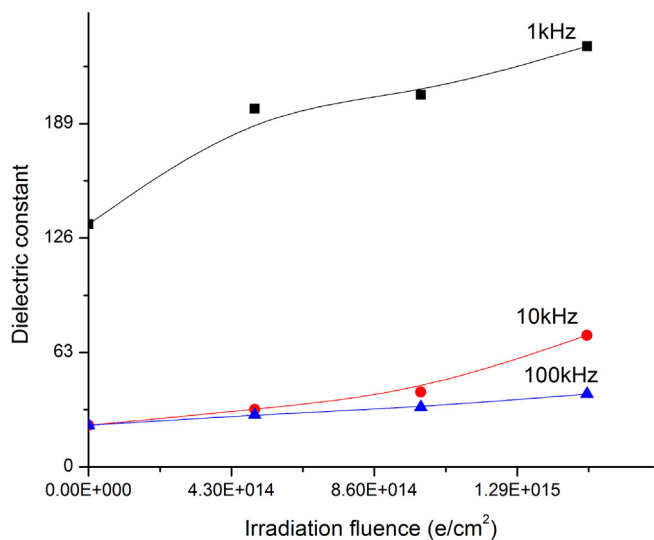
Fig. 11. Irradiation fluence Vs dielectric constant at different frequencies.
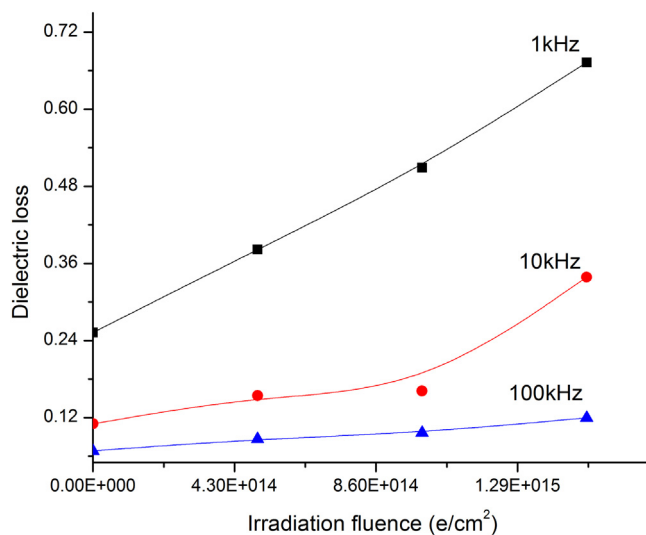
Fig. 12. Irradiation fluence Vs dielectric loss at different frequencies.

The Photoluminescence (PL) spectra of pure and irradiated LAMD crystals are recorded between 315 nm (3.94 eV) and 550 nm (2.25 eV) at room temperature and it is shown in Fig. 7. The position of the peak centers shifts towards the longer wavelength region (lower energy region) with increasing the dosages of EB. The observed peak centers are 3.12, 3.06, 3.04 and 3.03 eV for unirradiated and irradiated with fluences $0.5 \times 10^{15} e/cm^2$, $1.0 \times 10^{15} e/cm^2$ and $1.5 \times 10^{15} e/cm^2$ respectively. The shift in the peak centers is due to the formation of the defect bands caused by high energy electron beam. The intensity of the peaks reduced with irradiation fluence except for the irradiation fluence $1.5 \times 10^{15} e/cm^2$. The high energy electron beam may distort the crystal structure and reduce the electron-hole recombination process. Reduction in the radiative recombination leads to the decrease in intensity and broader peaks in the case of irradiated samples with fluences $0.5 \times 10^{15} e/cm^2$, $1.0 \times 10^{15} e/cm^2$. The increase in the intensity of the peak corresponding to $1.5 \times 10^{15} e/cm^2$ may be due to the formation of the intermediate energy levels (activators) at this fluence which favours radiative recombination process. The emission of photons by the electrons from different newly created levels in electronic transition caused the increase in peak intensity [25].
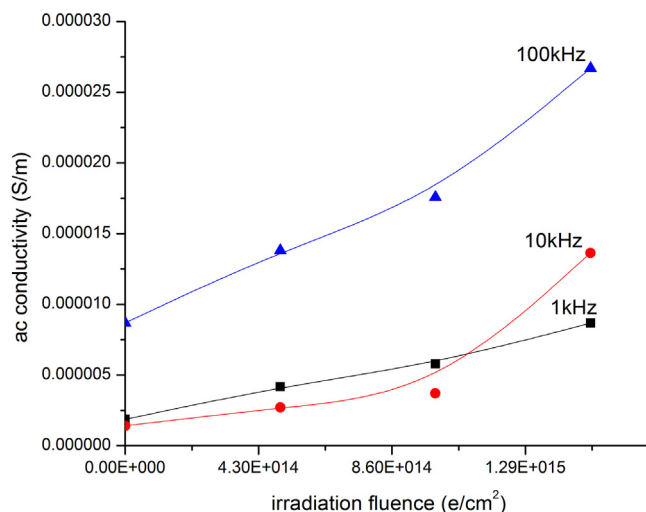
Fig. 13. Irradiation fluence Vs ac conductivity at different frequencies.

Table 4
Calculated polarizability parameters of unirradiated and EB irradiated LAMD crystals.

Parameters	Pristine	0.5×10^{15} e/cm^2	1.0×10^{15} e/cm^2	1.5×10^{15} e/cm^2
Electron plasma energy ($\hbar\omega_p$))	19.5137 eV	19.4944 eV	19.5096 eV	19.5199 eV
Penn gap (E_p)	4.1664 eV	3.7060 eV	3.4978 eV	3.3658 eV
Fermi energy (E_F)	15.4874 eV	15.4670 eV	15.4831 eV	15.4940 eV
Polarizability (α) from Penn Model	7.9757×10^{-23} cm^3	8.2151×10^{-23} cm^3	8.2998×10^{-23} cm^3	8.3506×10^{-23} cm^3
Polarizability (α) from Clausius-Mossotti equation	8.0548×10^{-23} cm^3	8.2772×10^{-23} cm^3	8.3546×10^{-23} cm^3	8.4012×10^{-23} cm^3
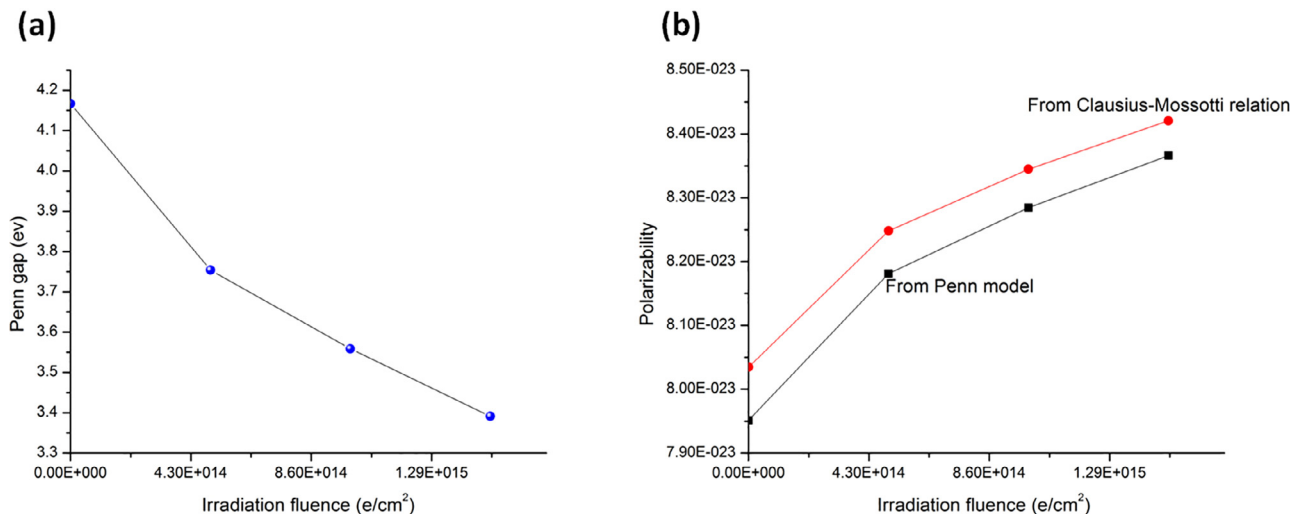
Fig. 14. (a & b): Effect of EB irradiation on Penn gap and Polarizability of the LAMD single crystal.
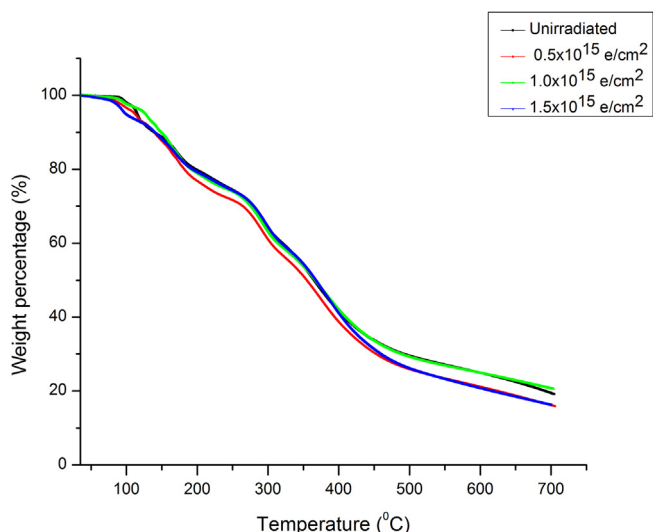
Fig. 15. TGA curves of unirradiated and EB irradiated LAMD single crystals.

Fig. 16. DSC thermogram of unirradiated LAMD single crystal.

4.3. Dielectric studies

The value of the dielectric constant, ε_r is calculated using the relation

$$\varepsilon_r = \frac{Cd}{\varepsilon_0 A} \tag{7}$$

where 'd' is the thickness of the sample, 'ε_0' is the permittivity of free space and 'A' is the area of the sample. The obtained values of ε_r are plotted against log frequency, the plot is shown in Fig. 8. The plot depicts that the value of dielectric constant is high at lower frequencies and decreasing according to the increasing frequencies. This is due to the fact that the four polarizations, namely electronic, ionic, orientational and space charge are active at lower frequencies and contributed to the value of dielectric constant. At higher frequencies, different polarizations mechanisms are deactivated because of the response of the polarizations do not cope with the increasing frequency and hence the value of the dielectric constant decreased. The dielectric loss also follows the same behaviour as the dielectric constant (Fig. 9). The ac conductivity of the material is calculated using the relation

$$\sigma_{ac} = 2\pi f \varepsilon_0 \varepsilon_r \tan\delta \tag{8}$$

where 'ε_0' is the permittivity of free space, 'ε_r' is the dielectric constant, 'f' is the applied frequency and 'tanδ' is the loss tangent. The ac conductivity versus log frequency plot is shown in Fig. 10 and it is observed that ac conductivity increases with frequency. The variations of dielectric constant, dielectric loss and ac conductivity with irradiation
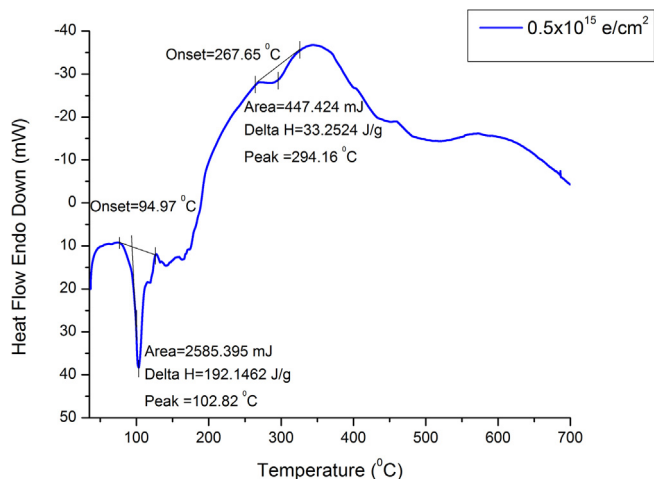
Fig. 17. DSC thermogram of LAMD irradiated with 0.5 × 10^{15} e/cm^2 fluence.
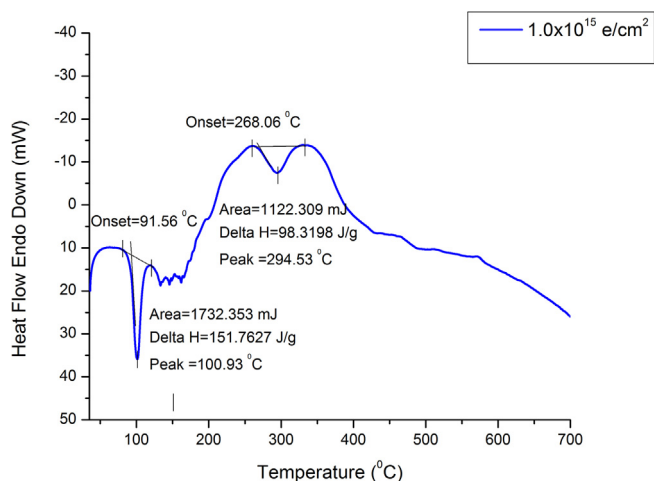
Fig. 18. DSC thermogram of LAMD irradiated with 1.0 × 10^{15} e/cm^2 fluence.
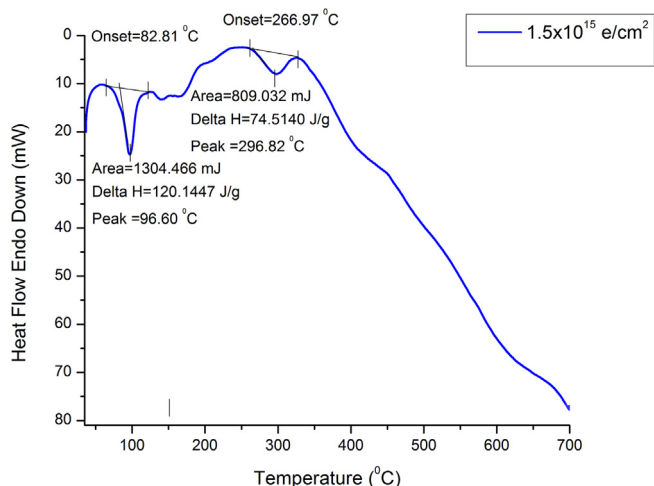
Fig. 19. DSC thermogram of LAMD irradiated with 1.5 × 10^{15} e/cm^2 fluence.

fluence are also plotted (Figs. 11–13) and found that all these increased with increasing the dosage of irradiation. The EB irradiation positively affects some of the polarization mechanisms and enhanced the value of dielectric constant. The total dielectric loss of a material depends on some intrinsic factors like crystal symmetry, ac field frequency, temperature etc. and some extrinsic factors like presence of impurities,

dislocations, grain boundaries etc [20]. The high energy EB induced some defects in the crystal. It also reduces the crystallinity of the material, which is confirmed by the PXRD and TGA-DSC studies. This increasing defect concentration due to EB irradiation is the reason for the increase in the dielectric loss with irradiation fluence. The creation of the free radicals and the increase in the number density of the guest electrons are the main reasons for the increase of conductivity with increase in irradiation fluence.

The electronic parameters such as valence electron plasma energy, $\hbar\omega_p$, Penn gap, E_p, Fermi energy, E_F and electronic polarizability, α from high frequency dielectric constant, ε_∞ for pure and irradiated LAMD crystals are also calculated. The valence electron plasma energy, $\hbar\omega_p$ can be found out from the relation [42,43]

$$\hbar\omega_p = 28.8\left(\frac{Z\rho}{M}\right)^{\frac{1}{2}} \tag{9}$$

where Z is the total number of valence electrons, ρ is the density, M is the molecular mass, $\hbar = \frac{h}{2\pi}$ and ω_p is the plasma angular frequency. The Penn gap, E_p and Fermi energy, E_F has a finite dependence on the $\hbar\omega_p$ and it can be written as

$$E_p = \frac{\hbar\omega_p}{(\varepsilon_\infty-1)^{\frac{1}{2}}} \tag{10}$$

and

$$E_F = 0.2948(\hbar\omega_p)^{\frac{4}{3}} \tag{11}$$

The electronic polarizability, α of the LAMD crystal can be calculated from the obtained values of electron plasma energy and Penn gap energy using the relation

$$\alpha = \left[\frac{(\hbar\omega_p)^2 S_0}{(\hbar\omega_p)^2 S_0 + 3E_p^2}\right] \times \frac{M}{\rho} \times 0.396 \times 10^{-24}\ cm^3 \tag{12}$$

where S_0 is a constant for the material and can be calculated from the relation

$$S_0 = 1 - \left[\frac{E_p}{4E_F}\right] + \frac{1}{3}\left[\frac{E_p}{4E_F}\right]^2 \tag{13}$$

The value of the electronic polarizability, α can also be calculated from the Clausius-Mossotti equation, which is given by

$$\alpha = \frac{3M}{4\pi N_a\rho}\left[\frac{\varepsilon_\infty-1}{\varepsilon_\infty + 2}\right] \tag{14}$$

where N_a is the Avogadro number. The calculated polarizability parameters for pristine and irradiated LAMD samples are given in Table 4 and the variations of Penn gap and Polarizability are plotted against irradiation fluence, which is shown in Fig. 14(a & b). It is apparent from the table and also from the plot that the polarizability increased with irradiation fluence and the Penn gap decreased with irradiation fluence. The frequency conversion efficiency of the material depends on its polarizability [10]. It is seen that the dielectric constant and thereby electronic polarizability of the material increased with irradiation fluence.

4.4. Thermal studies

The TGA thermograms of unirradiated and irradiated LAMD crystals are shown in Fig. 15. It is obvious from the plots that high fluence of irradiation causes the reduction of thermal stability. The decompositions of the samples are occur in three different stages. The change observed around 90 °C may be due to the loss of water of crystallization [11]. The dehydration of the material is completed in the first stage of the decomposition, between 90 °C and 178 °C. The second stage between 178 °C and 301 °C may be related to the liberation of carbon dioxide (CO_2) gas and the dissociation of the maleic acid. The final

Table 5
Values of some thermal parameters of unirradiated and EB irradiated LAMD single crystals.

LAMD Sample Parameters	TGA	DSC					
	Weight percentage at 90 °C (%)	Peak at first major dissociation			Peak at second major dissociation		
		T_{onset} (°C)	Peak temperature (°C)	ΔH (J/g)	T_{onset} (°C)	Peak temperature (°C)	ΔH (J/g)
Unirradiated	99.50	91.12	100.16	236.4104	269.70	293.15	78.0498
Irradiation fluence (0.5×10^{15} e/cm^2)	98.84	94.97	102.82	192.1462	267.65	294.16	33.2524
Irradiation fluence (1.0×10^{15} e/cm^2)	97.86	91.56	100.93	151.7627	268.06	294.53	98.3198
Irradiation fluence (1.5×10^{15} e/cm^2)	97.04	82.81	96.60	120.1447	266.97	296.82	74.5140

stage decomposition observed between the temperature ranges 301 °C–538 °C. The formation of peptide bonds due to the condensation reaction between the carboxyl group and amino group and the liberation of the other volatile substance such as CO, CH$_4$ and NH$_3$ happened at this stage [11].

The DSC plots of unirradiated and irradiated LAMD crystal is illustrated in Figs. 16–19. A sharp endothermic peak is present at 100.16 °C and a broad endotherm is also observed at 294.16 °C. The endothermic peak at 100.16 °C for unirradiated samples corresponding to the melting point of the material and the absorbed heat energy is used for the breakage of valence bond between the L-Arginine cation and maleate anion [11]. The reduction in the onset decomposition temperature (T_{onset}), at high fluence, may be due to the reduction in the crystallinity and the increase in amorphousness of the sample. Similar observations are made in the irradiated L-threonine single crystals [19]. The change in the onset melting temperature (T_{onset}), change in endothermic peak temperature and change in enthalpy of melting, ΔH for various fluences is presented in Table 5.

5. Conclusions

The L-Arginine Maleate Dihydrate (LAMD) nonlinear optical crystals have been grown by slow evaporation technique and are subjected to electron irradiation of energy 6 MeV at fluences 0.5×10^{15}/cm^2, 1.0×10^{15} e/cm^2 and 1.5×10^{15} e/cm^2. The powder XRD studies confirmed the triclinic crystal system with noncentrosymmetric space group $P1$. PXRD patterns also showed some variations in the intensity of the XRD peaks, which may be due to the changes in the crystallinity of the material caused by irradiation. The changes in the crystallinity are also confirmed by the TGA-DSC studies. The refractive index of the LAMD crystals was found to be increased by increasing the dosages of electron irradiation. The TGA-DSC thermal studies showed that the thermal stability of the material decreased with increasing irradiation fluence, which may be due to the breakage of bonds by high energy electrons. The electrical properties such as dielectric constant, dielectric loss and ac conductivity of the material are found to be increased with electron irradiation. The polarizability calculations revealed that the polarizability of the material increased with irradiation fluence, which enhances the nonlinear optical properties of the crystal. Thus by varying the EB fluence, one can easily tailor the optical, electrical and thermal properties of LAMD single crystals for optoelectronic devices and planar waveguide fabrications.

Acknowledgements

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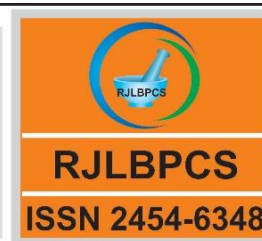
Original Research Article

INVESTIGATIONS ON THE OPTICAL, THERMAL, ELECTRICAL AND PIEZOELECTRIC PROPERTIES OF BIS THIOUREA CADMIUM CHLORIDE (BTCC) CRYSTALS

Sreekanth G[1,2*], Prince Thomas[2], Jacob Philip[3], Ginson P Joseph[2]

1. Department of Physics, N.S.S Hindu College Changanassery, Kottayam, Kerala.

2. Department of Physics, St.Thomas College Pala, Kottayam, Kerala, India.

3. Department of Basic Sciences, Amal Jyothi College of Engineering, Kanjirappally, Kottayam.

ABSTRACT: The single crystals of dimension 15 x 15x 8 mm^3 of Bisthiourea cadmium chloride (BTCC) are synthesized from aqueous solution using slow evaporation technique at ambient temperature. High resolution X-ray diffraction technique is employed to estimate the crystalline perfection of the grown single crystals. The grown crystals are confirmed by CHN analysis. The UV cut-off wavelength is found to be 320 nm and the optical band gap of BTCCC crystals is measured to be about 3.75eV. The thermal parameters at a modulation frequency 40Hz such as Thermal effusively (e), Thermal diffusivity (α), Thermal conductivity (k), Heat capacity (C$_p$) of the BTCC crystals are measured. The electrical properties such as dielectric constant, dielectric loss and ac conductivity of the BTCC crystals are carried out by Agillent E 4980 A LCR meter at different temperatures. The piezoelectric charge coefficient is found to be 8 pC/N. The P-E loop of the BTCC crystal was analyzed and the loop parameters were measured.

Corresponding Author: Dr. Sreekanth G* Ph.D.

Department of Physics, St.Thomas College Pala, Kottayam, Kerala, India.

Department of Physics, N.S.S Hindu college changanassery, Kottayam, Kerala, India.

Email Address:sreekanthgkaimal@gmail.com

1. INTRODUCTION

During the past few decades researchers working in the field of nonlinear optics developed new organometallic compounds having appreciable second harmonic properties, improved laser damaged threshold and excellent optical nonlinearity when compared to the organic counterpart [1]. In 1987 Chinese scientists investigated metal organic compounds for nonlinear optical applications, based on the Double-radical model [2-4]. The insights of this research laid the foundation for our research group to start the study of a primary aspect of the nonlinear optical properties of the organometallic crystals. While giving credits to the these materials of Chinese researches as well as research carried out by the Indians, this study concentrates on experiments providing more insights into the nonlinear optical properties of the materials and their qualities that can be easily and economically made use in our day to day life. The materials showing high quality optical bistability are found to be applicable in optoelectronics. Thiourea crystals exhibit large dipole moment and ability to form extensive network hydrogen bonds [5]. When the centrosymmetric thiourea is joined with metals, it will produce large hyperpolarizability which in turn results high nonlinear optical properties. Materials researchers are fascinated by this nonlinear optical property in thiourea complexes and many crystals based on the thiourea were investigated. Motivated by this consideration, a lot of thiourea complex crystals were explored.   Recently, M [tu]$_2$ X$_2$ type materials are interested by researchers where M=Cd, Co, Hg, Pb, Ti and Zn, tu is thiourea and X is a halogen [6], because they exhibit good nonlinear optical properties. Bisthiourea cadmium chloride (BTCC) [7], bisthiourea zinc chloride (BTZC) [8], bisthiourea cadmium acetate (BTCA) [9] Zinc tris (thiourea) sulphate (ZTS), Allylthiourea cadmium chloride (ATCC) [10], allylthiourea cadmium bromide (ATCB) are some of the crystals of the above said type [11]. BTCC is superior to other organometallic crystals for researchers because of their extended transparency down to UV, high optical nonlinearity and moderate mechanical property. BTCC is 110 times more nonlinear than quartz [12]. The laser damage threshold of BTCC crystals is 32 GW/cm^2 and 6 GW/cm^2 for single and multiple shots respectively. From the earlier reports BTCC belongs to orthorhombic crystal structure with the space group P$_{mn}$2$_1$ and its unit cell contains four molecules. They have the large laser induced damaged threshold compared to the other NLO crystals [13,14]. Bis(thiourea) cadmium chloride (BTCC) is a good candidate for engineering, a material with high nonlinearity out of an organic ligand by metal complexation [15]. Hence the present study deals with the synthesis, growth and physicochemical properties of the BTCC crystals.

2. MATERIALS AND METHODS

Single crystals of Bisthiourea cadmium chloride (BTCC) were grown by the solution growth techniques. Analytical reagent (AR) grade of the cadmium chloride and thiourea along with millipore water were used for the growth process. BTCC was synthesized from aqueous solutions of CdCl$_2$ and thiourea in the ratio 1:2 following the chemical reaction.

$$CdCl_2 + 2CS(NH_2)_2 \rightarrow Cd[CS(NH_2)_2]_2 Cl_2$$
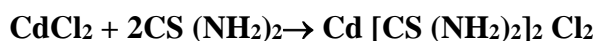
The pH value of the solution was adjusted to be 3 by adding hydrochloric acid with continuous stirring for few hours. The solution was heated and stirred well at room temperature to avoid the precipitation of multiple phases [16-18]. The purity of the synthesized salt was increased by successive re-crystallization process. Temperature as low as 50°C was maintained in order to avoid decomposition. The saturated solution was taken in a beaker covered it tightly and then it was allowed to evaporate at room temperature by making small holes on the top of the cover. Seed crystals of dimension 15 x 15 x 8 mm^3 were hatched out due to spontaneousnucleation, within a period of around one month. The photographs of as grown crystals were shown in Fig.1.
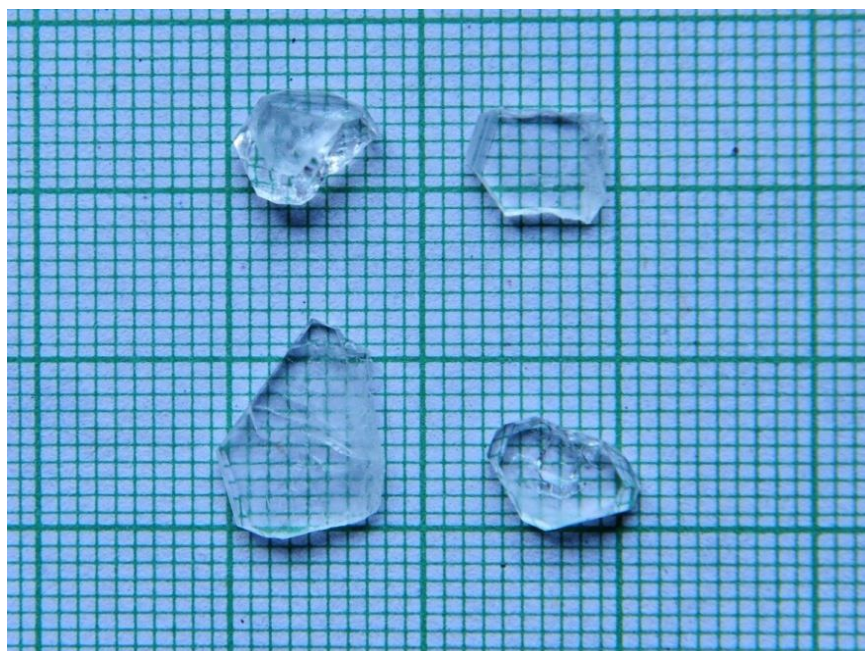
Fig. 1: Photograph of as grown crystals of BTCC

3. RESULTS AND DISCUSSION

3.1 High-resolution X-ray diffractometry study on BTCC

The crystalline perfection of the grown single crystals was characterized by HRXRD by employing a multicrystal X-ray diffractometer developed at NPL [19]. The well-collimated and monochromatedMoKα$_1$ beam obtained from the three monohromator Si crystals set in dispersive (+,-,-) configuration has been used as the exploring X-ray beam. The specimen crystal is aligned in the (+,-,-,+) configuration. Due to dispersive configuration, though the lattice constant of the monochromator crystal(s) and the specimen are different, the unwanted dispersion broadening in the diffraction curve (DC) of the specimen crystal is insignificant. The specimen can be rotated about the vertical axis, which is perpendicular to the plane of diffraction, with minimum angular interval of 0.4 arc sec. The rocking or diffraction curves were recorded by changing the glancing angle (angle between the incident X-ray beam and the surface of the specimen) around the Bragg diffraction peak position θ$_B$(taken as zero for the sake of convenience) starting from a suitable

arbitrary glancing angle and ending at a glancing angle after the peak so that all the meaningful scattered intensities on both sides of the peak include in the diffraction curve. The DC was recorded by the so-called ω scan wherein the detector was kept at the same angular position $2\theta_B$ with wide opening for its slit. Before recording the diffraction curve to remove the non-crystallized solute atoms remained on the surface of the crystal and the possible layers which may sometimes form on the surfaces on crystals grown by solution methodsand also to ensure the surface planarity, the specimen was first lapped and chemically etched in a non preferentialetchent of water and acetone mixture in 1:2 volume ratio.
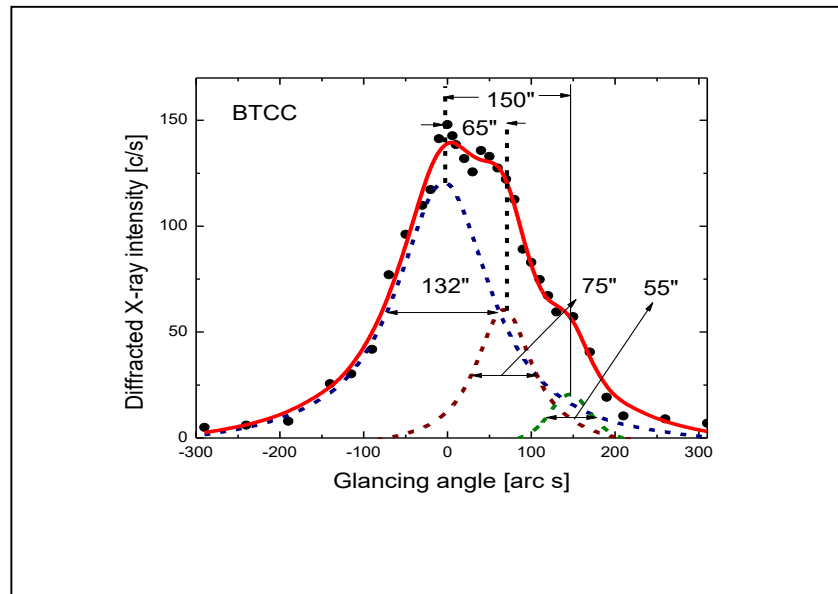
Fig. 2: HRXRD spectrum of BTCC

Fig. 2 shows the high-resolution diffraction curve (DC) recorded for a typical BTCC single crystal specimen using diffracting planes in symmetrical Bragg geometry by employing the multicrystal X-ray diffractometer. The solid line (convoluted curve) is well fitted with the experimental points represented by the filled circles. On deconvolution of the diffraction curve, it is clear that the curve contains two additional peaks, which are 65 and 150 arcs away from the main peak. These additional peaks depict internal structural low angle (tilt angle > 1 arc min but less than a degree) boundaries, whose tilt angles (misorientation angle between the two crystalline regions on both sides of the structural grain boundary) are 65 and 150 arcs from the main crystal block [20]. The FWHM (full width at half maximum) of the main peak and the low angle boundaries are respectively 132, 75 and 55 arcs. Though the specimen contains low angle boundaries, the relatively low angular spread of around 600 arcs (~ one sixth of a degree) of the diffraction curve and the low FWHM values show that the crystalline perfection is reasonably good. The effect of such very low angle boundaries may not be very significant in many device applications, but for applications like phase matching, it is better to know these minute details regarding crystalline perfection. Thermal fluctuations or

mechanical disturbances during the growth process could be responsible for the observed low angle boundaries.

3.2 CHN analysis

The elemental analysis of the as grown crystals of BTCC is performed using Elemental Vario El III Elemental analyzer. The molecular components carbon, hydrogen and nitrogen of the BTCC single crystals are experimentally measured. The results of the study are given in the Table 1.

Table 1: Results of elemental (C, H and N) analysis of BTCC

Weight Composition %					
Carbon		Hydrogen		Nitrogen	
Theoretica	Experimental	Theoretical	Experimental	Theoretic	Experimental
7.16	7.17	2.40	2.39	16.69	16.71

3.3 Spectroscopic studies of BTCC

The UV visible NIR spectrum was taken in the wavelength range of 200-1100nm, using Perkin Elmer UV Win Lab and is shown in Fig.3. The UV cut-off wavelength is found to be 320 nm. There is no significant absorption in the 300-1000 nm visible range. The crystal is appeared to be a good transmitter in the visible region. Using Tauc'srelation [21] a graph has been plotted between hv and $(\alpha h v)^2$ to measure the direct band gap value, where α is absorption coefficient and hv is the energy of the incident photon. From the plot (Fig.4) the band gap of BTCC is found to be 3.75eV. BTCC crystal has large band gap compared with other prominent organometallic crystals such as ATCC [22], MMTG [23], BTCZC [24] and BTZB [25] (Table 2).

The urbachenergy is calculated by the following equation:

$$\alpha = \alpha_0 \exp(\frac{hv - E_g}{E_u})$$

Where α_o and E_g are the material parameter, 'hv' is the photon energy and E_u is the Urbachenergy [26-28].Urbach energy is determined by plotting $\ln(\alpha)$ vs. E and fitting the linear portion of the curve with a straight line (Fig.5). The Urbach energy is found to be 0.046eV.

Table: 2 Direct Band gap of Organometallic compounds.

Sample	Direct band gap (eV)
ATCC	3.6
MMTG	3.5
BTCZC	3.65
BTZB	3.5
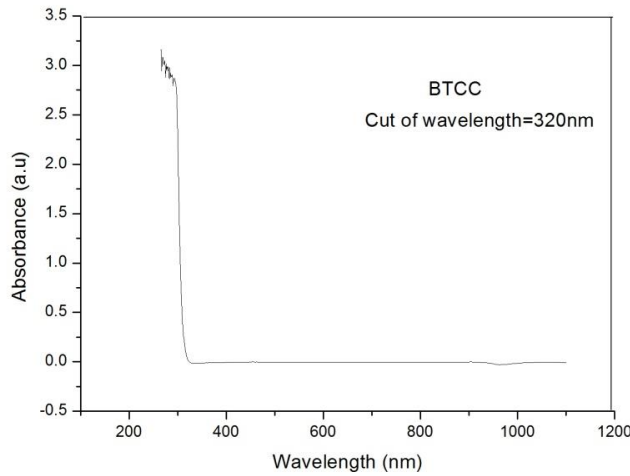
Fig. 3: UV visible NIR absorption spectrum of BTCC
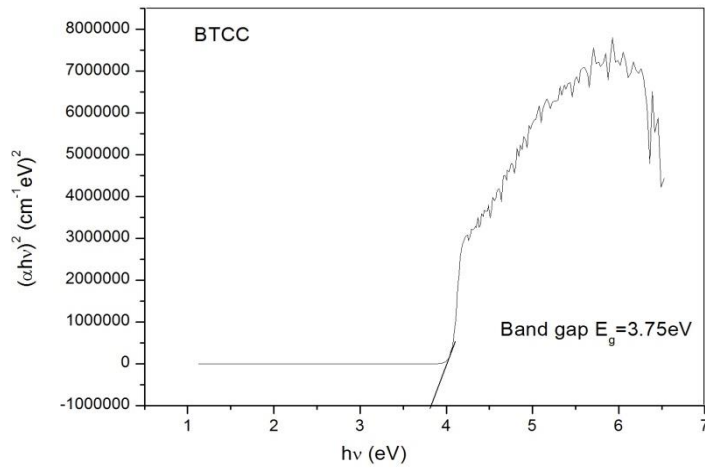
Fig.4: Tauc's plot of BTCC
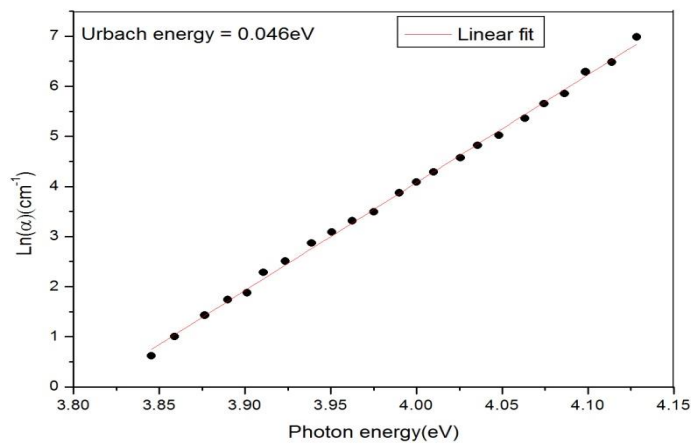
Fig. 5: The dependence of ln(α) with incident photon energy

3.4 Thermal analysis of BTCC

The thermal studies (TGA/DTA) of the BTCC crystals were performed by Perkin Elmer STA6000 and is shown in Fig.6.Thermal analysis was carried out in the range 40-700^{0}C at a rate of 10^{0}C/min in inert nitrogen atmosphere. The DTA endothermic peak at 213^{0}C, coincides with the major weight loss in the TG trace. This high-temperature weight loss may be due to melting and decomposition of BTCC. The melting point of BTCC shows higher value in comparison to the endothermic peak of BTZA [29] and BTCA [30] in the same family.
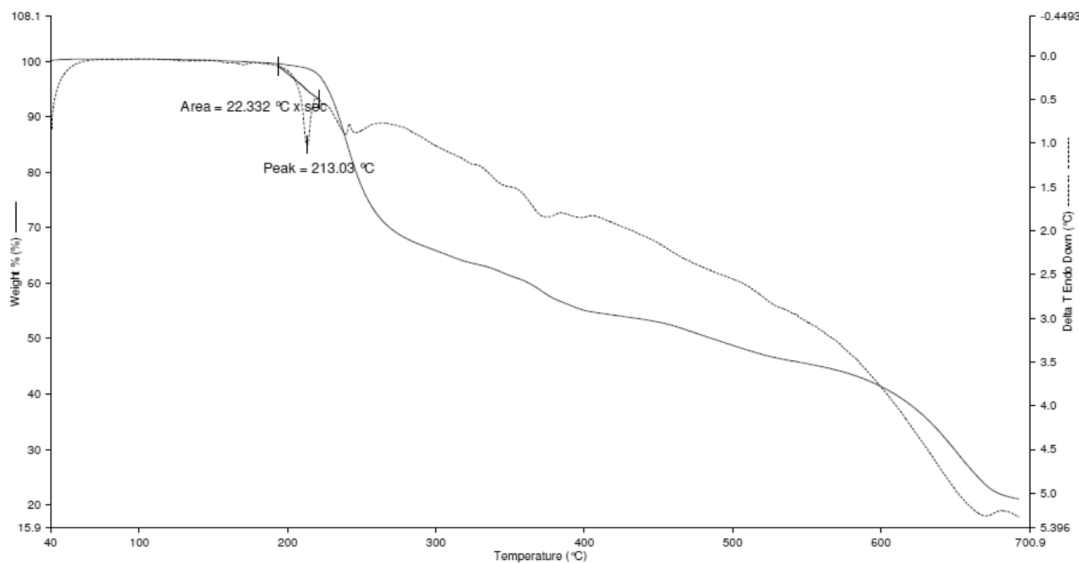
Fig. 6: TG-DTA curve of the grown BTCC crystals

3.5 Photopyroelectric (PPE) studies of BTCC

The thermal parameters of the crystals are measured using improved Photopyroelectric technique [31]. The grown selected BTCC sample is attached to apolyvinylidene difluoride (PVDF) film of thickness 28µm the pyroelectric detector. The thermal wave produced by the heating source (He-Cd laser of wavelength λ = 442 nm KIMMON, output power120mW) was allowed to propagate through the sample and are detected by the pyroelectric detector having pyroelectric coefficient =0.25×10^{-8} Vcm^{-1}K^{-1}. The Pyroelectric detector, sample and the backing medium should be thermally thick during the measurements. The intensity of the light from the laser was modulated using a mechanical chopper (SR 540). A lock-in amplifier (SR 830) was used to measure the signal output. The frequency dependence of PPE amplitude and phase for BTCC crystal is shown in Fig.7 (a) and Fig.7 (b) respectively.   The measured thermal parameters at a modulation frequency 40Hz such as Thermal effusively (e), Thermal diffusivity (α), Thermal conductivity (k), Heat capacity (C$_p$) of the BTCC crystals are given in the Table 3. It is found that thermal effusivity, thermal conductivity and specific heat capacity of the selected BTCC sample is slightly higher than that of the BTZC crystals in the same family [32].
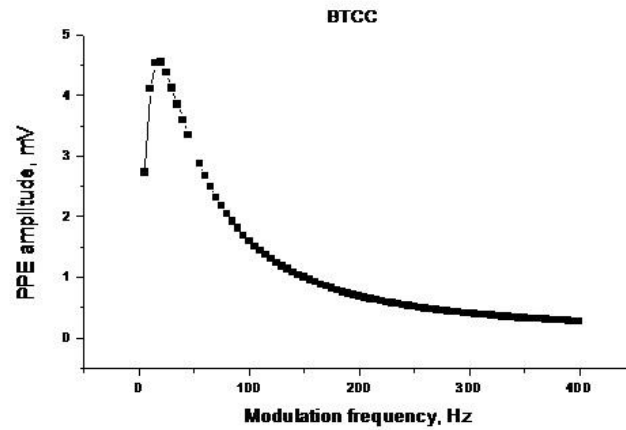
Fig. 7 (a):   Frequency dependence of PPE amplitude
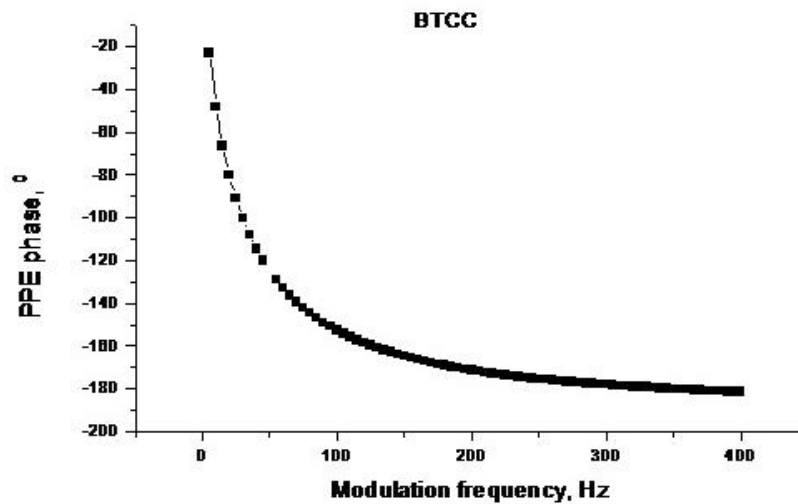
Fig. 7 (b): Frequency dependence of PPE phase

Table 3: PPE measurements of BTCC

Sample Thickness (mm)	Modulation Frequency (Hz)	Thermal effusivity E (Ws$^{1/2}$/m^{2}K)	Thermal diffusivity α (×10^{-6}m^2/s)	Thermal conductivity k (W/mK)	Sp. Heat capacity Cp (J/kgK)
1.6	40	3283	6.31	8.24	713

3.6 Dielectric properties of BTCC

The dielectric study of a crystal reveals the interaction of the molecules in the presence of an external electric field. When an electric field oscillates, the dipole in the system tend to follow the field and experiences some friction due to its collision with other molecule in the system or some energy is absorbed from the field, which is known as the dielectric loss. The dielectric studies are measured from the Agillent E4980 LCR meter, and plotted with frequency in the range 100Hz to 100kHz in the temperature range 25^0C– 145 ^{0}C with an interval of 20^0 C. The graph of dielectric loss (Fig.8)

shows an exponential decrease at high frequencies. The very low dielectric loss at higher frequencies is an indication of the perfection and purity of the crystal sample. The dielectric loss increases with temperature indicating high energy absorption. The real part of the dielectric constant is plotted in the temperature range 25^0-165^0C (Fig.9). At low frequencies all kinds of polarization are well active and the space charge polarization are absent at higher frequencies. Hence the BTCC sample exhibits high dielectric constant at high temperature. The space charge polarization is trusted on purity and perfection of the crystals [33, 34]. Dielectric studies of sample indicate the strong S.H.G conversion efficiency with lesser defects of the given crystals [35]. The dielectric constant and dielectric loss plotted against temperature for different frequencies is shown in Fig.10 and Fig.11 respectively. Both the dielectric constant and dielectric loss having very high value at low frequencies increase with increasing temperature.
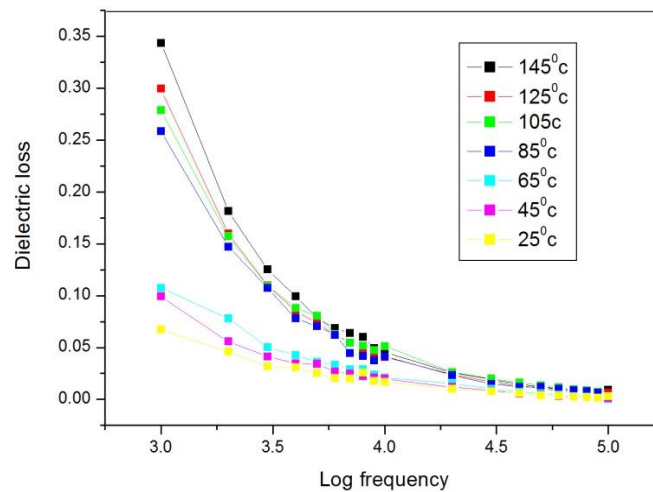
Fig.8: Dielectric loss versus log frequency
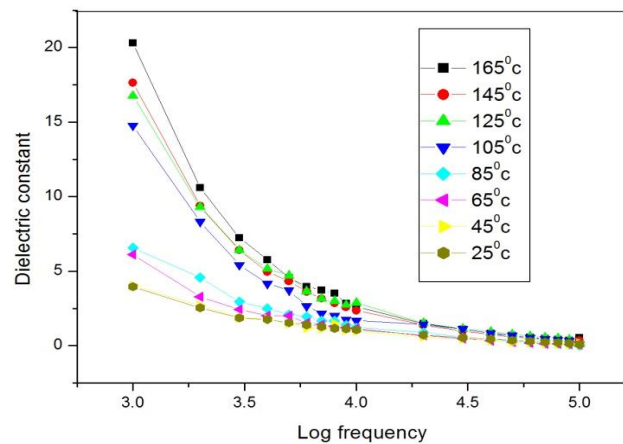
Fig.9: Dielectric constant versus log frequency
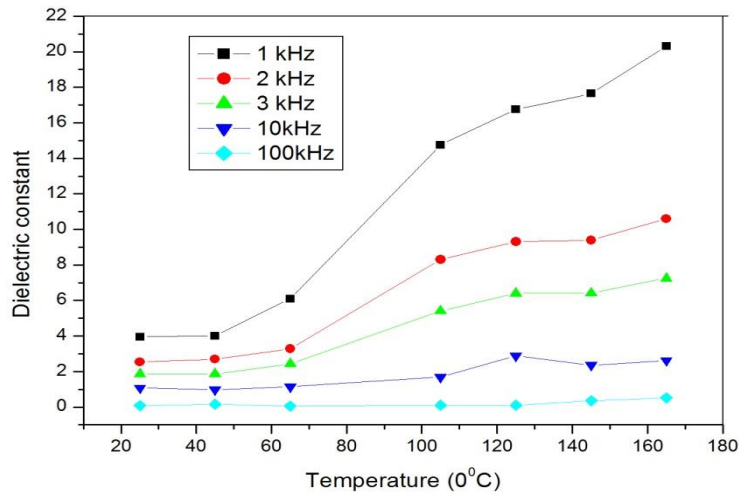
Fig.10: Dielectric constant versus Temperature for different frequencies
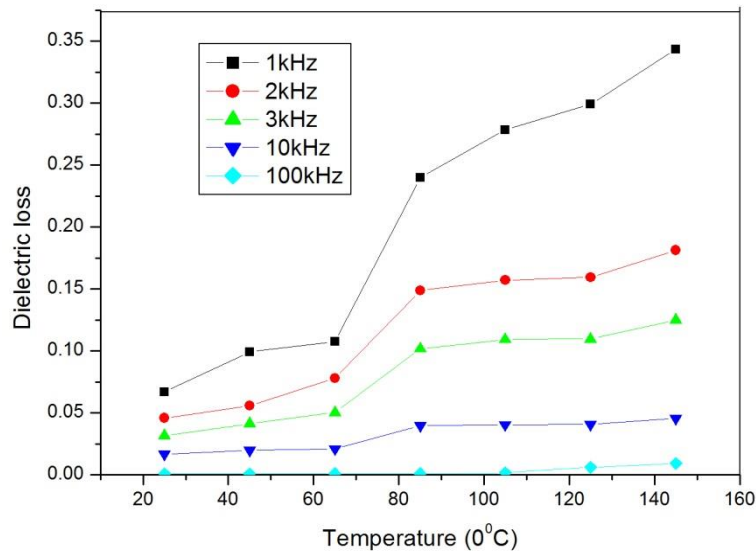
Fig. 11: Dielectric loss versus Temperature for different frequencies

3.7 A.C. Conductivity studies of BTCC

The ac electrical conductivity studies of the grown BTCC crystals were also done with the above Agillent E 4980 LCR meter. The graph of logarithmic conductivity with logarithmic frequency for the temperature range 130-180^{0}C is plotted having a positive slope and is found to increase with frequency, at all temperatures (Fig.12). The Arrhenius plot (log σ_{ac}T versus 1000/T) reveals that the sample exhibits Arrhenius type conductivity behavior as shown in Fig.13.The slope of the Arrhenius plot reveals that the activation energy of the crystal is 0.19eV under the temperature of investigation.
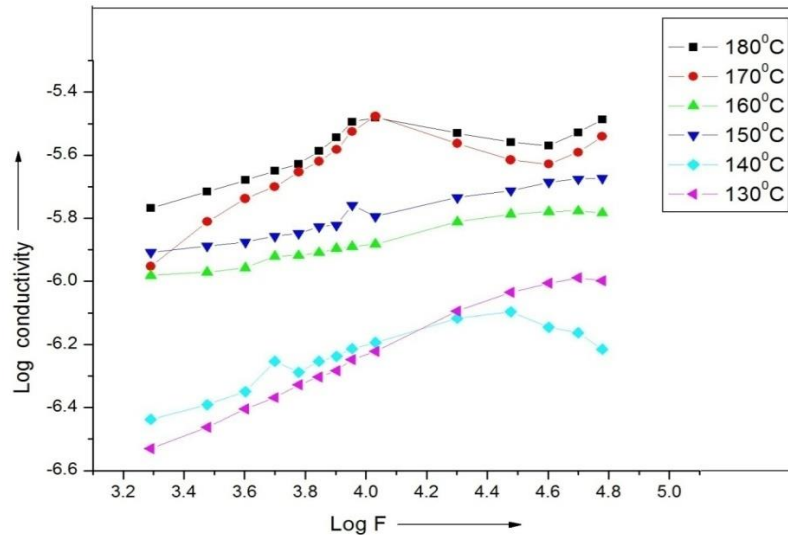
Fig.12: log conductivity versus log frequency for various temperatures
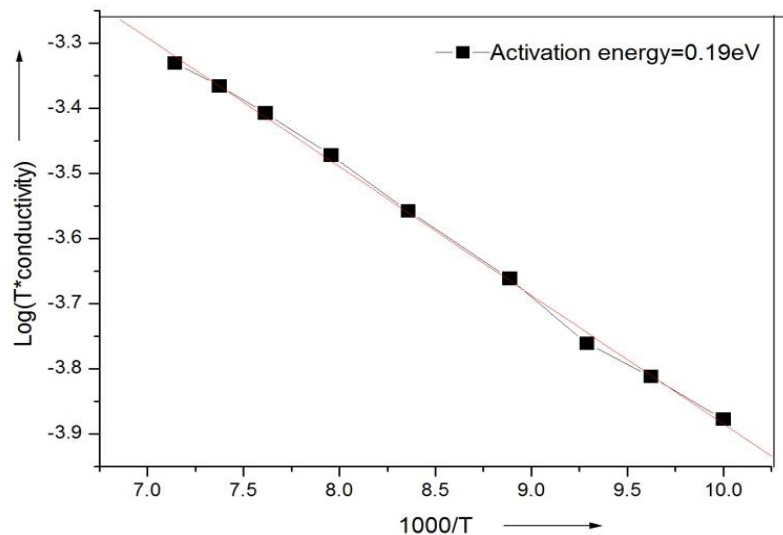
Fig.13: Arrhenius plot of BTCC

3.8 Piezoelectric studies of BTCC

Piezoelectricity is the phenomenon in which electric charges are separated when the material is subjected to an external stress. The inverse effect is also possible – that an applied field can produce vibration in the crystal. The crystal having non-centrosymmetric structure can exhibit piezoelectric properties. In the absence of external stress, the internal electric field is zero because of the symmetric charge distribution at their lattice sites. But when the crystal is under stress, the charges are displaced and the electric field is developed. The materials showing this phenomenon are known as piezoelectric materials. The common application of piezoelectric materials is in transducers and in delay lines. A good piece of the crystal with area 30 mm^2 and thickness 1.50 mm was prepared, and is placed in the piezometer system. Piezoelectric charge coefficient (d_{33}pC/N) was calculated with a piezometer system in the tapping frequency range of 50-300Hz and applying a tapping force

of 0.25N at room temperature and the obtained value is 8pC/N. The P E loop (Fig.14) of the BTCC crystal was taken using computer controlled P-E loop tracer. For an applied field of 40.4 kV/cm polarization reaches saturation (P_{max}=0.637μC/cm^2). Also it is measured that polarization has a value around 0.346μC/cm^2 at near zero electric field (remnant polarization, P_r) and the coercive filed, is 21.17kV/cm. A corona dc poling technique is employed to the shaped BTCC crystal, but also after poling the hysteresis loop parameters remains unaffected as an indication of saturation of dipoles. The loop parameters are tabulated in the Table 4.
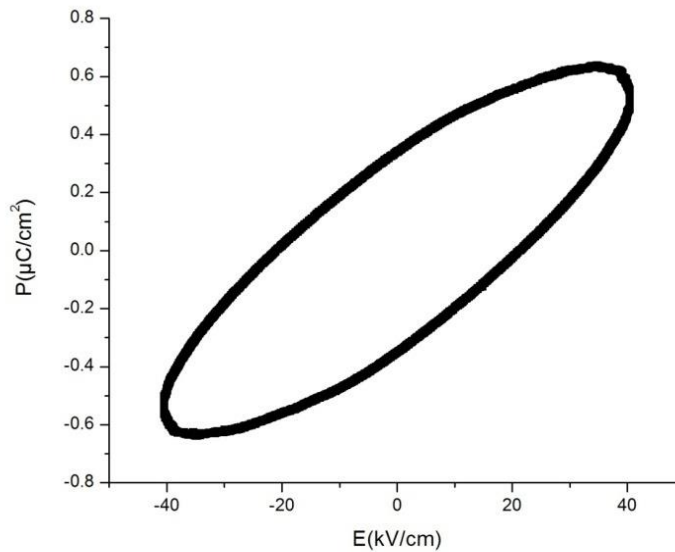
Fig.14: P-E loop of BTCC

Table 4: Hysteresis loop parameters of BTCC crystal

Sample	Thickness of the sample (mm)	Remnant polarization (P_r) (μC/cm^2)	Coercive field (E_c) (kV/cm)	Maximum Electric field E_{max} (kV/cm)	Maximum Polarization P_{max} (μC/cm^2)
BTCC (Unpoled)		0.346	21.174	40.402	0.637
BTCC (Poled)	1.5	0.346	21.174	40.402	0.637

3.9 Photoconductivity studies of BTCC

The photoconductivity measurement of the BTCC samples has been carried out using the Keithley 6485 Pico ammeter. The dark current was recorded by keeping the sample unexposed to any radiation. The applied field was varied from 0 to 400 V/cm at room temperature (305K). The sample was illuminated with a mercury lamp of 80W power by focusing a spot of light to the sample with

the help of a converging lens. The photo current was measured by varying the applied field for the same range in step of 20V. The variations of photo current (I_p) and dark current (I_d) with applied field is shown in the Fig.15. The dark current is always higher than the photocurrent for different applied field which is said to exhibit negative photoconductivity. The negative photoconductivity exhibited by the sample may be due to the reduction in the number of charge carriers or their life time, which is explained by Stockman model [36].
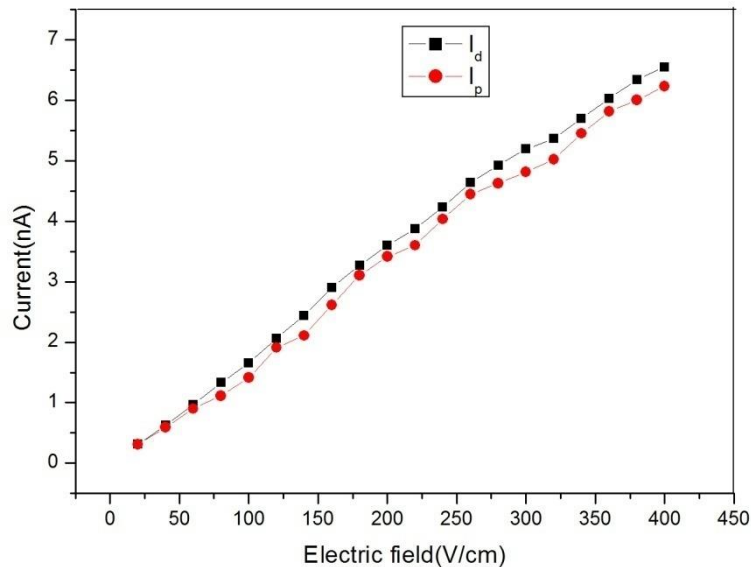
Fig.15: Field dependent conductivity of BTCC crystals

4. CONCLUSION

Single crystals of Bisthiourea cadmium chloride (BTCC) were prepared using slow evaporation technique. The crystalline perfection of the sample was estimated through high resolution X- ray diffraction technique. The UV cut-off wavelength and optical band gap were calculated from optical absorption studies. The dielectric loss and dielectric constant were measured from the Agillent E4980 LCR meter. The conductivity studies were carried out and the Arrhenius type behavior is revealed. Photopyroelectric studies of the crystals were done and thermal parameters of the BTCC crystals were measured. Piezoelectric studies were conducted and the Hysteresis loop parameters are measured from the PE loop. The field dependence of conductivity of the BTCC sample was measured from the photoconductivity studies.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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A STUDY ON INFLUENCE OF ONLINE REVIEWS ON PURCHASE INTENTIONS

Ajay Joseph*
Dr Gireesh Kumar **
Nihara Marie Thomas***

*(Assistant Professor, Bharata Mata College, Thrikkakara and Research Scholar Nirmala College Muvattupuzha)
**(Principal, Henry Baker College, Melukavumattam and Research Guide, Nirmala College Muvattupuzha)
*(Student, Bharata Mata College, Thrikkakara;)

ABSTRACT: Word-of-mouth (WOM) acts as a paramount source of information when a consumer has to decide upon a purchase. The augmentation of Internet has amplified consumers' options for gathering product information. Although word-of-mouth (WOM) is recognized as a cogent force in persuasion, we know little about the new communication phenomenon known as e-WOM. Online Consumer review is one of the main forms of e-WOM where consumers post product reviews on various websites. Digitization of WOM has manifested the penetration of customer feedback into the cyber space and has paved way for consumers to share and exchange customers' shopping experiences and influence future customers' purchase intentions. Nevertheless, how e-WOM affect consumers in making purchase decisions is hardly explored. The objective of the present study is to identify the factors affecting online consumer reviews through previous researches and the impact of online consumer reviews on purchase intentions of mobile phones and accessories. The results of this study will be constructive to the corporate world who actively influence and encourage online reviews.

Keywords: Online Consumer Reviews,e-WOM,Purchase intention.

INTRODUCTION

Word of mouth has been recognized as one of the most pivotal resources of information transmission since the beginning of human society. However, word of mouth has evolved into an entirely new form of communication with the expansion of technology which is known as electronic word of mouth (e-WOM). Recent technological buildouthas changed the way in which consumers make purchase decisions of products and services. Customers do not prefer traditional ways for availing information about the products and services they want. Instead, they have switched to e-WOM especially online consumer reviews as they are easily accessible and serviceable.

Online consumer reviews are a type of e-WOM and it entails an assessment or an evaluation, comments, opinions, critics and analysis generated and posted by the users of products. Online consumer reviews are posted with the intention of instituting change and hence a credible source of consumer sagacity and can be utilized to measure products and services by businesses in order to make corrections or any improvement.

Online Consumer Reviews can be found on weblogs, newsgroups, discussion forums, social network websites, review websites, and online newspaper columns. Even social networking sites provide a platform for consumers to exchange their opinions regarding products and brands.Truly, word of mouth has found a new way to assert its value to product marketing in new forms of communication (C. M. Cheung and D. R. Thadani, 2010).

Online Reviews have become an avenue where different customers share their shopping experiences. Shoppers seek information through reviews which include comments and experiences of users before they buy products. Online reviews are an essential component for purchase decisions as it create an image about the product and brand in the minds of the reader. Therefore, it is essential to study the influence of online reviews on purchase intentions.

Online consumer reviews (OCRs) are increasingly used by consumers to make enlightened shopping decisions about products. It considers the impact of online reviews on consumers' purchasing decisions where authenticity of the reviewer and the website is important. This study understands the influence of online reviews on purchase intention through a model which considers independent factors influencing purchase intention as Product Attitude, Valence, Volume, Recentness, Trust, Brand Recognition, Social influence and Review Type. The research aims to provide an insight on the impact of online reviews on purchase decisions of consumers.

REVIEW OF LITERATURE

Scholars and practitioners have long acknowledged that word of-mouth is the most effective marketing tool (Arndt 1967a; Trusov, Bucklin, and Pauwels 2009). Traditionally, consumers have exchanged word-of-mouth through face-to-face conversations (Keller 2007). However, as consumers increasingly use the Internet to communicate with other consumers as well as to review and purchase products, electronic word-of-mouth has gained importance (Goldsmith 2006; Trusov, Bucklin, and Pauwels 2009).

Online product reviews – a form of electronic word-of-mouth written by consumers on the Internet – have become the most important form of electronic word-of-mouth. Most online shoppers rely heavily on online product reviews to make purchase decisions (Freedman 2008; Park and Kim 2008; Schlosser 2011; Sen and Lerman 2007). According to a 2010 survey of Internet users in the U.S., 92% of users read online product reviews; of these, 89% said online product reviews influenced their product choice (Freedman 2011).

Since last decade, social network and media (SNM) sites are growing rapidly (Farooq & Jan, 2012). Scholars define SNM as a graph of relationships and interactions within a group of individuals, often mediating in spreading information, ideas, and influence among the members

(Kempe, Kleinberg, &Tardos, 2003). These services act as word-of-mouth (WOM) because participants repeat the information on SNM (Zhaveri, 2013)

A large and growing body of research has shown that consumers are likely to follow others when making purchase decisions (Berger & Schwartz, 2011; Bickart& Schindler, 2001; Gruen et al., 2007; Murray, 1991; Smith et al., 2005). Recent research shows that online consumers are increasingly driven by a need for social interaction, in addition to instrumental goals (Childers, Carr, Peck, & Carson, 2002). In the process of decision-making, consumers may engage in brand-related information search by reading other consumer's brand and service ratings and evaluations through an online eWOM source. (Bei, Chen, &Widdows, 2004; Bickart& Schindler, 2001; Dellarocas, 2003; Sweeney, Soutar&Mazzarol, 2011)

The most frequently used type of electronic word-of-mouth is online reviews (Schindler & Bickart, 2005). Online reviews written by consumers who have purchased a product previously are important and extensive sources of information for the potential consumer (Hu, Liu & Zhang, 2008). Consequently, a lot of companies are taking advantage of online reviews as a new marketing tool (Dellarocas, 2003). Informational platforms concerning products, brands and services have manifested itself as a central place for online reviews (Hennig-Thurau et al., 2004).

RESEARCH GAP AND OBJECTIVES

Despite of the considerable amount of prior research on online reviews, little is known about the online reviews of search products and its effect on consumers' purchase intentions. The review of literature divulge that prior studies have focused on the factors of online reviews but this study tries to unravelhow reviews influence purchase decisions incorporating the need to recognize a brand and considering social influence while using online reviews for purchase decision.So, the present study is an attempt to bridge the void in the literature by considering the additional factors like brand recognition and social influence.This study will be advantageous to the corporate world who engage in developing brand awareness and promote online reviews.The study raises the following questions for enquiry: What are the factors affecting online reviews?What is the influence of online reviews on purchase intentions of a product? Based on the above research questions, specific objectives have been formulated, which are:

- To explore the factors affecting online reviews
- To study the impact of online reviews on purchase Intentions of a product

MODEL DEVELOPMENT

Various factors are identified based on empirical evidence collected from numerous studies. It is found that online reviews have positive valence when a product is recommended by a customer or have negative valence when a customer advise against the use of the product. Negative online reviews have a tendency to decrease consumers' attitudes and company's sales, whereas positive online reviews incline to increase attitudes and rise company's sales (Lee, Park, & Han, 2008; Hu et al., 2008).

Researches have shown that the volume of reviews increases awareness (Liu, 2006) purchase intentions regardless of the level of consumer involvement (Park et al., 2008), and product sales (Duan et al., 2008ab; Liu, 2006). Online reviews are essential for the creation of online trust and online trust has been shown to considerably influence web user behavior and is a critical factor in stimulating purchase (Gefen, Rao & Tractinsky, 2003; Quelch & Klein, 1996).

Online reviews with more understandable and objective content with enough reasons to recommend is more persuasive in contrast to online reviews with emotional and subjective content with recommendations based on not a single specific reason (Park et al., 2007). The impact of the most recent online reviews may be bigger than old online reviews because of the up-to-date information of most recent online reviews. Recent researcher says that participants prefer recent reviews over old reviews (Jin et al., 2014)

HYPOTHESIZED MODEL
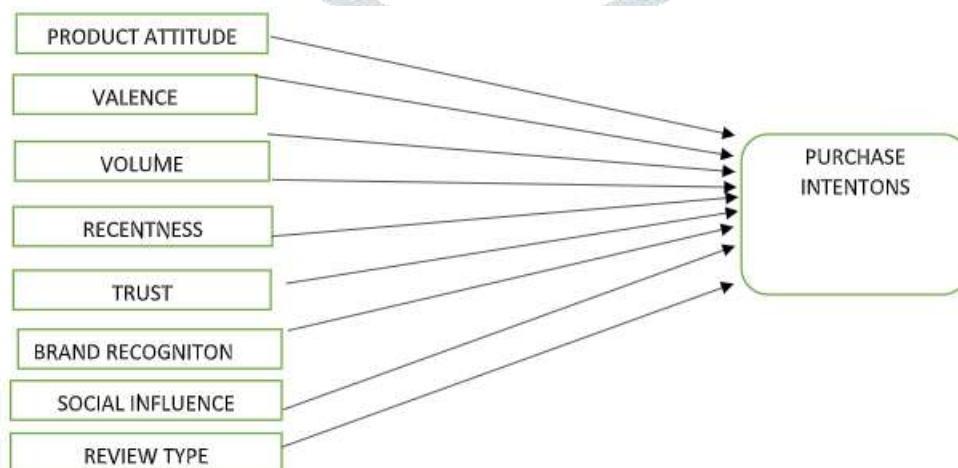
METHODOLOGY

In the present study, data were collected by survey method with the help of structured questionnaire. Both primary and secondary data sources were used for the study. Primary data collected from respondents who read online reviews before making a purchase decision. Responses were measured by a 5-point Likert-type scale ranging from strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1). The secondary data were accessed from the books and journals, official reports and websites. The collected data was analysed using statistical tools like arithmetic mean and regression analysis.

RESULTS AND DISCUSSIONS

The primary data were collected with the help of structured questionnaire from users of online reviews. The demographic characteristics are presented in table 1. Out of 64 respondents, 23 belong to male category and 41 belong to female category which clearly shows that female category forms the majority (64.06%). Regarding educational status majority are students (75%) followed by employed category (17.2%) and unemployed category (7.8%). Majority of the respondents belong to the age group of below 25 years (87.5%) and smart phones are the most searched product over the internet (85.9%). Regarding the source of product information, Facebook is seen as the major source of product information through online reviews (42).

Table 1:The general profile of the total 64 respondents.

Demographic Factors	Item	Frequency	Percentage
Gender	Male	23	35.93
	Female	41	64.06
Status	Student	48	75
	Employed	11	17.2
	Unemployed	5	7.8
Age Group	Below 25	56	87.5
	25-35	7	10.9
	35-45	1	1.6
How did you come across online reviews or product information	Product website	16	25
	Facebook	42	65.62
	Witter	8	12.5
	YouTube	26	40.62
	Instagram	11	17.18
	Amazon	16	25
	Flipkart	11	17.18
	Other e-shopping website	15	23.43
	Other	3	4.68
Have you searched online about the following products	Smart Phones	55	85.9
	Headphones	31	48.4
	Mobile Accessories	45	70.3
	Other Electronic products	51	79.7
	Other Products	54	84.4

Source: Primary Data

Constructs and Measures Used in the Study:

Product Attitude

Reviewer's overall evaluation of a person, objects (e.g. brand/products/websites) and issues (J. Lee, D.H. Park, I. Han,2008)

Table 2: Measures of Product Attitude

Measures	Item Acronym	Mean	Mode	SD
The information in online reviews was helpful for me to evaluate the product	PA1	3.98	4	.724
customer ratings were useful for me to evaluate the quality of product specification and features	PA2	4.06	4	.639
The product review is very helpful in judging the quality of the product.	PA3	3.80	4	.800

Source: Primary Data

The mean, mode and SD for PA1,PA2 and PA3 are given in Table 2. Mean for PA2 is the highest of 4.06 which shows Customer ratings are more preferred by respondents in order to evaluate the product specification and features. Mode of all three measures is 4which clearly shows that the respondents could gain useful insights from online reviews and hence develop a positive attitude about the product.

Valence

Valence refers to the way an online review is framed (e.g. negatively framed or positively framed). A positively framed online review will highlight the strengths of a product or service and encourage other consumers to buy a product or service whether negative online reviews reveals the weaknesses and negative features of a product or service and thus discourages people to adopt them (Lee, Youn, 2009).

Table 3: Measures of Valence

Measures	Item Acronym	Mean	Mode	SD
I read reviews before making a decision	VA1	4.44	5	.664
Positive reviews have greater impact on my purchase decision.	VA2	4.06	4	.687
When I buy a product/brand, negative product reviews make me confident in purchasing the product/brand*	VA3	4.38	4	.696
High ratings for product/brand affect my purchase decision	VA4	4.00	4	.713

Source: Primary Data

From table 3, it can be inferred thatmajority of the respondents undergo meticulous reading of online reviews before making a purchase decision as VA1 shows the highest mean and mode of 4.44 and 5 respectively.

Volume

The volume of online consumer reviews of a product represents the product's popularity because it is related to the sales volume of the product. The more reviews there are, the more important and popular a product is. It is likely to lead consumers to rationalize their buying decision by "Many other people also bought the product"

Table 4: Measures of Volume

Measures	Item Acronym	Mean	Mode	SD
The number of product reviews about the product affects my purchase decision.	VO1	3.53	3	1.007
I try to read maximum number of online reviews before making a decision.	VO2	3.47	4	1.098
The number of reviews in social media about a product/brand affects my purchase decision.	VO3	3.45	4	1.112

Source: Primary Data

Table 4 depicts that VO1 has the highest mean of 3.53 which gives an inference that the number of product reviews certainly have an influence while purchasing a product. It also has the lowest SD of 1.007 which clearly confirms the above inference.

Recentness

The date the online review was posted (Gretzel et al., 2007).

Table 5: Measures of Recentness

Measures	Item Acronym	Mean	Mode	SD
Recent product reviews posted on website have more effect on my purchase decision than old reviews	RE1	3.59	4	1.109
Recent product reviews posted on the website are more reliable	RE2	3.45	4	.925
Recent online reviews are not accurate*	RE3	4.31	4	.613

Source: Primary Data

The mean, mode and SD for RE1,RE2 and RE3 are given in Table 5. RE3 has the highest mean of 4.31 and all the three measures have 4 as their mode. This resultantly makes it evident that readers rely on online reviews which are recent in nature and consider it for purchase decision.

Trust
General belief of the truthfulness of the message (N.F. Awad, A. Ragowsky,2008)

Table 6: Measures of Trust

Measures	Item Acronym	Mean	Mode	SD
The information from online reviews are credible	TR1	3.39	3	.828
Reliability of the site that present the reviews affect my purchase decision	TR2	3.75	4	.891
Popularity of the website/social media posts affect my purchase decision.	TR3	3.77	4	1.109
International web sites are more reliable in making purchase decision	TR4	3.59	4	.921

Source: Primary Data

Table 6 portrays the various measures of trust affecting online reviews. TR3 has the highest mean of 3.77 and followed by TR2 with slight difference of 0.02 in its mean. It can be concluded that popularity and reliability are almost at the same level in their influence while reading product information through websites and social media.

Brand Recognition
Many scholars use two dimensions, brand recognition and brand recall, to define the term brand awareness Brand recognition refers to a consumer's ability to identify a brand when given the brand name as a clue, while brand recall is defined as consumer's ability to recall a brand when given the product category (Keller,1993; Rossiter&Percy,1997)

Table 7: Measures of Brand Recognition

Measures	Item Acronym	Mean	Mode	SD
Online reviews helped me to familiarize with the product/brand	BR1	4.02	4	.864
online reviews have helped me to recall the brand	BR2	3.73	4	.877
I understand a product better after receiving relevant information about the product/brand on social networking site.	BR3	3.73	4	.802

Source: Primary Data

The mean, mode and SD for BR1, BR2 and BR3 are given in Table 7. Mean for BR1 is the highest of 4.02 where majority of the respondents feel that online reviews have helped them to familiarize with the brand. At this point where mode of all three measure is 4,it is understood that online reviews assist respondents to recall and create awareness about the brand.

Social Influence
Social influence is the extent to which consumers perceive that their peer (e.g.: family and friends) believe that they should use a particular technology (Venkatesh et al., 2012)

Table 8: Measures of Social Influence

Measures	Item Acronym	Mean	Mode	SD
I will not try a product were information has been shared through social media*	SI1	4.25	4	.437
I am likely to purchase a product after viewing a positive comment on social networking site	SI2	3.36	4	.949
I frequently gather information from friends and family about the product before I buy	SI3	3.84	4	.912
I completely trust online reviews shared through social media	SI4	2.97	2	1.023

Source: Primary Data

Table 8 delineate a highest mean of 4.25 for SI1and also the lowest SD of .437which expresses that a greater portion of the respondents will try a product if shared through social media whereas SI4 has the least mean of 2.97 which shows that respondents does not completely consider information through social media.

Review Type

Previous studies on content types of online consumer reviews compare the e-WOM effectiveness of different types of reviews: attribute-centric versus benefit-centric reviews (Park & Kim, 2008) Attribute-value reviews "rational, objective, and concrete [reviews] based on the specific facts about a product" Simple-recommendation reviews "emotional, subjective, and abstract [reviews] based on the consumer feeling about a product"

Table 9: Measures of Review Type

Measures	Item Acronym	Mean	Mode	SD
Attribute –value recommendations are specific, clear and having reasons for arguments.	RT1	3.42	3	.905
Simple-recommendation reviews are subjective emotional and have no support for arguments.	RT2	3.22	3	.881

Source: Primary Data

The mean, mode and SD for RT1 and RT2 are given in Table 9. RT1 has the highest mean of 3.42 compared to RT2 with mean of 3.22. This gives an impression that Specific and clear recommendation have greater effect on respondents than subjective and emotional recommendations.

Purchase Intention

According to the literatures, purchase intention is one of the most prominent and popular variable resulting from e-WOM communication (Sher& Lee, 2009; Lee & Lee, 2009).

Table 10: Measures of Purchase Intention

Measures	Item Acronym	Mean	Mode	SD
Online consumer reviews enhance my shopping effectiveness	PI1	3.95	4	.844
Online customer reviews make it easier for me to search and find information about products.	PI2	4.08	4	.650
If I have little experience with a product, I often search information on the web about the product	PI3	4.13	4	.745
In order to choose the right product/ brand, I often consult other consumers' online product reviews.	PI4	3.81	4	.990
Online customer reviews make it easier for me to shop online.	PI5	3.94	4	.833
If I don't read online product reviews when I buy a product/brand, I worry about my decision	PI6	3.19	3	1.022
I don't think consumer reviews are helpful*	PI7	4.40	4	.699

Source: Primary Data

Table 10 displays the various measures of purchase intention. PI7 has the highestmean of 4.40 followed by PI3 with 4.13. It indicates that consumer reviews are helpful and they tend to browse information on web when they have little or no experience. The mode is 4 for majority of the measures which conveys a significant influence of online reviews on purchase intentions.

RELIABILITY TEST

A Reliability Test was carried out using Cronbach's Alpha, which measures the internal consistency of research constructs and the result is exhibited in Table 7. The Alpha values for all the eight factors are above 0.70, the threshold suggested by Nunnally (1978). Thus, it can be concluded that the scale has internal consistency and reliability.

Table 11:Cronbach's Co-efficient Alpha

Constructs	Number of Items	Cronbach's Alpha
VA	4	.724
PA	3	.736
VO	3	.718
RE	3	.744
TR	4	.811
BA	3	.825
SI	4	.717
RT	2	.783
PI	7	.734

Source: Authors' calculation.

Table 12: Correlation between Independent and Dependent variable

Variable and Item Acronym	PA	VA	VO	RE	TR	BR	SI	RT	PI
Product Attitude(PA)	1.00	0.20	0.05	0.18	0.65	0.28	0.65	0.17	0.60
Valence(VA)	0.19	1.00	0.19	0.69	0.17	0.20	0.17	0.18	0.17
Volume(VO)	0.18	0.61	1.00	0.17	0.18	0.13	0.18	0.05	0.13
Recentness(RE)	0.05	0.26	0.13	1.00	0.17	0.28	0.17	0.13	0.56
Trust(TR)	0.17	0.21	0.17	0.18	1.00	0.56	0.20	0.65	0.28
Brand Recognition(BR)	0.13	0.19	0.21	0.61	0.19	1.00	0.33	0.65	0.18
Social Influence(SI)	0.20	0.17	0.61	0.28	0.05	0.26	1.00	0.28	0.05
Review Type(RT)	0.05	0.21	0.20	0.13	0.13	0.21	0.56	1.00	0.20
Purchase Intention(PI)	0.20	0.05	0.18	0.28	0.56	0.13	0.17	0.69	1.00

Source: Authors' calculation.

The correlation coefficients between the independent variables like product attitude, valence, volume, recentness, trust, brand recognition, social influence, review type and the dependent variable purchase intention are reported in table 12. It is vivid that there exists a positive correlation between each independent variable and the dependent variable.

Table 13: Regression Analysis

Variables	Item acronym	Beta	t - value	p - value	VIF	Durbin Watson
Product attitude	PA	0.12	3.172	0.000*	1.156	
Valence	VA	0.112	1.238	0.000*	1.051	
Volume	VO	0.100	3.999	0.000*	1.029	
Recentness	RE	0.191	9.270	0.000*	1.087	1.989
Trust	TR	0.071	7.781	0.016**	1.011	
Brand Recognition	BA	0.210	6.142	0.022**	1.148	
Social Influence	SI	0.450	10.166	0.032**	1.335	
Review Type	RT	0.412	10.013	0.044**	1.282	

Source: Authors' calculation. R-squared = 0.188, Adjusted R-squared = 0.189.
Notes: (*) P < .001 (**) P < 0.05 Dependent Variable – Purchase Intention.

Multiple regression analysis examined the effect of product attitude, valence, volume, recentness, trust, brand recognition, social influence and review type on purchase intention. Regression model was formed using step-wise method.. Multi-collinearity was checked through Variance Inflation Factor (VIF). VIF values were ranged from 1.011 to 1.335 and, therefore, there is no multi-collinearity problem between the predictor variables. The Durbin-Watson statistic is 1.989, which indicates independence of observations. The model is statistically significant at 0.001 level and 0.005 level. Social influence (SI) has the highest beta coefficient (0.450) followed by review type (0.412). The model states that the variable social influence followed by review type has a major influence on purchase intention compared to other variables.

Findings and Discussions

   Among the various dimensions of online reviews, Social Influence (SI) has the strongest impact on purchase intentions. This reveals that consumers reflect on opinions of people they are close to and opinions from users. Its disposes that consumers tend to purchase product shared through social media. Thus, it is necessary that other consumers' assessments should be encouraged and posted on web sites particularly social media.

   Brand Recognition (BR) and Review Type (RT) also have influence on purchase decision. This urges a need for business organization to focus attention in creating awareness through e-Wom which are closely linked with consumer such as posts and comments on social networking sites and blog reviews. It can be said that consumers put in more trust when online reviews are more attribute- value reviews which are clear and simple. It is also found that popularity of website and up-to-date reviews are considered more helpful.

These findings assist the marketers in devising pertinent strategic plans for future applications. The electronic word-of-mouth is the truest reflection of consumers' product evaluation under the network environment. So, the enterprises should definitely take into account electronic word of mouth and heed to consumers' opinion of the brand inorder to improve its image and to be the pioneers in the corporate world featuring emulous competition.

Limitations

This study possesses some limitations too. It reflects characteristics of the customer while reading online reviews hence reviewer aspects while posting reviews are not examined. Another limitation of this study is that it inspects the effect of all types of online reviews such as reviews on product website, e-shopping sites, blogs and social media. Consequently, there arises a need for focusing on one particular type of online reviews. This study particularly focuses on search products and findings may not be applicable to experience products.

Theoretical Contribution of the Study

In spite of the limitation in the present study, it makes significant contribution to the existing literature by examining the characteristics of online reviews from a customer point of view who search information which guides the consumer in the decision-making process. The study makes an effort to add factors like brand recognition and social influence and proves to benefit the corporate world from the use of online reviews to help consumers recall a brand and lead to sales increase.

Conclusions and Scope for Future Research

Electronic word of mouth (e-WOM) is a powerful marketing instrument. Consumers search for information posted on several platforms of e-WOM such as blogs, review websites, discussion forums, shopping websites and social media. Consumers search such information so as to be contented with their purchase decisions. The objective was to study the impact and factors of online reviews on purchase Intention. It was found that purchase intentions are dependent on various factors such as social influence, brand awareness, review type and trust. Customers are involved in online reviews while purchasing a product which is characterised by high financial and emotional risk. The study focuses on understanding consumers' use of information received through online sources.

Consumers tend to seek information on products and this information could be controlled and extended in favour of the organization to formulate their strategies effectively and this ultimately leads to a significant impact of online reviews on consumers' purchase intentions. It can bring a positive change in the attitude of the consumer towards brands especially when information is received from a trustworthy and experiencedsource. Thus, the strategy of e-WOM marketing is going to be lucrative for organizations if handled properly.

The research model can be developed by adding more variables and also future research could investigate ane-WOM effect model on cross-cultural basis. Electronic word of mouth (e-WOM) is becoming a global phenomenon for organisational success and hence its cross-cultural research would be an interesting topic for young researchers to set their foot onto.

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Impact of job Stress on Employee Performance: A Study of Software Professionals in Kerala

ANU JOSSY JOY

Assistant Professor and Research Scholar in the Research and PG Department of Commerce, Nirmala College, Muvattupuzha, Kerala, India.

Dr. G.S. GIREESH KUMAR

Principal, Henry Baker College, Melukavu and Research Guide, Research and PG Department of Commerce, Nirmala College, Muvattupuzha, Kerala, India.

Abstract

Paradigm shift in the concept and context of work brought about remarkable changes in the work world of the 21st century. Digital revolution in the form of continuous refinements in the IT world and IT sector added more to this shift. Work today is no longer 'result oriented', it is 'people oriented'. No place for personal consideration and relations anywhere. Employees are evaluated on the basis of their performance and contribution to the organization. In the struggle to prove themselves 'fit' for the job, workers are exposed to magnified levels of stress and strain. Software professionals too are not an exception to the rule. They are those agile technology workers functioning under dynamic technological environment, where the up gradations are so fast and unpredictable. The present study evaluates the parameters that contribute to job stress among software professionals in Kerala and assesses the impact of each of these dimensions on the performance of the employees from a sample study of 438 software professionals. The study throws light to the fact that sources of job stress are inversely related to job performance and role ambiguity exerts great impact on job performance along with salary and rewards, fear of obsolescence and workload. Thus the study calls for the alarming need to take policy actions from the part of the Government and IT companies to mitigate the negative impact of job stress on the performance of Software professionals in Kerala.

Key Words: Digital revolution, Job stress, Software Professionals, Agile technology workers, Role ambiguity, Fear of obsolescence.

Introduction

Acceleration of world trade through the broadening of cross border transactions and also through the proliferation of digital revolution made continuous refinements in the work culture, work methodologies and eventually the boundary between work place and home. The traditional 'work around the clock' concept has subjected to a paradigm shift on account of alternative work timings and patterns of the twenty first century work environment. Work today is 'result oriented' rather than 'people oriented'. It is only the performance that matters. In the struggle to manifest themselves as appropriate for the work, workers are exposed

to magnified levels of stress and health related problems. When work is denoted as the source of self fulfillment in the past, it is an originator of stress, dissatisfaction and humiliation (Terkel, 1972 as cited in Joshi, 1999) nowadays. Vast studies in the area of job stress recognized stress as an alarming worldwide issue in many organizations, occupations, employees and employers (P. Misra & Srivastava, 2010). Stress is remarked as the 'health epidemic of this century (Fink, 2016). It is universal, dangerous and enduring (Parmar, Vyas, & Tapariya, 2011). Even a twenty first century typical worker is exposed to job stress, then what about the professionals in the IT sector, so called 'techies', whose work is fully technology oriented, requires logical and critical thinking, follows no work timings and adherence to predefined work schedules?

Work in IT sector is distinctive that it has strong affiliation to the world market and is commonly performed 'virtually' (Abraham, 2005; Ranjit & Mahespriya, 2012; Varghese, 2013). It functions underneath 24x7 principle. Added to this, work in IT sector is project based and mostly performed either at the individual level or at team level. Clients in international destinations particularly in America and European countries, outsource giant chunk of their work with time deadlines to IT corporations in India. IT industry paved the means for transformation of the Indian economy and changed the perception of India within the worldwide economy. India's competitive advantage in value, that is three to four fold less costly than the U.S., keeps its distinctive merchandising position in the international sourcing market. Most of the 'techies' in the sector work for over eight hours per day and forty eight hours per week. The industry is one amongst the key sectors powering the Kerala economy too. Kerala is one among the highest Indian states with large pool of technical graduates in information technology and engineering services. Majority of these graduates are employed in IT firms playing their jobs as software professionals.

Occupational stress and its impact on job performance

According to Selye, stress is "the non specific response of the body to any demand made upon it" (Selye, 1976a, p.137). Stress refers to all the non specifically induced changes (Selye, 1976b) that may create physiological, mental and behavioural reactions within a biological system. According to Ross and Altmeir (1994, p.1) "the term stress is so ubiquitous that it is used as a noun when we talk about being under stress, as a verb when events are stressing us and as an adjective, when we use the term - modern life has become stressful". Thus, the concept of stress is "multidimensional and composite, including emotion and arousal" (Moal, 2007, p.3). Job stress is denoted as a mismatch between one's aptitudes, capacities and demands of the job and needs supplied by the job environment (French, Rogers, & Cobb, 1974). Excessive demands are the product of individual's interaction with the surroundings pinpointing that the individual isn't fully equipped to handle a selected scenario (Jamal & Baba, 2000)

Software professionals are those agile technology workers functioning under dynamic technological environment, where the upgradations are so fast and unpredictable. Job/work/occupational stress is prevalent

among software professionals in varying degrees (Ajala, 2011; Bhat, Shet, Nayanatara, & Ganaraja, 2014; Ganesan, Mahalakshmy, & Kalaiselvan, 2011; Gautami & Anupama, 2016; Kumar & Siddique, 2011; A. Misra, 2015). Review of literature showed that job stress is a growing concern (Altangerel, Ruimei, Elahi, & Dash, 2015; Bickford, 2005; Damle, 2012; Mirela & Madalina-Adriana, 2011; Ngomani, 2015) for workers in IT sector particularly those designated as software professionals. Job in IT sector is distinctive in the sense that it requires high level of cognitive and technical skills (Carayon, Schoepke, Hoonakker, Haims, & Brunette, 2006; Gallagher, Kaiser, Simon, Beath, & Goles, 2010; McMurtrey, Downey, Zeltmann, & Friedman, 2008; Young, 2012). As an extreme difficult space of labour requiring high level of technical skills, software professionals in the IT sector are exposed to several antecedents of stress like workload, time pressure, demand, role ambiguity, skill variety, role conflict, strained workplace relationships, responsibility towards the organization, keeping themselves updated with latest technological developments, job insecurity, unfair reward system etc. (Bamba, 2016; Ibrahim, 2013; Jalagat, 2017; Karunanithy & Ponnampalam, 2013; Lopes & Kachalia, 2016; Priya, 2016; Shahid, Latif, Sohail, & Ashraf, 1998; Varghese, 2013).

Studies report wide variety of sources through which stress originates. These sources include intrinsic job stressors (Cooper & Marshall, 1976; Dua, 1994) namely workload (French & Caplan, 1972; Beehr & Newman, 1978; Hendrix, Spencer & Gibson, 1994; Ivancevich, Matteson, & Preston, 1982; Sutherland & Cooper, 2000), work pace (Kraan et al., 2014; O'Driscoll, Brough, Timms, & Sawang, 2010; Smith, Conway, & Karsh, 1999), long working hours (Dhar & Bhagat, 2008; Ibtisam, Gichinga, & Ahmed, 2015; Kavanagh, 2005; Kumari, Joshy, & Pandey, 2014), shift work (Gerber, Hartmann, Brand, Holsboer-Trachsler, & Puhse, 2010; Phillips, Magan, Gerhardstein, & Cecil, 1991), time pressure Babu, Sathyanarayana, Ketharam, Kar, & Detels, 2015; Ganapathi, 2014; Parasuraman & Alutto, 1981; Iyer, 2011), repetitive work (Babu, 2012; Guise, 1988; Johansson & Aronsson, 1984; Kornhauser, 1965; Mda, 2010), lack of autonomy (Babu et al., 2015; Hendrickson, 2007; Karasek & Theorell, 1990), poor working environment (Dhar & Bhagat, 2008; Mazumdar, Haloi, & Mazumdar, 2011; Routray & Satpathy, 2007; Siu, 2003), technological advancements (Almanae, 2015; Bickford, 2005; Saidel & Cour, 2003; Tarafdar, Tu, & Ragu-Nathan, 2010), high level of skills, unchallenging work (Dhar & Bhagat, 2008; Mathi & Malathi, 2016), lack interest and aptitude (Priya, 2016) and insufficient training (Krishnamurthy & Prabakaran, 2015; D. Menon, 2014; Sutherland & Cooper, 2000;).

Other sources of stress in the organizational context include role stressors (Dobreva-Martinova, Villeneuve, Strickland, & Matheson, 2002; Sudershan, 2012; Whisler, 2014), career advancement aspects (David, 2014; Karunanithy & Ponnampalam, 2013; Rao & Chandraiah, 2012), job insecurity (Ashford, Lee, & Bobko, 1989; Rajeswari & Anantharaman, 2003; Tarafdar, D'Arcy, Turel, & Gupta, 2015; Wilson, Larson, & Stone, 1993), fear of obsolescence (Amoako, Gyamfi, Emmanuel, & Batola, 2017; Culmer, 2012; Dwamena, 2012; Rajeswari & Anantharaman, 2003; Routray & Satpathy, 2007), frequent appraisals and evaluations (Agarwal, Narayanan & Jain, 2014; Bisht, 2010; Defrank & Ivancevich, 1998; Ross & Altmeir,

1994; Sethi, King & Quick, 2004), unreasonable rewards (Chandra & Sharma, 2010; Ali, Raheem, Nawaz, & Imamuddin, 2014; D. Menon, 2014), poor interpersonal relations (Kang & Singh, 2006; Keshavarz & Mohammadi, 2011; Yang et al., 2015) and work life conflict (Qureshi, 2006; Ram, Kurpad, & Swaminathan, 2014). In addition organizational structure and climate (Cooper & Marshall, 1976; Kang & Singh, 2006; Parker & Decotiis, 1983), level of employment (Cope, 2003; Lee, Foo, & Cunningham, 1995; Marinaccio et al., 2013; Nydegger, 2011; Shah, 2003) and personality characteristics (Patel, 1992; Robbins, 1993) such as locus of control (Chen & Silverthorne, 2008) and personality type (Batigun & Sahin, 2006; P. Menon & Natesan, 2012; Sivakumar, 2012) also have a bearing on the magnitude of stress confronted by employees.

Job performance is defined as the execution of a particular activity, the attainment of which is to be appraised in terms of pre-defined benchmarks of accuracy, completeness, economy and speed (Bierbusse & Siesfeld, 1997). Job performance can be considered as "an activity in which an individual is able to accomplish successfully the task/goal assigned to him, subject to the normal constraint of the reasonable utilisation of available resources" (Jamal, 1984, p.2).

Job stress is often described as closely associated with performance and have serious implications on individual and organizational performance. Stressed employees are most probably unhealthy, poorly motivated, less productive and less safe at work (Goswami, 2015; Lopes & Kachalia, 2016; Park, 2007). Sources of job stress contribute to reduced job satisfaction, reduced quality of labour, high worker's turnover, absenteeism, reduced worker overall performance and reduced organizational performance. Too much stress is clearly evidenced by a substantial decline in performance and organizational effectiveness (Borucki, 1987; Welford, 1973). The relation of stress to job performance or the impact of occupational stress on performance is a topic of academic interest over the years. A negative relation between stress and performance was proved in various sectors of the society such as banking industry (Kakkos & Trivellas, 2011; Shahriari, Meyvand, Koolivand, & Maleki, 2013; Shaikh, Akram, Rizwan, Kousar, & Malik, 2013), hospital industry (Kazmi, Amjad, & Khan, 2008; Nabirye, 2010), hotel industry (Olaniyi, 2013), high tech industries (Hsieh, Huang, & Su,2004), business (Dar, Akmal, Naseem, & Khan, 2011) and educational sector (Riyadi, 2015; Suandi, Ismail, & Othman, 2014). The result of these studies highlight that too much work stress impairs job performance. However, some studies observed no impact of sources of job stress on job performance (Dissanayaka, 2014; Manderson, 2014; Manzoor, Awan , & Mariam, 2012).

Research Gap and Objectives

Though there are plenty of literature that explored the sources of job stress and its impact on job performance in various sectors of the economy, similar studies among software professionals in the IT industry are scant in the literature and no such study have been found to be undertaken in the State of Kerala in India. It is essential that the software companies and the government must understand how job stress impacts the performance of the professionals in the sector for taking adequate measures to reduce the ill effects

of stress. This study aims to fill the void in the literature by identifying which aspects of job stress impacts the performance of software professionals and hence the study is quite relevant and timely from the point of view of both academic and IT industry. The study attempts to address the following research question. What are the sources of job stress among software professionals in Kerala and whether these dimensions have effect on job performance. Based on the above research question, the specific objective of the study was to explore the sources of job stress and to assess the impact of these dimensions on job performance among software professionals in Kerala.

Materials and Methods

The study is empirical in nature and survey method has been used to collect primary data. Software professionals working in the IT sector of Kerala form the population of the study. The respondents were identified in different stages. As the first stage of sample selection, IT parks in Kerala set up by the government of Kerala such as Technopark (Trivandum - pioneering IT park in India), Infopark (Kochi) and Cyberpark (Kozhikode) were selected due to the concentration of IT companies in the area and they clearly portray the IT work environment and culture. So, as a second stage, 56 companies from Kerala, which were registered with NASSCOM as on 1st March 2017, having offices in the selected IT parks of Kerala were identified. Out of these 56 companies, 42 companies were selected by simple random sampling method.

In the third stage, software professionals from these companies with minimum one year of experience were selected as samples. Employees less than one year of experience were excluded because "they may have additional stress on account of adjusting to a new firm, working fulltime after being a student etc. and they may not have adequate exposure to the software development process" (Rajeswari & Anantharaman, 2003). Thus a total of 1,150 questionnaires were distributed and 438 usable responses were received. The questionnaire was pilot tested on 51 respondents.

Measurement of Sources of Job Stress and Performance

An exploratory qualitative study was made among 25 software professionals in Kerala to gain insights about the key dimensions of sources of job stress. Professionals evaluated various dimensions framed on the basis of extensive literature review. Based on the review of literature and qualitative study, 34 items were finally identified to measure the sources of job stress among software professionals in Kerala and they are exhibited in Table 1. The responses were observed on a five point Likert scale from "Strongly Agree" (5) to "Strongly Disagree''.

Table 1 Measures on Sources of Job Stress

Code	Items
SS1	On account of heavy workload I have to work overtime rather than the normal working hours
SS2	I feel pressure to a certain extent due to heavy workload

SS3	I have to struggle hard to complete the assigned tasks as per specifications
SS4	I do not have enough time to complete the assigned tasks
SS5	Serving clients in different time zones increase my time pressure
SS6	I am confused as to what new technology to learn and not to learn
SS7	My current knowledge and skills will be outdated in the near future
SS8	I am concerned about the present retrenchment policies of the company
SS9	I am afraid of compulsory layoff from my company at any time
SS10	There is a possibility in my company to replace an experienced professional hand with a fresh professional as a cost reduction strategy
SS11	Communication gaps and chaos hinder better work relations
SS12	Unclear and changing client requirements create unhealthy relation with them
SS13	Frequent modifications as per changing client requirements cause a lot of hardships in the relationship
SS14	I have a clear idea regarding how the work is to be done **
SS15	I know exactly what is expected of me **
SS16	Explanation is clear about what has to be done in my job **
SS17	I do not get enough time to spend with my family members
SS18	I am not able to switch off at home
SS19	My job makes it difficult for me to enjoy free time outside work
SS20	I have no time for my hobbies/personal interests
SS21	My work demands high level of logical skills and expertise
SS22	My job requires continuous guidance, monitoring and evaluation
SS23	I have to exert greater level of attentiveness and patience every moment
SS24	My job compels me to work fast
SS25	I do not get enough appreciation on a work well done
SS26	Prospects for promotion and career growth are not clearly defined within the organization
SS27	There are no standardised procedures in the company to evaluate employee performance
SS28	Rivalries and lack of trust among professionals hinder career growth and development
SS20	Promotions are based on irrational considerations other than performance
SS30	My pay is poor compared to those of people in other companies with similar qualifications
SS31	I am not fairly rewarded according to my performance
SS32	Bonuses and allowances are insufficient to meet my needs
SS33	I will be given a fair hearing when I appeal **
SS34	The management takes prudent action upon grievances reported **

**Reverse coded statements

Performance is a multidimensional construct which forms organizational goal directed behaviours and actions (Mccloy, Campbell, & Cudeck, 1994). So, multi item measures were used to capture the job performance of software professionals in Kerala. The employee performance is examined in terms of overall performance measured through 30 items captured on a five point Likert scale from "Strongly Agree"(5) to "Strongly Disagree" (1) as given in Table 2.

Table 2 Measures of Job Performance

Code	Items
JP1	I work overtime to complete my projects
JP2	I acquire new skills and update myself to the latest developments in Technology
JP3	I exhibit punctuality on all job related matters
JP4	I work closely with others in doing in my work
JP5	I voluntarily help new employees to settle in their jobs
JP6	My office hours are not wasted in loose talks
JP7	I do not take unnecessary off from work
JP8	I do not take undeserved work breaks
JP9	I am able to follow a methodical approach in understanding and solving problems
JP10	Prior intimation is given to authorities on absence
JP11	Work done by me is usually free from errors
JP12	I have never been asked to redo the work
JP13	I complete the work within the stipulated time
JP14	Often I fail to attain my targets **
JP15	I am able to get promotions/ salary hike based on my work performance
JP16	I perform the assigned tasks to the best of my abilities
JP17	My response to client requirements is quick
JP18	I am able to understand the specific project demands very fast
JP19	I am able to work with and manage different groups/clients simultaneously
JP20	I am able to win the confidence of my higher ups to discharge whatever tasks assigned to me
JP21	I am confident to perform any tasks related to my job
JP22	Once the task is assigned, I will perform it without being asked to do
JP23	I always handle tasks with proficiency
JP24	I always apply the best methods for doing work
JP25	I sacrifice important part of my work due to schedule pressure **
JP26	I put forward new ideas and suggestions for improving team performance
JP27	I have never given any excuse in the execution of assigned tasks
JP28	I am updated with new developments in technology to execute any assigned task
JP29	I am able to create solutions which are elegant and simple
JP30	I am able to get top scores on my performance feedback

** Reverse coded statements

Sample Profile

Out of the total sample of 438, 62 per cent were males and 38 per cent were females. This is consistent with the findings of past studies (Abraham, 2005, M. A. Prasad, et al., 2014; Ramesh, Joseph, Kiran, Kurian & Babu, 2016; Rashidi & Jalbani, 2009) that males constitute more than ½ of the workforce in the sector. Representation of unmarried and married employees were 51 and 49 per cent respectively. 42 per cent of the employees fall in the age group 26 - 30 years. 23 per cent have below 25 years of age and remaining 35 per cent are of above 30 years of age. Consistent with the findings of Babu et al. (2015) and Ramesh et al. (2016),

the present study also found that large portion of software employees fall in 26 - 30 years of age. Graduates account for 58 per cent and postgraduates, 42 per cent. Around 70 per cent earn a monthly income up to Rs.50,000.

Analysis on work characteristics indicates that majority of the professionals are from large (above 500 employees) and medium sized companies (100-500 employees). Respondents from small companies account for only 19 per cent (below 100 employees). Half of the respondents perform middle level software jobs. Above 70 per cent, work for more than 8 to 10 hours. Finding of the study corroborates the findings of Bastian and Vivekanandan (2014) that most of the software professionals work for more than 8 hours per day. Besides, more than 70 per cent have experience up to 3 and > 3 - 6 years. Very few are working in the company/industry over a period of 9 years.

Exploratory Factor Analysis

Exploratory factor analysis using principal component analysis (PCA) was performed with the stipulation that the eigen value of each generated factor is more than1. EFA was conducted on 34 measures of sources of job stress and 30 measures of job performance. Correlation matrix assessed the suitability of the data for factor analysis, and found enough correlation between the measures. The Kaiser-Meyer-Oklin value reached 0.891 (sources of job stress) and 0.913 (job performance), which was considered meritorious according to Kaiser. The significance level of Barlett's test of sphericity was extremely small (0.000), supporting the factorability of the correlation matrix. Communalities of the 34 measures on sources of job stress ranged from 0.511 to 0.722 and 30 measures of job performance, from 0.502 to 0.714.

As presented in Table 3, PCA revealed the presence of 11 components for the sources of job stress that altogether explained 56.97% of the variance. After compressing the data to eleven components, Varimax rotation was performed and the rotated factors with their item constituents and factor loadings are also given in Table 2. Each of the eleven factors were suitably labelled based on the characteristics of the composing measures.

Table 3 Rotated Component Matrix[a] - Sources of Job Stress						
Dimensions	Code	Mean	SD	Factor loadings	Eigen Value	Cronbach's Alpha
Appraisal and Promotion Issues	SS25	3.14	1.11	0.594	9.07	0.807
	SS26	3.27	1.08	0.621		
	SS27	3.12	1.15	0.669		
	SS28	3.25	1.04	0.684		
	SS29	3.08	1.04	0.569		
Work life collision	SS17	3.20	1.16	0.676	3.08	0.835
	SS18	3.20	1.11	0.624		

Factor	Item	Mean	SD	Loading	Eigen	Cronbach's
	SS19	3.21	1.17	0.641		
	SS20	3.09	1.17	0.648		
Workload	SS1	3.88	1.05	0.700	2.44	0.719
	SS2	3.64	1.13	0.744		
	SS3	4.10	0.85	0.540		
Cognitive and other demands	SS21	4.27	0.73	0.711	1.96	0.753
	SS22	4.16	0.84	0.735		
	SS23	4.14	0.73	0.658		
	SS24	4.01	0.84	0.604		
Job insecurity	SS8	3.50	0.95	0.753	1.67	0.699
	SS19	3.18	1.13	0.764		
	SS10	3.36	1.14	0.622		
Strained relations	SS11	3.96	0.94	0.580	1.45	0.682
	SS12	3.66	1.06	0.805		
	SS13	3.82	0.95	0.793		
Role ambiguity	SS14	3.86	0.80	0.805	1.39	0.727
	SS15	3.89	0.82	0.830		
	SS16	3.63	0.91	0.724		
Fear of obsolescence	SS6	3.43	1.08	0.656	1.29	0.667
	SS7	3.43	1.14	0.610		
Salary and Rewards	SS30	3.43	1.09	0.729	1.19	0.773
	SS31	3.34	1.05	0.764		
	SS32	3.50	1.11	0.701		
Grievance redressal mechanism	SS33	3.38	0.89	0.617	1.08	0.756
	SS34	3.37	0.89	0.584		
Time pressure	SS4	3.36	1.02	0.548	1.03	0.697
	SS5	3.42	1.03	0.632		

EFA using PFA was performed on 30 measures of job performance which altogether explained 57.56% of the variance. Rotation revealed the presence of eight components. After reducing the data to eight components, Varimax rotation was performed and the rotated factors and their item constituents which were suitably labelled based on the characteristics of the composing measures are given in Table 4.

Table 4 Descriptive Statistics on Constructs of Job Performance					
Factor label	**Items**	**Mean Values**	**SD**	**Eigen Values**	**Cronbach's Alpha**
Work Efficiency	JP17, JP18,JP19, JP20,JP21,JP27	3.79	0.55	9.45	0.798
Personal Resourcefulness	JP23,JP24,	3.79	0.56	1.93	0.781

	JP26,JP28, JP29				
Self Reported Responsibility	JP5,JP7,JP8, JP10,JP16,JP22	3.91	0.56	1.65	0.735
Timeliness	JP3, JP6, JP9	3.77	0.62	1.34	0.717
Output Quality	JP11,JP12,JP13	3.58	0.66	1.29	0.745
Result Orientation	JP1,JP2, JP4	3.88	0.63	1.22	0.725
Professional Competence	JP14, JP25	3.05	0.79	1.09	0.689
Performance Feedback	JP15, JP30	3.52	0.74	1.01	0.692
Overall Job Performance	30	3.80	0.42	9.45	0.901

In the study, Cronbach's coefficient of alpha for all factors on sources of job stress except time pressure, fear of obsolescence, job insecurity and strained relations are well above 0.70 and the alpha coefficient of time pressure (0.697), fear of obsolescence (0.667), job insecurity (0.699) and strained relations (0.682) is much higher than 0.60 (Hair, Black, Babin, & Anderson, 2015) and is very close to the required minimum of 0.70 (Nunnally, 1978). As regards job performance is considered, alpha coefficients for work efficiency, personal resourcefulness, self reported responsibility, timeliness, output quality and result orientation are much higher than 0.70, the norm fixed by Nunnally (1978). However, in respect of professional competence (0.689) and performance feedback (0.692), the values are just below 0.70. Eventhough it is less than 0.70, it is very close to 0.70 and much higher than 0.60 as indicated by Hair et al. (2015), Loewenthal (2001) and Sekaran (2003). Reliability score of overall job performance is 0.901.

Regression Analysis

Stepwise multiple regression analysis is performed to assess the degree of impact of various sources of job stress (predictor variables) on job performance (dependant variable). Multi-collinearity is indicated when Tolerance value is below 0.20 and VIF is more than 5 in a regression model. Tolerance value ranges from 0.816 to 0.952 and VIF from 1.096 to 1.226 for all the predictor variables. Therefore, there is no reported problem of collinearity. Auto correlation is calculated using Durbin-Watson test. As the value lies between 1.5 and 2.5, there is no autocorrelation between the variables and are found to be independent observations. Summary of the multiple regression analysis along with R^2 and adjusted R^2 values are indicated in Table 5.

Table 5						
Results of Regression Model						
Model	**R^2**	**Adjusted R^2**	**Beta(β)**	**t-value**	**Sig.**	**Collinearity**
						Tolerance / **VIF**
(Constant)				14.99	0.000*	
Role Ambiguity	0.487	0.237	-0.456	-10.58	0.000*	0.952 / 1.050
Salary and Rewards			-0.123	-2.67	0.008*	0.842 / 1.118
Fear of Obsolescence			-0.110	-2.36	0.019*	0.816 / 1.226
Workload			-0.102	-2.32	0.021*	0.912 / 1.096

Predictors (constant): RA, SaR, FO and WL   Dependent Variable: Job Performance
(*Significance at 5 per cent level)

As per Table 5, R value is 0.487. R^2 value is 0.237 and the adjusted R^2 value is 0.230. Adjusted R^2 score indicates the per cent of total variation explained by all the predictor variables. β value for *Role ambiguity* -0.456 (t = -10.58), *Salary and rewards* -0.125 (t = -2.67), *Fear of obsolescence* -0.110 (t = -2.36) and *Workload* -0.102 (t = -2.32) are significant at 5 per cent level (p < 0.05). In respect of other eight sources of job stress such as appraisal and promotion issues, work-life collision, job insecurity, time pressure, strained relations, cognitive and other demands and grievance redressal mechanism, t-values are not significant at 5 per cent significance level (p > 0.05). The impact of sources of job stress on the overall job performance of software professionals in Kerala is given in Figure 1.

Figure 1

Impact of Sources of Job Stress on Job Performance
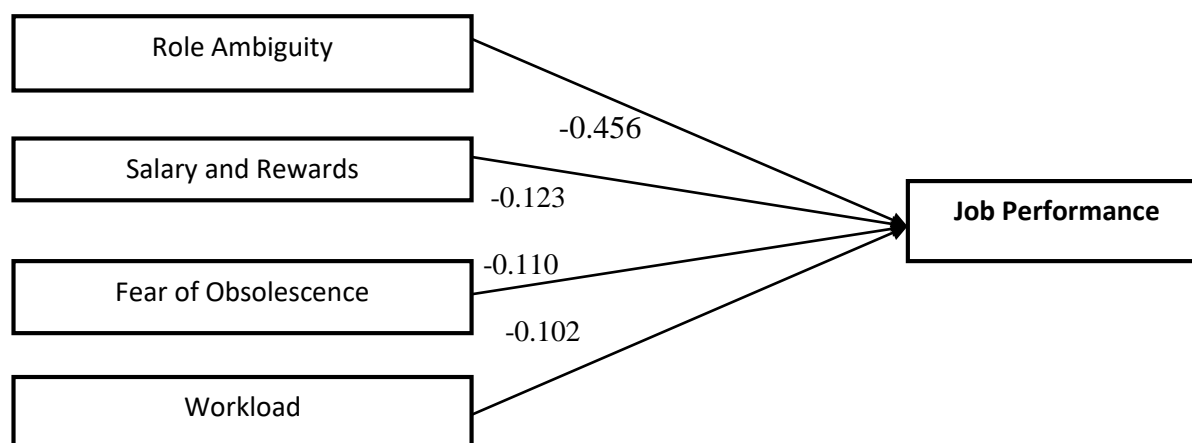
Discussions and Managerial Implications

Out of the eleven sources of job stress, four sources of job stress were emerged as the predictors of job performance. Considering the impact of each of the predictor variables on job performance, β is highest for role ambiguity (-0.456). Therefore it is emerged as the strongest predictor of job performance followed by salary and rewards, fear of obsolescence and workload. All these sources of job stress have significant negative impact on job performance of software professionals in Kerala. This calls for the need to pay special attention to these four dimensions of job stress. As a way to enhance the job performance of software professionals, efforts should be made to reduce the extent of these sources of job stress as far as possible.

Clear definition of the roles and due delegation of authority for executing the same may help to reduce role ambiguity. There should be proper flow of information from the senior level to the middle and lower levels. Changes in client requirements and specifications should be communicated in time. If the work is of sequential in nature, there should also be clarity on what one should do in the absence of the other professional

without delaying the completion time. It is a fact that global economic recession slowed down the IT industry and that companies are following the strategy of cost advantage. This advantage is usually attained by cutting down employee benefits or through implementing new retrenchment policies. Even though performance based appraisal systems are practiced by many companies, appraisals may be either biased or not systematic. Proper monitoring should be made at all levels to ensure that the professionals are not exploited and are given reasonable salary and other emoluments. A minimum pay scale and payment structure should be developed for the entire IT industry considering mode of operations, size of the company and its profitability. Profit sharing and stock option schemes can be efficiently implemented along with the performance based appraisal system.

Fear of obsolescence negatively impacts job performance. Companies provide induction or orientation training at the start of one's career. After that it is the responsibility of the employee to acquire additional talents. Skill sets vary from project to project. They are confused about what technology to learn and not to learn. So, they should be given proper guidance for the timely acquisition of skills and the proper development of the skills. Assignment of tasks in accordance with the tastes and talents of the employees will make them proficient in that area. Moreover, job enrichment by changing the job content and providing challenging tasks and opportunities to the professionals at middle and entry levels with added responsibilities help in eliminating the fear of obsolescence.

Workload is also found to have a negative impact on job performance. There is a possibility that neurological capabilities such as concentration, reflex actions, speed and tolerance level declines with increase in age. So age can be considered as a decisive factor while assigning duties. Relaxation programmes such as indoor and outdoor games, yoga and meditation can be recommended to the employees. Further, strict measures should be taken to ensure that the employees are not working for more than 8 hours per day. The industry is out of the purview of the Factories Act. Policies should be implemented by the government to ensure that no one works for more than more than 8 hours per day even on compulsion. Authorities may even think about developing a separate Act catering to the IT Industry for safeguarding the interests of employees. They should be provided with sufficient work breaks and off days. Short breaks after every 2 hours of working, off days after completion of each stage of the project may also be tried to reduce stress and enhance performance.

Limitations and scope for further research

The study focused on those companies situated at Infopark, Technopark and Cyberpark which were registered with NASSCOM and was confined to software professionals alone. Other areas in the IT industry and companies outside the three technology parks have been excluded from the study. Therefore, special care should be taken while generalising the findings of the study. The low R square reported by the current research to predict job performance represents an important limitation. Hence, there is a need to search for additional

measures and constructs that will improve the predictive power of the model. The study was more qualitative in nature. Additional research efforts are needed to evaluate the performance of software professionals quantitatively which would improve the validity of the findings.

Future research can be made to replicate the present study in the entire IT industry incorporating the ITeS and Hardware sector also. A holistic study of IT companies in Kerala can also be made by selecting employees from various IT companies all over Kerala and there is a scope for comparative study among professionals working at technology parks and outside. It is also possible to make a study of similar type among professionals from Kerala who work abroad, to understand the influence of culture and the impact of global economic trends on job stress and employee performance in IT industry. The impact of each of the sources of job stress on each of the dimensions of job performance can be thought of.

Concluding remarks

The study explored the sources of job stress among software professionals in Kerala and found that the job performance of the software professionals is dependent on role ambiguity, salary and rewards, fear of obsolescence and workload. Recent study reports focus on the aggravating problem of occupational stress among the professionals. In this situation, IT companies cannot afford to under estimate the importance of keeping an eye on these dimensions of job stress in an attempt to enhance individual and organizational performance. If it happens so, it will be a great curse to the Indian economy in terms of the overall investment and return from the blue chip sector, 'IT sector'.

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DIRECTORIAL CLIMATE AND PROFESSIONAL COMMITMENT: A STUDY OF SELF- FINANCING COLLEGE TEACHERS IN KERALA

THOMAS SEBASTIAN

Research Scholar (Commerce), Bharathiar University, Coimbatore

Dr. GIREESH KUMAR G.S

Principal, Henry Baker College, Melukavu, Kottayam, Kerala-686652

(Research Guide, PG & Research Department of Commerce, Nirmala College, Muvattupuzha)

Email: gireeshkartha@gmail.com

Abstract

One of the dominant problems facing by almost all organizations presently is how to motivate their employees for the better productivity and accelerating prosperity through a constant level of work satisfaction. The purpose of this study is to identify the relationship between college working culture and organizational commitment. The study focused on twenty self-financing colleges in Kerala. 115 teachers were randomly selected to be the respondents where they were asked to complete the questionnaire to test the collegiate culture while Organizational Commitment (OC) (Meyer &Allen, 1990) to examine teachers 'commitment. The factors which are apparent on the overdue of job satisfaction can be differentiated in to two categories: Professional commitment and environmental factors. To test the college working culture and organizational commitment, statistical methods, descriptive and inferential statistics were used. This paper aims on all of these dimensions and trying to discover the association between these factors with employee job satisfaction among self-financing college teachers.

Keywords: College working culture, Organizational commitment, Job satisfaction

1. Introduction

Many researchers perceived a different variable which has been mentioned several dimensions of job satisfaction and commitment. We know, every organization wants to recognize the job satisfaction of their employees and the subsidizing variables associated

with that. Institutional culture, workers satisfaction, workers commitment are certain important variables that must be identified in order to evaluate how culture affects the overall performance of organization and employees well-being. The development and maintenance of job culture had derived through leadership. Proper maintenance of code of conduct regarding employment leads to employee's commitment. Successful organizational change can be possible only through an influential job satisfaction.

1.1 Objectives

The objectives of the study are as follows;

1) To identify college work culture dimensions of self-financing colleges in Kerala.
2) To identify the relationship between professional commitment and environmental factors (College work culture) towards job satisfaction.

2. LITERATURE SURVEY

Many researchers have been pointed different views about job satisfaction and professional commitment. In other words, **(Schneider, 1970)** described that when the objective of the organization and employees of the organization are mutually participated or congruent, emotional commitment occurs. So emotional commitment characterizes a state in which an employee identifies with a particular organization and their aims, and gathering its membership in order to facilitate these goals **(Spector, 1997)**demonstrated, in an organizational behavior job satisfaction is the most prominent investigated variable. According to **EngIhardt, V (1973)** observed that, teachers" job satisfaction diminutions as the size of the work load and class increases. Satisfaction also has a direct association to the superior attention and apprehension to the teaching staff.

Fledvebel & Andrews (1998) discovered the relationship between the organizational climate and student accomplishment and found a positive and significant relationship between the two. On the other hand, **Kallestad Dan (1999)** explored functional issues connected to educational climate. According to him collegial communication, orientation to change and teacher stimulus over classroom practices were the three factors that affected organizational climate.

(Morrow 1983) observed the relationship between organisational climate and organisational commitment are specified that organisational climate has a significant and positive relationship with employee's organisational commitment. **Porter, Steer, Mowday and Boulian (1974)** detected that employees highly committed to an organisation were willing to devote a great amount of their energy and persuaded to remain with the organisation.

Angle & Perry (1981) identified that organisational commitment was positively associated to some measurements of organisational outcomes such as organisational adaptability, turnover and tardiness rate. On the other hand, **Welsch & Lavan (1981)** stated that organisational commitment is an essential behavioral dimension which can be used to appraise the strength of an employee's affection to his organisation. According to **Amsa (1982)** establish that individuals performed well and shown commitment only when an employee's expectations from his job are reasonably fulfilled by the organisation.

Balaji (1984) reported that managers at the higher levels of the organisational hierarchy were more committed to their organisation than those at the lower levels. In the words of **Oliver (1984)** revealed that the founder members of the co-operatives in Scotland showed significantly higher organisational commitment, involvement and loyalty than other members.

3. RESEARCH DESIGN

Since this study involved a huge number of respondents therefore Stratified random sampling was appropriate for mixed populations because this method could reduce the sample error, decrease variants, and give correct assumptions **(Gorard, 2001)**. Size Determinant Table for educational research activities built by (**Krejcie and Morgan 1970**) was used to determine the research sample and 115 teachers chosen from among several self-financing colleges through simple random sampling were used as research sample. A- Part consisted of teacher's personal information such as gender, marital status, age, specialized group, years of teaching experience and years of teaching in the college and educational qualification. Part-B involved 4 college working culture dimensions which contained 10 to 11 items for each dimension (Psychological relationship (1-11), Behavioral system (12-21), Cognitive aims (22-31), internal systems (32-42) and five options were given; Never, Rarely, Sometimes,

Often, Always . Section C dealt with teachers' commitment which involved 25 items based on Organizational Commitment (5 Likert scale was given; 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree and 5= Strongly Agree).

3.1 Data Collection

The researcher distributes the research instrument to college teachers in twenty self-financing colleges in Kerala. The respondents were given two weeks for complete the questionnaire. Data collected was analysed by using SPSS (Statistical Package for Social Science) version 19. 0. To describe sample characteristics and college working culture dimensions, frequency, average, standard deviation, and percentage were used. Spearman Correlation test were used to identify the relationship between college culture and teachers' commitment.

3.2 Research Model developed based on literature survey
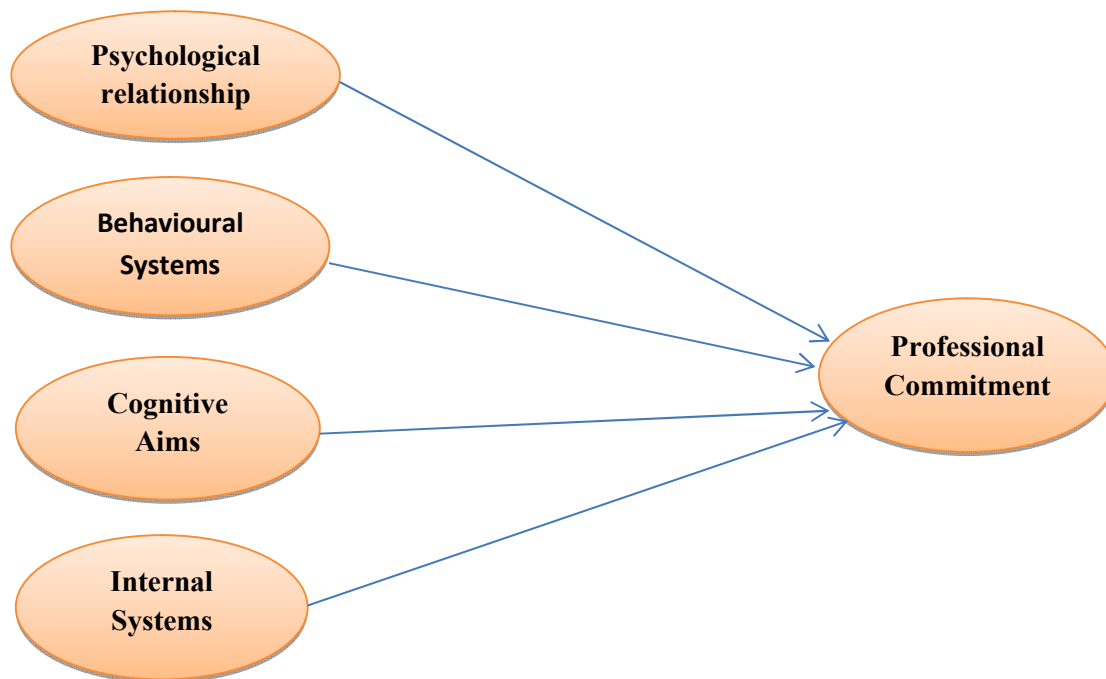
Fig: 1 Research Model

4. RESULTS

4.1 Demographic Information

Descriptive analysis was used to explain the respondents' information in terms of gender and marital status. Based on Table 1, there were 12 male teachers (10. 43%) and 103 female teachers (89. 56%) involved.

Table1. Respondents' distribution based on gender

Gender	No. of Respondents	Percentage (%)
Male	12	10.43
Female	103	89.56
Total	115	100.00

Table 2 shows the mean result of the overall culture which is 3. 31. Psychological relationship has the highest mean value which is 3. 38. The mean for other dimensions are high; with Human relationship (3. 38) the highest, Behavioral system (3. 12), Cognitive aims (3. 05), Internal process (3.32).

Table2. Mean and Standard Deviation for school culture

College Working Culture Dimensions	Mean	SD
Psychological relationship	3.38	0.40
Behavioral system	3.12	0.26
Cognitive aims	3.05	0.34
Internal systems	3.32	0.63
Overall	**3.31**	**0.42**

4.2 Hypothesis Testing

H01: There is no significant relationship between school culture and teachers' commitment.

Based on Table 4, the correlation analysis using Spearman test finding showed positive significant relationship between college culture and teachers' commitment (r = . 501, p<. 05). This result rejected Ho1. The analysis finding showed that a high practice of college culture will result in high level of teachers' commitment. The

correlation value between college culture and teachers' commitment was averagely high.

Table 4: Spearman Correlation - college culture and teachers' commitment

Variables	Teachers Commitment	
	Correlation Value (r)	Significant
College Culture	0.501**	.000

Table: 5 Correlation Analysis

Hypotheses	Hypotheses Statements	Method of Testing	Correlation Value	Test Findings
H02	There is no significant relationship between Psychological relationship dimension and teachers' commitment at self-financing colleges in Kerala.	Spearman correlation	.996	Rejected
H04	There is no significant relationship between behavioral system dimension and teachers' commitment at self-financing colleges in Kerala	Spearman correlation	.498	Rejected
H05	There is no significant relationship between cognitive aims dimension and teachers' commitment at self-financing colleges in Kerala	Spearman correlation	.500	Rejected
H06	There is no significant relationship between internal systems dimension and teachers' commitment at self-financing colleges in Kerala	Spearman correlation	.500	Rejected

Note: P≤0.05

Correlation analysis result using Spearman test in Table 5 showed positive significant relationship between Psychological relationship dimension and teachers' commitment (r = . 996, p<. 05) statistically. This result failed to accept Ho2. The high positive relationship showed that a high level of human relationship was able to increase the level of teachers' commitment and vice versa. The relationship between behavioural system dimension and teachers' commitment was also positive and significant (r = .498, p<. 05) which also rejected Ho3. The result showed that high level of behavioural system practice resulted in high level of teachers' commitment and vice versa. Similarly with Ho4, there was positive significant relationship between cognitive aims and teachers' commitment (r =. 500, p>. 05) which

failed to accept Ho4. With this, there was an averagely high relationship between both variables. The positive significant relationship showed that high cognitive aims brought about high teachers' commitment. Finally, the result for Ho5 was also significantly positive (r =. 500, p<. 05) which showed an averagely high positive relationship between internal systems dimension and teachers' commitment. This result failed to accept Ho5. The positive significant relationship showed that an effective internal system resulted in high teachers' commitment and vice versa. Overall, psychological relationship dimension showed a high correlation value r =. 996 compared to other dimensions which gained r value, r = .498.

5. DISCUSSION

This study was aims to find out the relation between college work culture and its professional commitment towards job satisfaction. There are four college culture dimensions namely psychological relationship, behavioural system, cognitive aims and internal systems in this study. Overall, the mean score for all the four dimensions were high which exceeded 4 in the 5 Likert scale. The result finding showed that psychological relationship dimension is the dominant culture in self-financing colleges in Kerala with the mean value of 3.38.

Small size colleges can produce good working culture and which will produce a high quality educational output. This happened due to the healthy relationship of teachers towards parents of their students. Small size institution could monitor their children individually. Overall performance of the students can evaluate as per academic scaling.

Colleges with high culture practice will increase the level of teaching and professional commitment along with this will lead to job satisfaction and vice versa. Colleges in Kerala practices more importance for academic excellence than other cognitive aims of the institution. The findings of the study revealed that psychological relationship dimension is the most dominant college culture. So the parental oriented programs along with academic strategies must be introduced and this will accelerate the professional commitment of the teachers in the self-financing colleges in Kerala.

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An Empirical Study on the Level of Job Stress among Bank Employees in Kerala

Dr. GANGADATHAN NAIR. D

Associate Professor and Head, PG Department of Commerce, SVR NSS College, Vazhoor, Kerala- 686504

Dr. GIREESH KUMAR G. S

gireeshkartha@gmail.com

Principal, Henry Baker College, Melukavu, Melukavumattom P.O, Kottayam (Dist), Kerala-686652

Abstract & Keywords

Job stress has become a major concern of the modern times as it can cause harm to employees' health and performance. Although a degree of stress may clearly be beneficial in providing stimulation and creating energy, thus increasing both productivity and efficiency, it is believed that this is too often used even to justify poor or inappropriate management practices. Work-related stress is a serious and growing problem in the industrial as well as service domain and is regarded as a significant health and safety issue. If the pressure of work is too heavy or is prolonged and the individual finds himself unable, to cope successfully, the physical and mental reactions, collectively known as 'stress' will arise. Such reactions become manifest in a wide variety of illnesses and behavior disorders. An assessment of the level of stress is highly instrumental to delve into the myriad causes of stress and diagnose the probable effects of stress - both physical and psychological. Level of stress or magnitude of stress is measured on the basis of psychological effect, on a five- point rating scale. It is proved that there is dependence between level of stress and gender, employment status, and work load. Gender-wise, males and employment status- wise, officers and managers, experienced comparatively higher levels of stress. There is clear dependence between workload and stress and the stress progresses with every increase in effective working hours. Whilst, the level of stress is independent of variables, type of bank, location of the bank, marital status, age, educational qualification and length of service.

Keywords: Stress, Occupational Stress, Burnout, Work-life Balance, Psychological effect

Introduction

The rapid and striking policy changes after liberalization, privatization and globalization since 1990s has brought significant impact in the functioning of commercial banks in India. De-regulated and competitive environment exert severe pressure on business share, interest spread and financial health. The customers' expectations and demands have also undergone radical change due to the entry of new generation banks that have started offering variety of value added services with focus on door steps delivery and that too round the clock. Banks are innovating new products, offering 7 days a week to 24 hours banking, introducing new delivery channels and devising new ways and means to cut the costs, to overcome delays and to offer services at competitive rates. They are becoming more and more professional in their approach by complying with international banking standards in the area of risk management, capital adequacy, loan loose provisions, assets quality and corporate governance. Business alliance with other players in the financial sector is a strategically initiative for survival and growth of banks. The advent of technological changes, especially extensive use of computers in the sector has changed the work pattern of employees and has made it inevitable to downsize the workforce in the sector. All the factors discussed above are prospective attributes to cause occupational stress and related disorders among the employees.

Level of stress indicates the degree of stress experienced by a person at workplace. Assessment of level of stress is utmost significant in gauging into the probable causes and consequences on various aspects of work life. The best way to quantify the magnitude of stress is on the basis of its consequences on individuals. Therefore, consequences of stress are measured in terms of both physical and psychological effects. The level of stress confronted by an employee is assessed on the basis of psychological effect of stress as it is more apt and relevant. There are 15 elements which fall under psycho-effect of stress covered under the study. The effect is measured on a five point Likert scale ranging from 1(Strongly disagree) to 5(Strongly agree). Reverse scaling is done in the case of negative statements where a score of 5 for to strongly disagree and 1 for strongly agree. The scores are collected summated, averaged and compared across different groups to draw meaningful conclusions.

Literature Review

Sen.P.C(1981) in his work "A study of personal and organizational correlates of role stress and coping strategies in some public sector banks" investigated the main role stress experienced by employees in banks at different levels and coping strategies adopted by them.

Bhatnagar.D and Bose K. (1985) studied "Organizational role stress among branch managers" of a banking organization to understand the relative strength of different stressors for bank managers on the assumption that" branches "form the backbone of a bank and its role incumbents are simultaneously subjected to internal, organizational and environmental stresses.

Umasekaran(1989) in a study titled "Paths to the job satisfaction of bank employees" investigated casual connections among job characteristics, sense of competence(SOC), job involvement(JI) and job satisfaction(JS) using 267 bank employees. In a study "Occupational stress: field dependence-independence and job level in banking organizations" conducted by **Herode, R.D and Palnitkar. A (1987)**, a sample of 100 officers and 100 clerks were used.**Chaudhary. A (1990)** in his study titled "A study of relationship between job satisfaction and role stress of bank officers" examined the relationship between role stress and job satisfaction among bank officers. **Rajeswari.T.R (1992)** in her research work "Employees stress: A study with reference to bank employees" found that structured rigidity and poor physical working condition are sources of stress. This study was conducted among 34 officers and 79 clerks from five nationalised banks. **Mina Westman and Ramat-Aviv program (1992)** in their study "Moderating effect of decision latitude on stress-strain relationship: Does organizational level matter?" tested the hypothesis that decision latitude and role stressors have a differential effect on strain in a group of clerical bank employees as compared with their managers. In a study "Locus of control as determinant of organizational role stress" by **Ashwinkumar Malik and Madhulikasabharwal (1999),** examined the relationship between role stress and locus of control in bank employees.

In a study "Employee occupational stress in banking" by **Michailidis.M and Georgiou.Y (2005),** they examined occupational stress of employees in the banking sector. **Fortes-Ferreira, Jose.M.Peiro, Gloria.M.Gonsalez-mordles and Isabel Martin (2006)** in their study "Work-related stress and well being: The roles of direct action coping and palliative

coping" analysed the roles of direct action coping and palliative coping in the relationship between work stressors and psychological well-being, as well as their possible interactions, in a sample of 464 bank employees. "Impact of Occupational Stress on home environment: An analytical study of working women of Ludhiyana city" a research study undertaken by **R.Bakshi, N.Sudha and P. Sandhu (2008)** to analyse the impact of occupational stress on home environment as perceived by selected respondents. "Gender,self-concept and occupational status differentials in occupational stress among bank workers in Lagos state" is a study by **Eunice Modupe Hassan(2009)** to investigate the determinants of occupational stress using gender, self concept and occupational status as factors.

Research Problem

Ever since the introduction of deregulation of the banking sector in India in the early 90s, there has been a paradigm shift in the focus of banks from social objectives to sound business objectives. Accordingly, there has been an increased thrust on profitability and productivity of all banks, including the public sector banks. Competition in the industry became intense with the emergence of new generation private sector banks and also with the enhanced dynamism of the foreign banks. The new generation banks and foreign banks, with their advanced technological base and highly skilled manpower, have been relatively at a competitive advantage over their two counterparts, viz., Public sector banks and old private sector banks, In order towithstand the competitive pressure and also to enhance productivity and customer service, banks have to invest heavily in technology and also go for highly skilled manpower or to train their existing staff suitably. In short, for the banking system as a whole, adoption of advanced technology has become an imperative to ensure better productivity and enhanced customer service.

The highly competitive work environment in the banking sector demands updated skill and knowledge from the managers and other employees in the banks, which are essential to fulfil the ever-increasing aspirations of the high-demanding customers. Coupled with this, the uncertainties and ambiguity associated with the finance sector around the globe multiplied the stress level of bank employees. A sound theoretical base in banking operation as well as practical experience acquired from the job is now not sufficient for them to tackle the various work-related issues confronted by them. Moreover, banks are not able to provide adequate training and back up support to enhance their competency.

The above said transformation in the banking sector has affected the social, economic and psychological domains of bank employees and their relations. They have to cope with the enhanced work pressure, which leads to more of mental stress and physical strain. In the light of these grounds, it is imperative to study the work-related stress faced by bank employees, the stressors and their effect, and strategies to combat such stress. Therefore, the present study addresses the following intricate questions: What is the extent of job stress confronted by bank employees in Kerala? I there any significant variation in the extent of stress as experienced by various categories of employees? What are the influencing factors of occupational stress in banks?

Objectives of the study

The study is pursued with the following specific objectives:

1. To assess the level of occupational stress confronted by bank employees in Kerala

2. To identify the demographic and other job-related factors which influence the level of stress experienced by bank employees in Kerala.

Hypotheses

To have a disciplined guidance to the enquiry, the following hypotheses are formulated and tested:

1. There is no difference among employees belonging to the three selected bank groups in their level of stress.

2. There is no difference in the level of stress among employees belonging to different locations, employment status, gender groups, marital status, age groups, educational levels, lengths of service and workloads.

Research Methodology

For the purpose of analysis, the data were collected from 462 employees identified from Public sector banks, Old private sector banks and New generation banks. Respondents were identified based on stratified random sampling technique from North, South and Central parts of Kerala. A structured questionnaire was prepared and administered on sample respondents to elicit primary information concerning the extent of stress and various stress-related factors. A

five-point Likert Model has been constructed for the first three instruments intended to measure the extent stress.

In order to test the internal consistency of the scales developed by the researcher and to reduce the number of statements to a manageable size, a pilot survey was conducted before the main study. Questionnaires were served to 100 respondents with a personal request to express their agreement/disagreement with the statements and an undertaking was given that the information furnished by them would not be used for any purpose other than the research study. Filled questionnaires have been obtained from 56 respondents and studied in detail, and some modifications have been incorporated in the questionnaire to make the statements more suitable and unambiguous.

For an assumed level of 5 per cent error in the estimate of the means of these 56 responses using the information on variance from the pilot study, the sample size was obtained based on each response. The formula used is $n \geq (1.96s/d)^2$. Where 'n' is the sample size, 's' is the estimate of standard deviation, 'd' is the standard error of the estimation of population parameter, and the value 1.96 is the critical value from normal test at 5 per cent level of significance. The sample size of 452 was the maximum among the sample sizes obtained from the number of responses for all the statements. However, the actual number of samples used in the study is 462.

From the pilot study it has been decided to have a sample size of 452, and it has been seen that there are 969 banks branches, with 556 PSB, 310 OPSB and 103 NGB. In order to represent the banking sector reasonably well in the sense that the required information is feasible, it has been decided to allocate the sample sizes for the three sectors on the basis of the ratio of the number of banks in each sector. So this has resulted in a sample of size 462 consisting of 254 Public sector, 132 Old private sector and 76 New generation banks with marginal adjustment for the purposes of feasibility. Also, this number is allocated for each region in proportion to the number of banks in each one of them. Thus the number of banks has been selected in the ratio of 2:2:1 for Public sector banks, 2:3:1 for Old private sector banks and 2:3:1 for New generation banks.

Data Analysis

Fifteen statements are considered to measure the level of stress which has an overall Cronbach's alpha of 0.909 which is well above the accepted norm of 0.70 (Nunnally, J.C, 1978). Hence, the variables identified and included in the instrument are reliable and relevant.

Table 4.12: Reliability statistics

Cronbach's Alpha	Number of items
.909	15

Table 4.13 gives a snapshot of variables used to measure the levels of stress of respondents along with means and Cronbach' Alpha.

Table 4.13: Indicators of Level of Stress

Item Code	Statements	Mean	Cronbach's Alpha if Item Deleted
SL 1	I am totally satisfied with my present job.	2.4784	.840
SL 2	If a friend seeks my opinion of joining a job like mine, I will strongly recommend it.	2.6190	.837
SL 3	I feel completely exhausted at the end of the day.	3.3723	.834
SL 4	I feel tired (even with adequate sleep) during the day.	2.9589	.836
SL 5	I worry if these mounting pressures persist for long, it will significantly damage my efficiency to work hard.	3.2965	.830
SL 6	I feel frustrated in carrying out my responsibilities at work.	2.6732	.833
SL 7	It is hard for me to feel calm and relaxed at work.	2.8550	.836
SL 8	I find it difficult to finish my work in the stipulated time.	2.8723	.836
SL 9	I often miss the get-together parties of my family and friends.	3.6212	.833
SL 10	I feel that I can't serve the customers as expected.	2.6364	.842
SL 11	I have a lot of other interests (e.g. cultural, social, spiritual etc…) which remain neglected due to workload.	3.4654	.836
SL 12	I spend work so long that my outside relationships are	3.4177	.832

	suffering.		
SL 13	I always get a good night's sleep without worrying about my work.	3.2251	.886
SL 14	Since I am preoccupied with hectic work schedule, I give only little attention to my family.	3.0173	.833
SL 15	I feel emotionally drained from my work.	2.9026	.829

The Cronbach's Alpha of the fifteen stated indicators range from .829 to .886, which shows no more significant improvement in reliability, is possible by deleting any of the variables.

On the basis of the means scores, respondents were classified into low, medium and high. A score ranging from 1.5 to 2.5 (mean+- 1 S.D) was considered Medium; a score below 1.5 (mean-1 S.D) was considered Low, and a score above 2.5 (mean + S.D) was considered High.

Table 4.14: Level of stress

Stress level	Score Range	No. of respondents	Percentage
Low	< 1.5	72	15.6
Medium	1.5- 2.5	318	68.8
High	< 2.5	72	15.6
Total		**462**	**100**

Source: Primary data
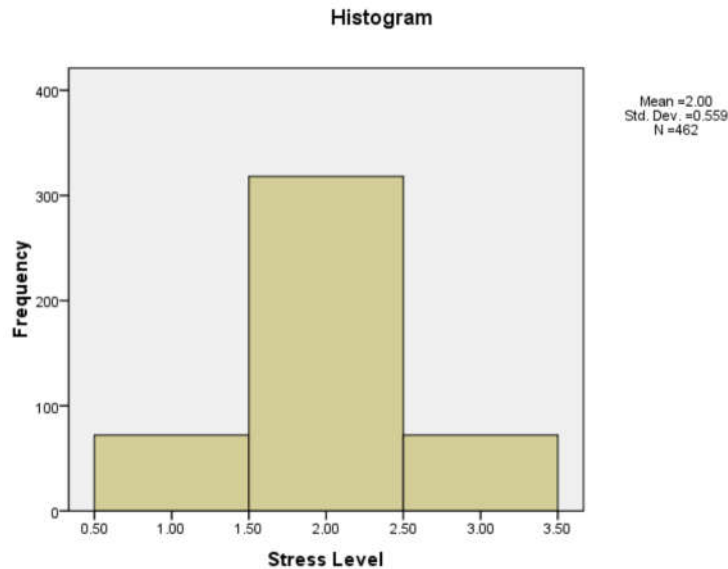
Fig 4.1: Stress Levels and Stress Score

The actual observed stress scores of the sample population is presented in fig. 4.1. From the Table it is seen that medium stress level was prevalent among the majority (68.8%) of respondents. It is also interesting to note that high and low levels of stress were approximately the same (15.6%).

The classification of respondents on the basis of score range is exhibited in Fig 4.1

4.3 Level of Stress and Demographic Variables

The interrelationship between level of occupational stress and demographic variables is analyzed using appropriate statistical tools in the succeeding paragraphs.

4.3.1 Type of Bank and Level of Job Stress

The banks selected for the study were classified as Public sector, Old private sector, and New generation banks, based on their ownership pattern and nature of functioning. Rules and regulations, work environment, competition, management attitude, routine work schedule, working time, targets, career prospects, punishment, etc., differ from bank to bank and sector to sector, which will have a direct influence on the level of job stress experienced by the employees. So the level of stress has been analysed on the basis of the type of banks.

The mean stress score, range and S.D. across different sectors are given in Table 4.15 and exhibited in Fig. 4.2

Table 4.15: Type of Bank and Job Stress-Mean Scores

| Type of Bank | No.of Respondents | Percentage | Mean Score | Range | | S.D |
				Min	Max	
PSB	254	54.98	42.41	18.	63	8.37
OPSB	132	28.57	40.68	19	66	7.61
NGB	76	16.45	42.85	20	64	9.01
Total	462	100	41.99	18	66	8.29

Source: Primary data
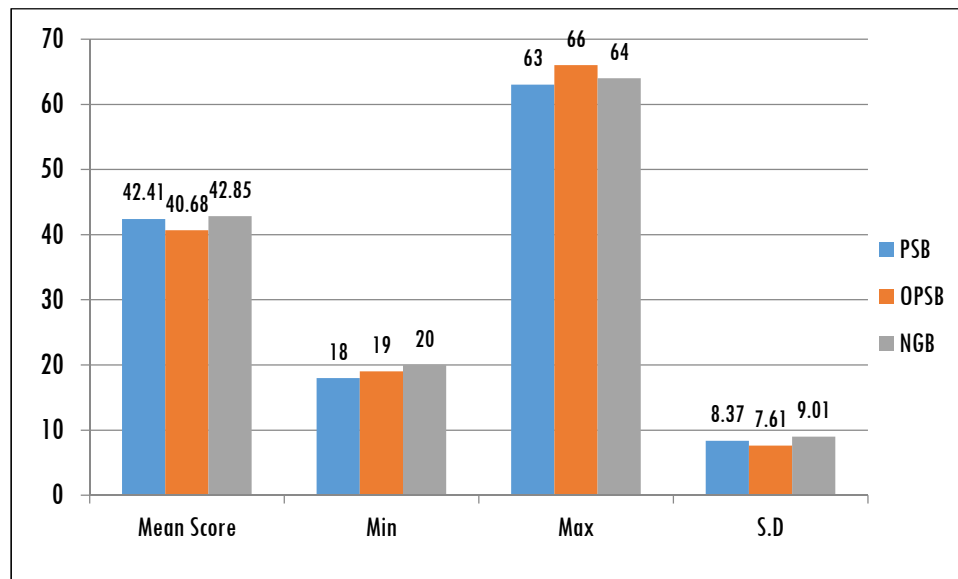
Figure 4.2: Type of Bank and Job Stress-Mean Scores

From Table 4.15, it is found that the average stress score was marginally higher among the employees of New Generation Banks compared with other bank groups, and was the lowest among the employees of Old Private Sector Banks. The average job stress score of employees in Public Sector Banks was found to be between these two banks groups.

Further, to study the association between level of stress and type of bank, a cross analysis was done which is given in Table 4.16 along with the test result in table 4.17.

Table 4.16: Type of Bank and Job Stress (Two-Way Table)

Type of Bank	Level of stress			Total
	Low	Medium	High	
PSB	35 (48.61)	175 (55.03)	44 (61.11)	254 (54.98)
OPSB	22 (30.55)	97 (30.50)	13 (18.05)	132 (28.57)
NGB	15 (20.83	46 (14.46)	15 (20.84)	76 (16.45)
Total	72 (100)	318 (100)	72 (100)	462 (100)

Source: Primary data

Note: Figures in parentheses indicate percentages to total.

It is seen that medium stress was experienced by a majority of the respondents (68.8%) from the three sectors of banks. Among the 'high stress' group, employees from public sector banks accounted for a high percentage (61) sequenced by New generation banks and Old private sector banks. Further 55 per cent of the 'medium stress' respondents were also from PSB.

This was further subjected to statistical test using Chi-square with the following hypotheses.

H0: There is no dependence between type of banks and level of job stress.

H1: There is dependence between type of banks and level of job stress.

Table 4.17: Chi-square Test Results

Pearson chi-square	D.F	P Value.
6.76	4	0.14

The null hypothesis is accepted as the value ($p > 0.05$) is not significant at 5 per cent level of significance and it is proved that there was no significant difference between employees of different types of banks as regards level of stress. Hence it was concluded that level of stress and type of banks were not mutually dependent.

4.3.2 Location of the Banks and Level of Stress

Work environment, work pressure, level of competition, ever-increasing customer demand, etc., vary from place to place. The place of work of a bank employee is a variable which will affect his stress level. So the level of stress with respect to place of work was analyzed. Place of work was classified into three types namely, rural, semi-urban and urban areas.

Table 4.18 explains the average stress scores, range and S.D. of employees with respect to the place of work, which shows that the stress score was slightly higher among employees in rural branches.

Table 4.18: Location of the Branch and Job Stress-Mean Scores

Location of the Branch	No. of Respondents	Percentage	Mean Score	Range		S.D
				Min	Max	
Rural	18	3.90	43.16	30	57	8.71
Semi-Urban	331	71.65	41.93	19	66	8.02
Urban	113	24.45	41.98	18	64	9.05
Total	**462**	**100**	**41.99**	**18**	**66**	**8.29**

Source: Primary data

Based on the stress scores, the levels of stress were determined, as given below.

Table 4.19: Location of the Branch and Job Stress (Two-Way Table)

Location of Banks	Level of stress			Total
	Low	Medium	High	
Rural	3 (4.16)	11 (3.46)	4 (5.56)	18 (3.90)
Semi- urban	46 (63.89)	238 (74.84)	47 (65.28)	331 (71.65)
Urban	23 (31.95)	69 (21.70)	21 (29.17)	113 (24.46)
Total	**72 (100)**	**318 (100)**	**72 (100)**	**462 (100)**

Source: Primary data
Note: Figures in parentheses indicate percentages to total.

It has been observed from the Table that the majority of the employees from the three locations were medium-stressed (69%). It is also observed that among the highly stressed respondents, the majority (65%) were from employees working in semi-urban area. Further 75 per cent of the medium-stressed employees were also from semi-urban area.

This was further analyzed using Chi-square, to test the interdependence.

H0 : There is no dependence between Location of work and level of job stress.

H1 : There is dependence between Location of work and level of stress.

<div align="center">

Table 4.20: Chi-square Test Results

</div>

Pearson Chi-square	D.F	P Value.
5.43	4	0.24

The null hypothesis is accepted as the value (p>0.05) was not significant at 5 per cent level of significance and hence it is observed that there was no dependence between location of the work and level of stress.

4.3.3 Employment Status and Level of Stress

The employees of banks are working in different cadres like Manager, Officer, Clerk, etc. The nature of job assigned to each cadre is different and the responsibilities fixed on each cadre also differ in terms of volume and quality. So the stress level of each position may vary, depending upon the situation. Hence, it was deemed necessary to find out whether nature of job had any dependence on level of stress.

Table 4.21 furnishes the mean stress score, range and S.D across employees of different status.

Table 4.21: Employment Status and Job Stress-Mean Scores

Employment status	No. of Respondents.	Percentage	Mean Score	Range		S.D
				Min	Max	
Manager	125	27.05	43.30	20	63	8.79
Officer	159	34.42	43.94	30	66	7.60
Clerk	178	38.53	39.32	18	61	7.85
Total	**462**	**100**	**41.99**	**18**	**66**	**8.29**

Source: Primary data
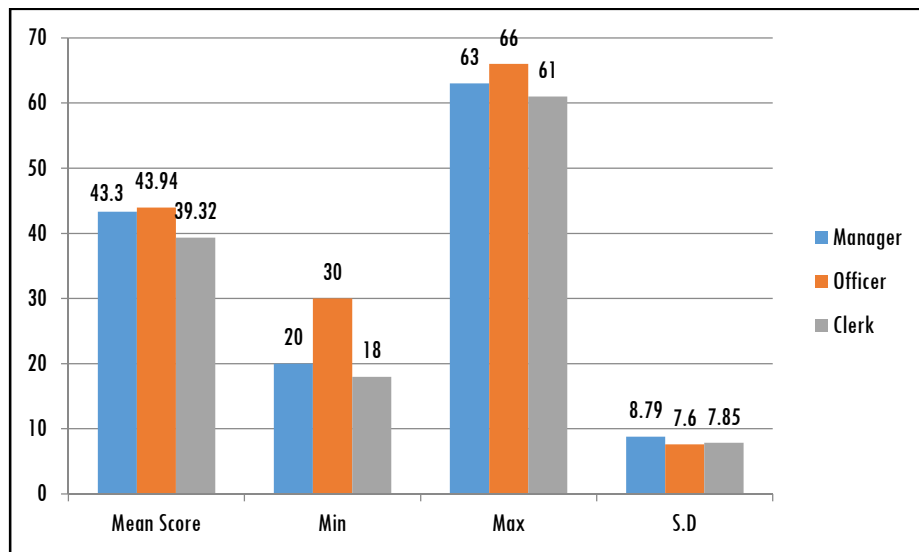
Figure 4.3: Employment Status and Job Stress-Mean Scores

It is observed from Table 4.21 that the stress scores were comparatively higher among the officers and managers compared to clerks. It is noted that the volume of responsibility and magnitude of work in the case of clerks were comparatively lower.

Table4.22: Employment Status and Job Stress (Two-Way Table)

Employment Status	Level of job stress			Total
	Low	Medium	High	
Manager	16 (22.22)	85 (26.73)	24 (33.33)	**125 (27.06)**

Officer	16 (22.22)	111 (34.90)	32 (44.44)	**159** **(34.42)**
Clerks	40 (55.56)	122 (38.37)	16 (22.22)	178 (38.52)
Total	**72** **(100)**	**318** **(100)**	**72** **(100)**	**462** **(100)**

Source: Primary data

Note: Figures in parentheses indicate percentages to total

From Table 4.22 it is observed that level of stress was medium for a high percentage of all categories. It is clear that Officers (44%) and Managers (33%) were the highly stress-affected groups among the respondents compared to clerks (22.22%). These figures depict that the highest stress-prone group in the banking profession was that of Officers, followed by the Managers. Pressure from the top and higher responsibility for results might be the reasons behind this situation.

Further validation using Chi-square test was done with the following hypotheses:

H0 :   There is no dependence between nature of job and stress level.

H1 :   There is dependence between nature of job and stress level.

Table 4.23: Chi-square Test Results

Pearson Chi-square	**D.F**	**P Value.**
17.30	4	**0.002***

* Significance at 5 per cent level of significance.

The null hypothesis is rejected as the P value (p< .05) was statistically significant at 5 per cent level of significance and it is evident that difference in the nature of job caused difference in the extent of job stress. Hence, it is concluded that nature of job and level of stress were dependent at 5 per cent level of significance.

The significance of difference in the level of stress is tested across various demographic factors and the results are furnished in the table:

4.3.4 Gender and Level of Job Stress

There is a lot of physiological and natural differences between men and women. Further, some differences are enforced by the society, which vary according to time and place. It is called "gender disparity" which may make the job stressful.

Table 4.24 shows the mean stress scores of the gender groups of respondents with range and standard deviation.

Table 4.24: Gender and Job stress-Mean Scores

Gender	No. of Respondents	Percentage	Mean Score	Range		S.D
				Min	Max	
Male	279	60.39	42.90	19.00	66.00	8.57
Female	183	39.61	40.60	18.00	64.00	7.67
Total	**462**	**100**	**41.99**	**18.00**	**66.00**	**8.29**

Source: Primary data

It is observed from the Table that the mean score and S.D of male respondents are comparatively higher than those of female group.

The test whether there was any difference in the stress level among the two gender groups revealed that the level of stress was related to gender as shown in Table 4.25.

Table 4.25: Gender and Level of Stress (Two-way Tables)

Gender	Level of job stress			Total
	Low	Medium	High	
Male	37 (51.38)	189 (59.43)	53 (73.61)	**279** **(60.39)**
Female	35	129	19	**183**

	(48.62	(40.56)	(26.39)	(39.61)
Total	**72** **(100)**	**318** **(100)**	**72** **(100)**	**462** **(100)**

Source: Primary data

Note: Figures in parentheses indicate percentages to total.

A cursory look at the above shows that males dominated in both high and medium stress level groups. Of the 72 respondents under 'high level', nearly three-fourths (73.61%) were males, whereas in the 'medium-group' they found only 59 per cent. Therefore, in all categories, the predominance of male was noted.

This is further validated using a Chi-square test for interdependence using the following hypotheses:

H0: There is no dependence between gender and stress level.

H1: There is dependence between gender and stress level.

Table4.26: Chi-square Test

Pearson Chi-square	D.F	P Value.
7.822	2	**0.02***

* Significance at 5 per cent level of significance.

The H0 was rejected for absence of 5 per cent level of significance as the value of P was less than 0.05. This implies that there was dependence between gender and stress level. The level of stress was more among male respondents than among females.

Sl.No.	Groups	Chi-square Value	P Value
1	Marital Status and Level of Stress	4.27	0.64
2	Age and Level of Stress	9.193	.163
3	Educational Qualification and Level of Job Stress	4.44	0.34

| 4 | Length of Service and Level of Job Stress | 9.0 | 0.34 |
| 5 | Effective Working Hours and Level of Job Stress | 27.14 | .00* |

Significant at 1 per cent level of significance

4.4 Conclusion

An assessment of the level of stress is highly instrumental to delve into the myriad causes of stress and diagnose the probable effects of stress - both physical and psychological. Level of stress or magnitude of stress is measured on the basis of psychological effect, on a five- point rating scale. On the basis of the extent of stress, respondents are dichotomized (grouped) into High level of stress, Medium and Low level of stress. Of the total, 69 per cent had medium level of stress and the rest were equally distributed for low and high levels. The level of stress is related to various demographic variables to study the association between them. The study reveals that there is dependence between level of stress and gender, employment status, and work load. Gender-wise, males and employment status- wise, officers and managers, experienced comparatively higher levels of stress. Similarly, there is clear dependence between workload and stress and the stress progresses with every increase in effective working hours. However, the level of stress is independent of variables, type of bank, location of the bank, marital status, age, educational qualification and length of service.

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NEW SOURCES AND NEW HISTORIES: UNRAVELLING THE HISTORIES OF WOMEN RELIGIOUS CONGREGATIONS OF KERALA

Dr. Beena Paul

Associate Professor, Department of History, Henry Baker College, Melukavu, Melukavumattom P.O, Kottayam, Kerala, 686652

ABSTRACT *Women Religious congregations of Kerala, being taken as part of the Church history, has not so far been received much attention of the academic world. Women Religious congregations started at a particular social juncture were purposefully utilized by the ecclesiastical authorities to cope with the changes during the colonial period. The congregations became centers of spiritual and temporal moulding. The children were trained to become good Religious and good wives. With large quantity of convent records, hitherto unexplored histories of women Religious, unravels the Syrian Catholic efforts to meet the urgent need to educate and mould the Syrian –Catholic women in this phase. Here the attempt is to show, how the women who opted secluded life is made socially productive, through a European religious institution transplanted to Kerala in the wake of colonial modernity.*

Keywords: Women Religious Congregation, Nalagamam, Social Reproduction, Modernity.

Introduction

New methodologies and new approaches to history and acceptance of multiple realities and multiple truths, has enlarged the horizon of historians. Search for new sources or untapped sources to unveil histories are getting much importance now a day. Writing histories of difference and shedding light to untold histories, hidden figures and veiled narratives, disrupts the status-quo and enables a diversity of voices to be heard. It is not only about new sources but also about silences in history and how these silences are spelled. When talking about new sources in unveiling histories, two problems confront us. One is how the old materials and old sources are put in new ways and two, unraveling the hither to unexplored areas. It is in this context study of religions or religious institutions are taken into consideration. Women religious congregations are generally treated as part of the church history but it needs much more explorations. No one has taken any serious interest in the study of religious congregations or Christian monastic orders of Kerala except few sisters or priests. This has to be changed and a more comprehensive approach is needed to study the emergence and working of the religious congregations in the wake of colonial modernity.

Study of women's history and of women Religious[1] had gone a long way in west. But women Religious who are central not only to Syrian-Catholic[2] history but also to religious history, institutional history, women's history and social history of Kerala has not acknowledged as an area of study even today. Here the purpose is to rebuild bridges, make connections and integrate the history of women religious into the larger context of women's history and social history of Kerala. The focus of the paper is the social manifestation of religious congregations and their place in the social history of Kerala rather than the ideational level or the philosophies which they may have generated.

Review of literature

Previous studies pertaining to women religious in Kerala are few. Alex Paul Urumpackal's *Vocations in India, Vol.2: The Religious Women* (1986) , gives a detailed account of different religious vocations in Kerala as well as its statistical data. *Indian Women in Religious life: A Formative Approach* (2003), by Bhavya argues how Religious life makes true womanhood. Another work directly dealing with women religious of Kerala is *Gender and Spirituality: A Feminine Perspective* (2008), by Annie .P.V. The work is about the invisibility of women particularly women religious; though a minority who contributed much to the society. The invisibility was not due to her passiveness or inactivity but because of the strong traditional patriarchal domination and an authoritarian control over them. This work emphasized how women as object, has changed to a subject of study. Though a study on spirituality in general, the focus is on the Holy Family Congregation that had its origin in the Trichur diocese in 1914.

Two PhD thesis produced in this area are that of Fr. James Thallachellur's, *Formation of Religious Women in the Syro-Malabar Church with Special Reference to the Congregation of Mother of Carmel (A Historico-*

Juridical Study), thesis for the degree in Canon law, Pontificum Institution Oriental, Rome, 1990 and by Mary C. John, *The Evolution of the Congregation of the Mother of Carmel and its Impact on Society and Culture with Special Reference to Women* (1866-1991), Calicut University, 2002.The first study makes a comparison of formation given to women religious of Congregation of Mother of Carmel with that of other congregations having its origin in Syro-Malabar Church. The second thesis is about the contribution of Congregation of Mother of Carmel (CMC) in the field of social welfare and women's development especially educational, over a period of 125 years. As a matter of specific importance, the above two works have concentrated on the emergence of first congregation for women in Kerala as well as its activities. Since all the works have concentrated on the history and activities of a particular congregation, these works could not encompass the socio-economic factors behind the starting of new congregations in the wake of colonial modernity. The gradual spreads of convents to different parts of Kerala have not studied so far. More over sources pertaining to Women Religious congregations opens up new vistas of social life which is not so far unraveled and as such it is opening new areas of research.

Methodology

The present work is interdisciplinary in approach and Sociological, Anthropological and Historical tools of analysis have been made use of. Collection of the data pertaining to the area of study unraveled a wide repository of sources so far unearthed. The new sources enlarged the horizon of historians by entering the religious space so far considered unapproachable by the lay people. The history of the origin and growth of convents which belongs to four different congregations, spread far and wide in Kerala, necessitated extensive field survey so as to collect various sources pertaining to each convent. Each convent had a history independent of another and all records are preserved in the respective convents. A random visit of these convents of three ancient dioceses of Kerala helps to study the conventual history, otherwise unraveled.

Contested notions, new sources and new histories.

An understanding of the Religious life is essential for a better understanding of the women Religious. Nunnery[3]/ Women religious congregation is an integral part of the universal Catholic Church. It is a European institution and it came to Kerala through Catholic Missionaries.

Religious life is a form of life within the Roman Catholic Church characterized by the lifelong profession of the evangelical counsels (vows), of poverty, chastity, and obedience according to the approved constitution of a particular order or congregation[4]. The Religious live in their special domiciles (convents) and are recognized inside and outside their institution by their distinctive dress (religious habit). Their lifestyle itself effectively separates the Religious from the world outside the church and distinguishes the Religious from the laity in the church. The Catholic community has the notion that, this is a special vocation or call. Religious Life is considered as a "way of perfection", in "closer following of Jesus." Although lay life is, in theory, normative and a fully salvific form of Christian life, Religious life is actually regarded by many Catholics, including some religious themselves, as a superior way to serve God[5].

Renunciation of the "world" or keeping aloof from the world is an important feature of the life. Whatever form Religious life takes - eremitical or cenobitic, contemplative or ministerial, stable or mobile is in fact, monastic, means "aloneness", of the Religious.[6] The aloneness or apartness of the Religious means that she or he, either singly or with others, creates an alternative life form. The objective is the quest for the fullest possible realization of the true self in relation to reality conceived as a whole or as transcendent.

The purpose of women's monastic life was union with God, but it offered another dimension too; for many, the convent provided an alternative to marriage. Over the time, the decision to start a celibate life as religious was for different purposes. It helped women to be independent of man. A woman, who sought an alternative life, was free from the burdens and responsibilities of family life. The risk of child bearing can also be avoided. This provided Christian women an opportunity to live together in an association that would be impossible in society because of the traditional dependence of women on man. Congregation gave them, support and creative energy to be independent and to develop a spirituality and ideology that was particularly female[7]. Celibate communities also provided support system for a uniquely feminine spirituality and ideology in the face of androcentricism. The decision to lead a chaste life was an autonomous one in a society that left little to the preference of women.

Complete negation of the world was impossible because there was always dialectic between monasticism and the world the monk had abandoned. The various dimensions of Religious life are a clear indication to show that different forms taken by religious congregations at different periods were conditioned by the demands and expectations of the society that supported them. Information about the

beginning of religious life, constraints in early years of community life, formation of the religious, rules and regulations, everyday life, their financial status and interaction with the renounced world can be drawn from the convent records, which are rich repositories of knowledge.

The data in the convent archives are official records maintained from the beginning of the institution. A tradition handed over by the Catholic missionaries, documentation and preservation of records are still meticulously done by religious institutions. Because of the secluded nature of congregational life, convent records are not easily accessible to the public. Sources of study for this virgin area of research include:

a. *Nalagamam* or chronicle –most important unpublished primary source. The chronicle of an institution is an unassuming record of naked facts of its starting, growing, intervening events, its nature, configuration, pattern and progress. Each convent had a history independent of another and all records are preserved in the respective convents. In some of the provinces there are two types of *nalagamam*, general and confidential. Apart from *nalagamam*, constitutions and directives, book of accounts, book of tradition, reports, and proceedings of the general council, annual reports of the charitable institutions, the baptism records of the converts, all manuscript form the primary material for this study.

b. The published materials like letters of both the religious and the priests, rules and regulations, code of conduct ,prayer books, hagiographies etc

c. History of the congregations , history of the convents and biographies of the founders, diaries and letters of the religious and clergies published by the religious gives first hand information about the life and activities they pursue. These publications were at first meant for private circulation and to educate the beginners in the congregational history.

d. Church related documents like diaries and letters, pastoral letters, *vaidikapanchangam* (almanac for priests) and *mangalapatram* (wishes on festive occasions).

Women religious congregations have been part of the Western Christian tradition since the early Christian centuries and had no precedent in the church history of Kerala. The people of Kerala had heard of men and women who practiced religious virtues, but they did not have any living examples of religious virginity, except that of men[8]. Women, who desired to live as a virgin, had no other choice but to marry.

In the wake of colonial modernity, the gendered self already existing within the community began to change, in order to cope with modern ideas and institutions. The evolving Syrian -Catholic Church, took efforts to educate, regulate, shape and produce women of values, morality and 'womanly' qualities. During this period some of the Syrian-Catholic women challenged the traditional role ascribed to them they began to enter the spiritual field from where they were alienated so far. The decision to opt for Religious life or their passive attitude towards marriage represents a slippage from the social reproduction - an alternative life outside the family system through religious system[9].

The changing attitude towards women and their sphere of activity in the wake of colonial modernity and the women's earnest desire to cross the domestic space created an atmosphere congenial to take a deviation from the traditional course of womanhood. Traditional role ascribed to women were challenged by and they began to enter the spiritual field from where they were alienated so far.

Religious congregations started in Kerala were an indigenized form of Western religious orders. Influenced by the European ideals, and inspired by the indigenous spiritual tradition, women religious congregations soon became an integral part of the societal landscape of Kerala. The beginning of Religious life and the making of nun did not happen in a single day. It was not an easy process. It took years to make a nun and to give an institutional form. Koonammavu *nalagam* details the intricacies involved in the formation of nunneries and nun in Kerala. A European institution as such was introduced in Kerala.

The decision of the Christian women to deviate from the traditional roles got social acceptance when they joined the congregation. The canonical pattern of religious congregation was introduced in Kerala so as to accommodate those women who opted for Religious life. In fact the church authorities could identify those who opted for an alternative space and directed them to a more secure divine space where their chastity is protected and controlled. The process of surpassing the traditional roles and the acceptance of the community to lead such a life was accompanied by the institutional formation given to them.

The beginning of women religious life in Kerala can be traced back to 13th February, 1866, when the first indigenous congregation for women, Congregation of Mother Carmel was started at Koonammavu[10]. The women who desired to lead a virgin life were placed within the congregation of Mother of Carmel with twin objectives: 1. Self-sanctification through contemplation and mortification of

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the senses. 2. Work for the salvation of the soul of others through prayer and education of young girls [11]. In other words charism of the congregation was both contemplative and apostolic. The initiative for the foundation of the congregation was taken by Rev. Fr. Chavara Kuriakose Elias, the Vicar General of the Archdiocese of Verapoly and the then Prior General of the CMI monasteries and Fr. Leopold Beccaro OCD, the Carmelite delegate in Kerala at that time [12]. A widow named Eliswa and her 14 year old daughter Anna were the first members [13]. The convent was constructed in their property.

Twenty two years after the foundation of the first indigenous congregation in Kerala, Franciscan in spirit and mendicant in nature, the second congregation for women was established in Kerala. Franciscan Third Order for women, named and approved by the Vicar Apostolic of Kottayam, Rt. Rev. Dr. Charles Lavigne and popularly known as the Clarist Congregation, was founded on 14th December 1888 [14]. Inspired by the Franciscan life of poverty and simplicity and influenced by Thommachan Puthenparambil, a lay man from Edathua, eight pious women from Pala and around, became the members of the Third Order of St. Francis and started a kind of community life in a small house, in the property of a leading parishioner, Itty Joseph Pazhayakottaram in 1875. It was a congregation for women with less patrimony. A deep and intense prayer life, integrated with hard manual labour, care for the aged and the orphans and service of the poor, marked their way of life [15]. Unlike the Carmelite sisters who followed a monastic type of life and contacted with the outside world through the apostolate of women education, Clarist sisters were out in the world, looking for the poor and the destitute.

The third indigenous women religious congregation of Syro-Malabar Church known as Sisters of the Adoration of the Blessed Sacrament was founded on 8th December 1908 at Champakulam in the Vicariate of Changanacherry. The congregation was founded by Fr. Thomas Kurialacherry (1873-1925), and Vallayil Philomena (1880-1972), the co-foundress [16]. According to the constitution, this congregation is to be a harmonious blend of both prayer and action. For that they should do activities that would foster faith in others and liberate the people around. One of the purposes of the establishment of the congregation was to educate the illiterate girls around, which they considered as the outward expression of their love for the Eucharist.

The Congregation of the Sisters of the Sacred Heart of Jesus is the fourth indigenous congregation for women that took shape in the Syro-Malabar Church of Kerala. It was founded at Pala on January 1st 1911 at the initiative of Fr. Mathew Kadalikattil (1872-1935). Several devout women, both virgins and widows, in and around Pala, eager to lead a community life, who had neither the required education nor the financial means to enter the established religious congregations, joined this congregation [17].

If the first two congregations took inspiration from the European congregations, the other two were purely indigenous in concept and all the four were formed necessarily according to the societal needs of the time. An overview of the beginning of congregations indicates that, different congregations emerged in different periods were to accommodate women from different strata of the society. Secondly it also shows that the women who were desirous of religious life had to fulfill the societal needs apart from self sanctification. This necessitates an understanding of the period in which these institutions began to emerge. Social reform movements, during colonial period, led by the intellectuals and upper middle class males together emphasized the restructuring of the traditional society, by improving the 'lot' of women. The changes were oriented towards the making of 'modern' women, having 'specific womanly' characteristics. In this process, the emergent community consciousness produced mechanisms of their own to mould women of their community, having common gender disparities that cut across various communities.

The efforts to reform women came from the male counter parts of each community. Within the Syrian-Catholic community ecclesiastical authorities took the lead. The influence of the new ideas and modern institutions on Syrian-Catholic community began to appear by the mid-nineteenth century. The efforts to educate women, itself were a modernising tool, and it started along with the establishment of first women religious congregation. These endeavours were to cater the spiritual and temporal needs of the community and this necessitated the moulding of Syrian-Catholic women in the phase of modernity.

With the emergence of women religious congregations, Nazrani women entered an alternative space other than familial. They crossed the domestic space to enter the spiritual life, surpassing the general notion that, 'wifehood and motherhood', is the embodiment of womanhood. The group of women who opted for celibate life made significant changes within the community and society. These women utilized the support of the clergy and the lay people to start convents and convent schools and it became the centers of learning and formation for Syrian-Catholic women. The types of activities carried out by the women religious were exceptional in Kerala. By running schools and boarding, orphanages, weaving and industrial schools they became visible in the social scenario of Kerala. So convents were not mere

religious institutions. It was more than that. The emergence of congregations and large number of convents in different parts of Kerala was the result of the collective efforts of the women religious.

Over a period of ninety years, altogether 149 convents were started by four congregations[18]. Except the first convent at Koonammavu, all other convents were started in the traditional Syrian Christian belt[19] and no two congregations have convents in same place. The first and third congregation, i.e., CMC and SABS from the beginning had education as its charism and other two mainly focused on poor and destitute. Even then in the later years they too switched over to education.

It is important to note that majority of the early convents had schools and boarding attached to it. In places where convents had no schools, they worked in parish schools. There were instances of building of schools in places where there is no schools by parishioners or well to do families and bringing sisters to that place either from neighboring convents or they helped them in constructing convents. Even three parishes shared a convent. This is one of the reasons for increasing the number of convents.

Construction of the convents was not an easy task. It took years to complete the construction as per the requirements of a religious house. For eg., Carmelite sisters started their life in a temporary house. Only after one year they could move to their permanent residence. Clarist sisters constructed their first convent with the donation of Pulickal Mariam and the money collected through their work and through begging[20]. Philomena or Sr. Shanthal, the foundress of the SABS congregation and the children under her care did not get any convenient place to reside at Edathua. In the end they got a manger and later on they got a boat house to reside. After two years, they settled permanently at Chamapakulam[21]. So the construction of each and every convent was a struggle for sisters.

More convents mean more vocation, which needs large resources to survive. It is true that over 90 years the four congregations had 149 branches within three vicariates, i.e., out of 413 parishes.[22]. But the question is how these congregations could manage with the establishment of its branches which hardly had any assets with them? The answer to the question lies in fact in the mechanisms through which the religious mobilised resources in order to meet their livelihood challenges. One cannot deny the reciprocity between the religious and society. Though the religious were shut behind the walls, cut off from the relatives and society, they thrived on the material support of the lay people. The sisters, who belonged to the noble families, got their patrimony in the form money or land. Salary from the schools, boarding fees, income from handicrafts and other small enterprises also added the income of the convents. The donation in the form of land and money even though rare and alms received at times of need; all became the base for many convents.

Regarding the spread of the congregation three trends can be noticed on the basis of the initiative taken to start the convent in other places. The initiative came from three groups mainly, the sisters, ecclesiastical authorities and the people. Analysis of the interest taken by the last two groups would reveal the actual cause and the reciprocity between the religious and the laity. The laity who wanted to educate their daughters helped the construction of schools and convents in the form of money, material, and the religious in turn gave secular and religious education to the girls. They were trained to be good religious or good wives. Thus the urgent need to educate the Syrian-Catholic women fell upon those women who opted out of the society to lead a secluded life.

Conclusion

Women Religious Congregations, which are considered as part of the religious history of Kerala, clearly shows the social manifestations of the religious institutions. New Sources are used so as to understand the subject with a new perspective. New methodologies and new perspectives on the women Religious unraveled the reciprocity between the Religious and the society, they left behind. If the changing social scenario of Kerala in the wake of colonial modernity gave social sanction to the establishment of congregations, the changing material condition of the Syrian-Catholic gave economic sanction to the foundation of the convents and attached institutions. More over the emerging political economy as well as the social mobility of the classes in Travancore and Cochin had been influential in producing these changes among the Syrian-Catholics. Thus women religious congregations established in Kerala at a particular social juncture had been instrumental in bringing about social change in the community which had the socio- religious backing of the period.

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End Notes

[1] Religious are women and men, who seek to live their baptismal consecration more perfectly through the observance of the evangelical counsels (vows) of poverty, chastity and obedience. The women who wish to follow celibate life and to do apostolic work is women Religious. Throughout the text, word 'Religious' is capitalized when it refers to the specific state of Religious life, whereas, religious as an adjective referring to concern with the transcendent dimension of life or religious is not capitalized. Women Religious / Nun / Sister are used simultaneously in the text.

[2] Syrian Catholics are traditional Christians of Kerala who came under the Papal jurisdiction. They are also known as Romo-Syrians, Pazhayakooru or they themselves call Catholics.

[3] Nunnery is a medieval term to signify the place where the nun lived. In Catholic monastic hierarchy nun is one who chose cloistered life and belongs to Second Order in the church and the Religious to the third order.

[4] Sandra M. Schneiders, Finding the Treasure: Locating Catholic Religious Life in a New Ecclesial and Cultural Context, Vol.1, U.S.A, 2008, p. XXIII.

[5] Ibid., p.12.

[6] Ibid., p. 9.

[7] Serenity Young (ed.), Encyclopaedia of Women and World Religion, Macmillan, New York, 1998, Vol.1, p.144.

[8] Koonmmavu Nalagamam,Vol.1, p.1,(This original Malayalam manuscript is kept in the Koonammavu Convent Archives)

[9] Anru Lee, 'Women of the Sisters' Hall: Religion and Making of Women's Alternative Space in Taiwan's Economic Restructuring', in Journal of Gender, Place and Culture, Vol.15, No. 4, August 2008, p. 376.

[10] Koonammavu is 16 kms away from Aluva, situated in between North Paravoor and Puthenpally and adjacent to Varappuzha.

[11] Munnamsabha Kanyastrikalude Nyayapramanam, 1875, p.1; (Constitution of the Sisters of Third Order; The term Constitution is used to denote the term Nyayapramanam, which means the rules and regulations of the congregation. The word constitution began to be used widely only after the II Vatican Council(1964) and the rules and regulations are not static but they are updated according to the needs of the time)

[12] Chavarayachente Sampoorna Kruthikal: Nalagamangal, Vol.I, CMI publishing Committee, Mannanam, pp.124-125; Koonammavu Nalagamam Vol.1, pp. 3-5. Fr. Leopold Beccaro was a Discalced Carmelite Missionary (1837-1914) who came to Kerala in 1859. He received the deaconate and priestly ordination in Kerala. He learned Malayalam within four or five months after his coming to Kerala and looked after the spiritual needs of the parishioners of Koonammavu. There are differences of opinion about the founder of the congregation. In the context of the death of Fr. Kuriakose in 1871, Fr. Leopold mentions Fr. Kuriakose as the founder of the congregation; Leopold Beccaro, Life of the Servant of God, trans. Postulator, St. Joseph's Monastery, Mannanam,1970, p. 80.

[13] Koonammavu Nalagamam, Vol.1, pp. 3-5.

[14] Changanacherry Franciscan Moonnam Sabhakaraya Kanayakalude Nalagamam, Vol.1,1888-1914, p. 5.

[15] Directory: Franciscan Clarist Congregation, Portiuncula, Aluva, 2005, p. 3.

[16] Divyakarunya Aradhana Sabhayude Nalagamam, Vol.1, 1908-1925, kept in SABS Archives Rita Bhavan, Koothrapally, Changanacherry, p. 3.

[17] Thiruhridaya Sabhayude Nalagamam, Pala, p. 1-2

[18] Beena Paul, Identity Formation of Catholic –Nazrani Women: A Study with reference to women Religious Congregationas of Kerala, 1860-1950,Unpublished Thesis, SSUS ,Kalady ,2014,p.150

[19] Koonammavu (1837), Mutholy (1856), Vaikom (1809), Changanacherry (1017), Arakuzha (999), Ambazhakad (300), Pulincunnu (1557), Karukutty (1829), Ollur (1718) and Kayalpuram (1878)

[20] Lalam Madam Nalagamam, Vol.1, p.17

[21] SABS Nalagamam,Vol.1, p. 13

[22] According to the data provided by the "Vaidikapanchankam of 1949", in 1948, Ernakulam, Trichur and Changanacherry had 127, 124 and 162 parishes respectively. Vaidikapanchankam: Calendar for 1949 of Archdiocese of Ernakulam, Ernakulam 1949, p. 41.

A Panel Corrected Standard Error Model Approach to Study the Impact of Board Governance on Performance of Listed Private Banks in India

Mr. BINOY CHACKO

Assistant Professor, Department of Commerce, St.Thomas College, Pala

Email: binoychacko23@gmail.com

Dr. Gireesh Kumar G S

Principal, Henry Baker College, Melukavu, Kottayam, Kerala-686652

E mail: gireeshkartha@gmail.com

Abstract

This study presents the relationship between board governance and performance of private sector banks listed in Bombay Stock Exchange (BSE) by using Panel Corrected Standard Error (PCSE) Model. The study examines 17 private sector banks for the period of five years from 2013 to 2017. The study used Return on Asset as proxy for the financial performance and Board Size, Number of Independent Directors, Number of Board Meetings and Number of Board Committees were taken as proxies for board governance. The study found that both number of board meetings and number of board committees are negative and significantly related to bank performance. But both board size and number of independent directors showed no significant impact on the performance of private banks listed in BSE. With this results the study concluded that board governance will definitely affect the bank performance.

Keywords: **Financial Performance, Board Composition, Corporate Governance**.

Introduction

Sustainability of any organization depends mainly on its good corporate governance culture. Good corporate governance is essential for companies to access domestic as well as global capital at competitive rates. Corporate governance has received the special attention of various stakeholders after the revelation of a number of corporate scandals such as financial scams of Enron, WorldCom and Satyam in India. These incidences emphasized the need of improved corporate governance and led the way towards more legislation in India and all over the world. Corporate governance deals with the ethical responsibilities of a company's management, its board towards different segments of societies. Corporate governance affects the investment decisions of the company. That means in order to take a good decision, corporate governance is necessary and in turn, helps firms to prosper in the domestic as well as in the global market. It is concerned with the proper implementation of policies and procedures by a company to satisfy its related parties including shareholders, employees, customers, suppliers, regulatory authorities and the community at large.

In today's world, companies are evaluated based on sales and profit. Most of the companies particularly banks are at profit now, later after three or four moths will suffer a loss. What is

the main reason for this phenomenon? Through accounting, companies should calculate the exact profit or loss and can perform other numerical analysis also. With this calculation, we can't find the exact reason. Based on the previous research, the main root cause of this phenomenon is corporate mis-governance e.g.; Enron, Satyam etc. Governance is the mind of every company. That means good governance makes ethical companies. Boards of directors' structure, their decisions, their partnership among other companies etc. are the board factors affecting governance of a company.

From the above discussions, it is very clear that board of director's inefficiency cause serious threats to the business. Banks are the central point of the developed economies. Well developed banking system mainly depends on the superior decision taken by the board of the banks. Good governance definitely resulted on efficient banking system in the economy. Adeyemi (2010)found that "the boards of directors of a good number of sampled banks were ineffective and that the internal controls were equally weak as a result of the overriding influence of the chairman/chief executive officers"(p. 34). Weisbach (1988) suggest a positive relationship between board composition and firm performance. Therefore good board governance is important and the present study conducted to know the impact of board governance on the performance of private banks listed in BSE for a period of 5 years (2013-2017).

Review of Literature

Board Size

Researchers are concentrated their efforts to study the impact of number of directors on the board on the financial performance. Korir and Cheruiyot (2000) found board size is positively related to firms' performance.Mudashiru etal.,(2012); Muchemwa et al.,(2016); Tanna et al.;Adams and Mehran (2008); Sheikh and Karim (2015); Haniffa and Hudaib (2006) supports the same.Ness et al., (2010) found that board size positively related to revenue growth.A study conducted by Bashir et al.,(2018) does not found any relationship between board size and firms' performance. Supporters of this view are Ayorinde et al.,(2012); There are some other findings that board size had negative effect on financial performance. Supporters of this view are Fanta et al., (2013); Gómez et al.,(2017); Pearce and Zahra (1992)Lipton and Lorsch, (1992); Coleman and Biekpe(2008); Arosa et al., (2013); Staikouras (2007); Ranti (2011); Bebeji et al.,(2015). Ammari et al.,(2016)found that large board size has a negative effect on marketperformance. The following null hypothesis developed;

H0:- There is a no significant impact on the board size on the performance of private banks listed in BSE.

Board Independence

Korir and Cheruiyot (2000) found greater board independence improves firms' performance (p.86).Tanna et al.; Qadorah and Fadzil (2018); Sheikh and Karim (2015); Singhchawla et al. (2011); Rouf (2011); Bebeji et al.,(2015). supports the same.A study conducted by Bashir et al.,(2018) does not found any relationship between board independence and firms' performance.Zeng (2018) found that the size of independent directors has no significant effecton corporate performance.Adams and Mehran (2008) argued that "board independence is

not related to performance".Gómez et al.,(2017) found a negative relation with financial performance."Highest number of independent directorswould not assure to enhance firm performance" suggested by Fuzi et al.,(2016). Horvath and Spirollari (2012) support the same.García Martín, C. J., &Herrero, B. (2018) found negative and significant relationship with the independence of boards and firm performance.Bhagat and Black (1999); Ranti (2011) supports the same. The following null hypothesis developed;

H0:- There is a no significant impact on the number of independent directors on the performance of private banks listed in BSE.

Number of Board Meetings

Ntim and Osei found positive association between the frequency of corporate board meetings and corporate performance, implying that boards that meet more frequently tend to generate higher financial performance". Al-Daoud et al.,(2016); Gómez et al.,(2017) support the same.Paul (2017) found thatthe attendance in board meetings is significantly positively correlated with the performance measure. Qadorah and Fadzil (2018) does not find any relation between number of board meetings and financial performance. Aryani et al.,(2017) support the same. Hanh et al., (2018) found that there exists a negative association of number of board meeting and the financial performance of firms. The following null hypothesis developed.

H0:- There is a no significant impact on the number of board meeting on the performance of private banks listed in BSE.

Number of Board Committees

Board committees play an important role in the functioning of the company. Musyoki (2008) argues that "properly constituted board committees with the right mix of non-executive directors tend to contribute more to performance than hoards with a predominance of inside directors." The study is an attempt to understand whether the number of board committees on the financial performance of private banks listed in BSE.The following null hypothesis developed.

H0:- There is a no significant impact on the number of board committees on the performance of private banks listed in BSE.

Statement of the problem

One of the important reason for the decline in shareholders' wealth and company collapse is the inefficiency of the board of directors while taking serious decisions. Board of directors are largely criticised in the spotlight for the fraud cases that had resulted in the failure of major corporations, such as Enron, WorldCom Global Crossing and Satyam computers in India. The main reasons for the failure of corporations are the lack of vigilance by the board of directors, the inappropriate board composition etc. Banks are the central point of an economy and the good governance of banks is inevitable for the successful development of the economy. Various corporate governance reforms have specifically emphasized on appropriate changes to be made to the board of directors in terms of its composition, structure and ownership configuration and in India Securities and Exchange Board of India (SEBI) introduced clause 49 of listing agreement Therefore, the present study is a humble attempt to

understand the impact of board governance on financial performance of private banks listed in BSE.

Research Question

The study attempts to address the research question "Does board governance impact the performance of private banks listed in BSE"?

Research Objective

The present study is conducted with the following specific objective:
- To study the impact of Board Governance (board size, board independence, board activity and board committees) on the performance of listed private banks in India.

Methodology

Since this study is on the board governance of listed private banks in India, population of the study is made up of private banks listed on the Bombay Stock Exchange (BSE). A sample of 17 listed private banks for 5 year period (2013-2017) was used for detailed study and analysis. For the purpose of the study, data has been collected through secondary sources. Return on Asset was taken as dependent variable and board size, number of independent directors, number of board meetings and number of board committees were taken as independent variables for the study. The sampling technique adopted for the purpose is simple random sampling for selecting banking industry and sample units. Balanced panel data methodology used for the study. Descriptive statistics, Breusch-Pagan / Cook-Weisberg test, White's test for homoscedasticity, Pooled OLS model, fixed effect model, random effect model, Hausman test, Pesaran's test of cross sectional independence, Wooldridge test for autocorrelation in panel data, Panel Groupwise Heteroscedasticity Tests, Prais-Winsten regression, correlated panels corrected standard errors (PCSEs) were employed for the study for data analysis. Statistical software STATA 13.0 used to analyze data. The empirical model used in this balanced panel study can be described as follows;

$$ROA_{it}= \beta_0+\beta_1 BOARDSIZE_{it} +\beta_2 NOOFIDs_{it} +\beta_3 NOOFBMs_{it} +\beta_4 NOOFBCs_{it} +\varepsilon_{it}$$

Where: β_0 = constant term; ROA = Return on Assets; NOOFIDs = Number of Independent Directors; NOOFBMs = Number of Board Meetings; NOOFBCs = Number of Board Committees; β_1, β_2, β_3, β_4 = Beta coefficients; ε = error term.

Data Analysis

The following table shows the descriptive statistics of dependent and independent variables.

Table 1 : Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.	Observations	
ROA						
Overall	1.120706	.6786538	-.35	2.3	N =	85
Between		.6389976	-.186	2.02	n =	17
Within		.2677623	-.0332941	2.016706	T =	5
BOARDSIZE					N =	85
Overall	10.8	1.716863	7	15	n =	17
Between		1.496663	8.8	13.8	T =	5

Within		.9023778	8.4	12.8	
NOOFIDs					N = 85
Overall	6.682927	1.755964	2	12	n = 17
Between		1.409129	5	10	T -bar =
Within		1.073244	3.482927	9.682927	4.82353
NOOFBMs					N = 85
Overall	10.8	4.822566	0	22	n = 17
Between		4.493328	4.6	21.8	T = 5
Within		2.00713	3	17	
NOOFBCs					N = 85
Overall	11.54118	1.570206	8	15	n = 17
Between		1.318645	8.8	13.6	T = 5
Within		.8997354	8.941176	13.54118	

The above table shows the descriptive statistics of panel variables. Total number of observations is 85 and total 17 banks and time period is 5. Return on Asset (ROA) produces an overall mean of 1.120706 with a standard deviation of .6786538 and -.35 and 2.3 are minimum and maximum values respectively under overall statistics. Under between statistics ROA shows a standard deviation of .6389976 with a minimum and maximum values of -.186 and 2.02 respectively. Under within statistics ROA shows a standard deviation of .2677263 with a minimum and maximum values of -.0332941 and 2.016706 respectively.

Board size (BOARDSIZE) produces an overall mean of 10.8 with a standard deviation of 1.716863 and 7 and 15 are minimum and maximum values respectively under overall statistics. Under between statistics board size shows a standard deviation of 1.496663 with a minimum and maximum values of 8.8 and 13.8 respectively. Under within statistics board size shows a standard deviation of .9023778 with a minimum and maximum values of 8.4 and 12.8 respectively.

Number of independent directors (NOOFIDs) produces an overall mean of 6.682927with a standard deviation of 1.755964and 2 and 12 are minimum and maximum values respectively under overall statistics. Under between statistics number of independent directors shows a standard deviation of 1.409129 with a minimum and maximum values of 5 and 10 respectively. Under within statistics number of independent directors shows a standard deviation of 1.073244 with a minimum and maximum values of 3.482927 and 9.682927 respectively.

Number of board meetings (NOOFBMs) produces an overall mean of 10.8 with a standard deviation of 4.822566and 0 and 22 are minimum and maximum values respectively under overall statistics. Under between statistics number of board meetings shows a standard deviation of 4.493328 with a minimum and maximum values of 4.6 and 21.8 respectively. Under within statistics number of board meetings shows a standard deviation of 2.00713 with a minimum and maximum values of 3 and 17 respectively.

Number of board committees (NOOFBCs) produces an overall mean of 11.54118 with a standard deviation of 1.570206 and 8 and 15 are minimum and maximum values respectively under overall statistics. Under between statistics number of board committees shows a standard deviation of 1.318645 with a minimum and maximum values of 8.8 and 13.6 respectively. Under within statistics number of board committees shows a standard deviation of .8997354 with a minimum and maximum values of 8.941176 and 13.54118 respectively.

<div align="center">Table 2 –Checking the Assumption of Multi-collinearity</div>

Variable	VIF	1/VIF
NOOFIDs	1.14	0.880557
BOARDSIZE	1.13	0.881624
NOOFBMs	1.02	0.978130
NOOFBCs	1.02	0.979603
Mean VIF	1.08	

Daoud (2017) argue that "Multicollinearity or near-linear dependence is a phenomena when two or more predictors are correlated, if this happens, the standard error of the coefficients will increase. Increased standard errors means that the coefficients for some or all independent variables may be found to be significantly different from 0. In other words, by overinflating the standard errors, multicollinearity makes some variables statistically insignificant when they should be significant. The VIF is a tool to measure and quantify how much the variance is inflated. To interpret the value of VIF the following rule is used in the table below:

<div align="center">VIF interpretation Table</div>

VIF-value	*Conclusion*
VIF = 1	Not correlated
$1 < VIF \leq 5$	Moderately correlated
VIF > 5	Highly correlated

The above table shows that none of the variables VIF are greater than 5 and conclude that there is no multicollinearity problem.

Table 3 – Checking the Assumption of Heteroscedasticity

Knaub (2007) "Homoscedasticity and heteroscedasticity refer, respectively, to whether the variances of the predictions determined by regression remain constant or differ" (p.431).

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ROA

Chi2(1)   =   6.67
Prob> chi2 = 0.0098

White's test for Ho: homoscedasticity - Against Ha: unrestricted heteroskedasticity

Chi 2 (14)   =   49.98
Prob> chi2   =   0.0000

<div align="center">Cameron & Trivedi's decomposition of IM-test</div>

Source	chi2	df	p
Heteroskedasticity	49.98	14	0.0000

Skewness	11.43	4	0.0221
Kurtosis	2.71	1	0.1000
Total	64.12	19	0.0000

The above table shows both Breusch-Pagan / Cook-Weisberg test for heteroskedasticity and White's test for homoscedasticity does not give any satisfactory result as both test p-value is less than 0.05 that means there is a problem of heteroskedasticity in the panel data set.

Table 4 – Checking the Assumption of Normality

Skewness / Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	---------------Joint---------------	
				adj chi2(2)	Prob>chi2
ROA	85	0.0350	0.4162	5.04	0.0804
BOARDSIZE	85	0.8167	0.3758	0.86	0.6515
NOOFIDs	82	0.2642	0.3754	2.10	0.3505
NOOFBMs	85	0.0145	0.7722	5.78	0.0555
NOOFBCs	85	0.3876	0.9830	0.76	0.6829

The above is the Skewness/Kurtosis tests for Normality. It shows p-values of all variable is greater than 0.05 that means data is normal.

Table 5 – Checking the Pooled OLS is best model or not

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Source	SS	df	MS
Model	32.816453	20	1.64082265
Residual	4.89909817	61	.080313085
Total	37.7155512	81	.465624089

Number of obs= 82
F (20,61) = 20.43
Prob> F= 0.0000
R-squared = 0.8701
Adjusted R-squared = 0.8275
Root MSE =0 .2834

ROA	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
BOARDSIZE	-.053306	.0353737	-1.51	0.137	-.1240401	.0174281
NOOFIDs	.0834252	.0300196	2.78	0.007	.0233973	.1434531
NOOFBMs	-.0256943	.0156392	-1.64	0.106	-.0569668	.0055782
NOOFBCs	-.031445	.0367079	-0.86	0.395	-.104847	.0419569
BANK1	.2136133	.3070936	0.70	0.489	-.4004584	.827685
BANK2	-1.143384	.2386846	-4.79	0.000	-1.620663	-.6661043
BANK3	.295598	.2373662	1.25	0.218	-.1790451	.7702411
BANK4	-.4251863	.2972649	-1.43	0.158	-1.019604	.1692316
BANK5	-1.383151	.2575368	-5.37	0.000	-1.898127	-.8681743
BANK6	-.4964878	.2695068	-1.84	0.070	-1.0354	.0424244
BANK7	.6162059	.2868104	2.15	0.036	.042693	1.189719
BANK8	.1733407	.2951181	0.59	0.559	-.4167844	.7634657
BANK9	.4520524	.3083886	1.47	0.148	-.1646086	1.068713
BANK10	-.5173529	.2619522	-1.97	0.053	-1.041159	.0064529

BANK11	-.6267432	.2247498	-2.79	0.007	-1.076158	-.1773282
BANK12	0 (omitted)	0 (omitted)	0 (omitted)			
BANK13	.5995204	.3010335	1.99	0.051	-.0024333	1.201474
BANK14	-.4735619	.2141912	-2.21	0.031	-.9018636	-.0452601
BANK15	-.4945595	.316681	-1.56	0.124	-1.127802	.1386834
BANK16	-.6637186	.2559076	-2.59	0.012	-1.175438	-.1519997
BANK17	.1221388	.3298156	0.37	0.712	-.5373683	.7816459
_cons	1.992607	.6514262	3.06	0.003	.6899995	3.295214

F (16,   61) =   15.01
Prob> F   =   0.0000

Based on the output of Pooled OLS, we conclude that this model is not a best model as p-value is less than 0.05 i.e, 0.0000.

Table 6 - Fixed Effects Model

Fixed-effects (within) regression   Number of obs   =   82
Group variable: Id   Number of groups =   17
R-sq: within   = 0.1679   Obs per group: min =   4
between   = 0.2135   avg   =   4.8
overall   = 0.1899   max   =   5
F (4,61)   =   3.08
Corr (u_i, Xb)   = 0.1631   Prob> F   = .0225

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
BOARDSIZE	-.053306	.0353737	-1.51	0.137	-.1240401	.0174281
NOOFIDs	.0834252	.0300196	2.78	0.007	.0233973	.1434531
NOOFBMs	-.0256943	.0156392	-1.64	0.106	-.0569668	.0055782
NOOFBCs	-.031445	.0367079	-0.86	0.395	-.104847	.0419569
_cons	1.780216	.5808259	3.06	0.003	.6187829	2.941649
sigma_u	.58689138					
sigma_e	.28339563					
rho	.81091885		(fraction of variance due to u_i)			

F test that all u_i=0:   F(16, 61) =   15.01   Prob> F = 0.0000

The above results shows there are three types of R Square i.e., within, between and overall it means panel data analysis. Based on the fixed effects model, three variables such as board size, number of board meeting and number of board committees are significant but negative influence on ROA.

Table 7 - Random Effects Model

Random-effects GLS regression   Number of obs   =   82
Group variable: Id   Number of groups =   17
R-sq: within = 0.1600   Obs per group: min =   4
between = 0.2977   avg =   4.8
overall = 0.2616   max =   5
Wald chi2(4)   =   16.86

corr(u_i, X) = 0 (assumed)   Prob> chi2   =   0.0021

ROA	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
BOARDSIZE	-.0516312	.0334789	-1.54	0.123	-.1172486	.0139862
NOOFIDs	.0759011	.0290691	2.61	0.009	.0189268	.1328754
NOOFBMs	-.0347885	.0140305	-2.48	0.013	-.0622878	.0072892
NOOFBCs	-.0537783	.0348434	-1.54	0.123	-.1220701	.0145134

	-------Coefficients-------			
	(b) fe	**(B)** re	**(b-B)** Difference	sqrt(diag(V_b-V_B)) S.E.
BOARDSIZE	-.053306	-.0516312	-.0016748	.0120886
NOOFIDs	.0834252	.0759011	.0075241	.0082129
NOOFBMs	-.0256943	-.0347885	.0090942	.0071268
NOOFBCs	-.031445	-.0537783	.0223333	.0122591
_cons	2.160094	.5620748	3.84	0.000	1.058447 3.26174

sigma_u   .53999905
sigma_e   .28339563
   rho   .78405356   (fraction of variance due to u_i)

The above results show there are three types of R Square i.e., within, between and overall it means panel data analysis. Based on the random effects model, two variables such as number

of independent directors and number of board meeting are significant. Number of independent directors are positively influences the ROA and number of board meeting negatively influences the ROA.

Table 8- Hausman Test for Model Selection

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4)   = (b-B) '[(V_b-V_B) ^ (-1)] (b-B)
             =   4.94
Prob>chi2 =   0.2930

The P-value of Hausman test shows is greater than 0.05, that means null hypothesis is accepted and the random effect model is appropriate.

Table 9 - Pesaran's test of cross sectional independence in the model

Pesaran's test of cross sectional independence =   -0.177, Pr = 1.1404
Average absolute value of the off-diagonal elements =   0.496

The p-value is 1.1404 (greater than 0.05) that means there is no cross sectional dependence.

Table 10- Wooldridge test for autocorrelation in panel data

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation

F(1, 16)	=	4.801
Prob> F	=	0.0436

Here the p-value is less than 0.05 (0.0436) that means there is the problem of serial correlation.

Table 11- Checking the heteroscedasticity in random effects model

Sample Size	=	82	|	Cross Sections Number	=	17
Wald Test	=	21.3235	|	P-Value >Chi2(4)	=	0.0003
F-Test	=	5.3309	|	P-Value >F(4 , 61)	=	0.0010
(Buse 1973) R2	=	0.2169	|	Raw Moments R2	=	0.7916
(Buse 1973) R2 Adj	=	-0.0399	|	Raw Moments R2 Adj	=	0.7232
Root MSE (Sigma)	=	0.6958	|	Log Likelihood Function	=	-28.2419

- R2h= 0.2905   R2h Adj= 0.0578   F-Test =   7.88   P-Value > F(4 ,   61) 0.0000
- R2v= 0.0732   R2v Adj = -0.2307   F-Test =   1.52   P-Value > F(4 ,   61) 0.2075

ROA	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
ROA						
BOARDSIZE	-.0533636	.0295703	-1.80	0.071	-.1113202	.0045931
NOOFIDs	.0421657	.0284371	1.48	0.138	-.01357	.0979013
NOOFBMs	-.0246594	.0128134	-1.92	0.054	-.0497732	.0004544
NOOFBCs	-.0533346	.0277774	-1.92	0.055	-.1077772	.001108
_cons	2.270273	.5257768	4.32	0.000	1.23977	3.300777
Hetero						
BOARDSIZE	.1365462	.0667411	2.05	0.041	.0057361	.2673562
NOOFIDs	-.2529356	.0728566	-3.47	0.001	-.3957319	-.1101392
NOOFBMs	-.052076	.0237354	-2.19	0.028	-.0985965	-.0055554
NOOFBCs	.062656	.0620729	1.01	0.313	-.0590047	.1843166
/Sigu	.494711	.4544762	1.09	0.276	-.3960461	1.385468
/Sige	.2400393	.2149069	1.12	0.264	-.1811706	.6612492

* Panel Model Selection Diagnostic Criteria - Model= (xtmlh)

- Log Likelihood Function   LLF   =   -28.2419

- Akaike Information Criterion   (1974) AIC   =   0.4777
- Akaike Information Criterion   (1973) Log AIC   =   -0.7388

- Schwarz Criterion   (1978) SC   =   0.6744
- Schwarz Criterion   (1978) Log SC   =   -0.3939

- Amemiya Prediction Criterion   (1969) FPE   =   0.5526
- Hannan-Quinn Criterion   (1979) HQ   =   0.5488

- Rice Criterion	(1984) Rice	=	0.5019	
- Shibata Criterion	(1981) Shibata	=	0.4619	
- Craven-Wahba Generalized Cross Validation (1979) GCV		=	0.4884	

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* Panel GroupwiseHeteroscedasticity Tests

Ho: Panel Homoscedasticity   -   Ha: Panel GroupwiseHeteroscedasticity

- Lagrange Multiplier LM Test	=	1.44e+04	P-Value >Chi2(16)	0.0000	
- Likelihood Ratio LR Test	=	34.0739	P-Value >Chi2(16)	0.0053	
- Wald Test	=	1.41e+05	P-Value >Chi2(17)	0.0000	

Here Wald Test shows p-value of 0.000 (less than 0.05) that means there is the problem of heteroscedasticity.

Table 12 - Panel Regression Results of the Impact of Board Governance on the Financial Performance of Private Sector Banks Listed in BSE

Group variable: Id		Number of obs	=	82
Time variable: YEAR		Number of groups	=	17
Panels: correlated (unbalanced)		Obs per group: min	=	4
Autocorrelation: common AR(1)		avg	=	4.823529
Sigma computed by casewise selection		max	=	5
Estimated covariances	= 153	R-squared	=	0.4366
Estimated autocorrelations	= 1	Wald chi2(4)	=	14.76
Estimated coefficients	= 5	Prob> chi2	=	0.0052

ROA	Panel-corrected					
	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
BOARDSIZE	-.0419702	.0367732	-1.14	0.254	-.1140444	.030104
NOOFIDs	.0450018	.0365433	1.23	0.218	-.0266217	.1166254
NOOFBMs	-.0393915	.0127855	-3.08	0.002	-.0644506	-.0143324
NOOFBCs	-.0978092	.0310186	-3.15	0.002	-.1586045	-.0370138
_cons	2.804813	.5420527	5.17	0.000	1.742409	3.867217
rho	.6458544					

The above table reports the results of bank performance based on Panel Corrected Standard Error Model. Moundigbaye et al., (2018) argued that "FGLS estimator cannot be estimated when the number of time periods, T, is less than N, because the associated EVCM cannot be inverted (Beck and Katz, 1995). Second, even when T ≥ N, there may be relatively few observations per EVCM parameter, causing the associated elements of the EVCM to be estimated with great imprecision.As demonstrated by Beck and Katz (1995), henceforth BK, this can cause severe underestimation of coefficient standard errors, rendering hypothesis testing useless.To address these problems, BK proposed a modification of the full GLS-Parks estimator called Panel-Corrected Standard Errors (PCSE)". Based on this we justify for using the Panel Corrected Standard Error Model as it produces an efficient estimation when a case where N (cross-sections) is greater than T (time period). The panel model showed that both number of board meetings and number of board committees are negative and significantly

related to bank performance at 5% level. The finding on this study showed that more number of board meetings weaker the performance of banks. Our findings are in line with previous researchof Hanh et al.,(2018). With this result we reject the null hypothesis and accept the alternative hypothesis that there is a significant impact on number of board meetings on the performance of private banks listed in BSE. The study also showed that more number of board committees weaken the performance of banks and this may due to board will lose its concentration on major committees. With this result we reject the null hypothesis and accept the alternative hypothesis that there is a significant impact on number of board committees on the performance of private banks listed in BSE. But both board size and number of independent directors showed no significant impact on the performance of private banks listed in BSE.The results are in line with the previous studies such as Bashir et al.,(2018), Ayorinde et al.,(2012),Zeng (2018) and Adams&Mehran (2008)

Conclusion

The study main objective was to find any significant impact of board governance on the financial performance of banks. The study employed panel data models to examine the impact. The study found that both number of board meetings and number of board committees are negative and significantly related to bank performance. But both board size and number of independent directors showed no significant impact on the performance of private banks listed in BSE. With this results we can conclude that board governance will definitely affect the bank performance. Due to the time constraints this study used limited variables and the researchers have the option to select more governance variables for their research.

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A STUDY ON THE ANTECEDENTS OF MOBILE BANKING ADOPTION WITH SPECIAL REFERENCE TO KERALA

Tessa Mary Jose   *Dr. G.S.Gireesh Kumar*
Assistant Professor in Commerce   *Principal*
Sacred Heart College (Autonomous)   *Henry Baker College,Melukavu*
Thevara, Kochi 682013   *Kottayam, Kerala- 686 652*
(Research Scholar, Bharathiar University, Coimbatore)
 tessamaryjose@gmail.com   gireeshkartha@gmail.com

ABSTRACT

Mobile banking can be considered as the convergence of mobile technology and financial services (Chung & Kwon, 2009). Karjaluoto (2002); Rugimbana (1995) found that there is vast market potential for mobile banking due to its always on functionality and the option to do banking virtually anytime and anywhere. Adoption of electronic banking is important not only in terms of reducing cost and improving competitiveness, but also in terms of banks' ability to maintaining existing customer base and attract new customers (Akinci et al.,2004;Guriting and Ndubisi, 2006). Thus mobile banking creates a win-win situation for both the banks and the customers if adopted and used continuously. In spite of all these benefits the usage of mobile banking is far from satisfactory, so there is an urgent need to find out the motivators and inhibitors of mobile banking adoption. Although there are various technology adoption models namely Technology Adoption Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Diffusion of Innovation Theory (DIT) and Unified Theory of Acceptance and Use of Technology (UTAUT). Themost popular and widely accepted is Technology Acceptance Model (TAM), Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the main constructs of TAM, but they are not sufficient to explain the adoption or non-adoption of an innovation. Many other constructs have been added to TAM over a period of time, which includes, trust (TR), Self-Efficacy (SE), Social Influence (SI), Perceived Cost (PC) and Perceived Risk (PR) all these constructs are considered in this study. Primary data was collected from a sample of 400 customers and analysed using Stepwise Regression to find out the influence of these selected constructs on actual adoption. The results of the study proved that except perceived cost and perceived risk all the other factors namely, perceived usefulness, perceived ease of use, trust, self-efficacy and social influence had a significant effect on actual adoption of mobile banking.

INTRODUCTION

Technology is making a dramatic impact upon service industries in general and financial service industry in particular. The latest changes in the financial service industry is brought about through the interaction of customer needs, competitive pressure and technological innovation where banking is no exception to this change. Banking today takes place mainly through electronic channels such as Automated Teller Machines (ATMs), Telephone Banking, Internet Banking and Mobile Banking. Customers are also attracted towards these Self Service alternatives for meeting their banking needs which were traditionally met through inter-personal service encounter. Self Service Banking Technology has been proved beneficial to both banks and customers, as it decreases the cost per transaction for banks and increases the convenience of customers. The primary motivation for the increasing role of

technology in service organisations has been to reduce cost and eliminate uncertainties (Kelly, 1989) as well as being used to standardise services by reducing the heterogeneity prevalent in the typical employee/customer encounter (Quinn, 1996).

MOBILE BANKING-CONCEPT

The latest addition in electronic banking is mobile banking, where customers use wireless channels to access their bank accounts. Mobile banking is defined as "a channel whereby the consumer interacts with a bank via a mobile device, such as a mobile phone or personal digital assistant. In that sense it can be seen as a subset of electronic banking and an extension of internet banking with its own unique characteristics". First mobile banking transaction services in India were offered by ICICI bank in January 2008 (Mr. V. Vaidyanathan, 2008). Banks have begun to provide the mobile banking services via apps to attract more smartphone users, however users are concerned about the internet transaction security and reliability of mobile banking apps. Mobile banking involves the use of mobile phone or another mobile device to undertake financial transactions linked to a client's account. Mobile services are more attractive compared to other alternative channels due to its ubiquity, interactivity, convenience and flexibility. In contrast to traditional banking channels, mobile banking for the customer is promised to be more flexible, ubiquitous and convenient (Wessels and Drennan, 2010; Luarn and Lin, 2005).The ability to fit a financial institution on a cell phone and place it in the pockets of future users is an exciting idea (Divakar Goswami and Satish Raghavendran, 2009).

MOBILE BANKING-ADOPTION

Adoption is the first step in usage of a technology or innovation. Research on adoption focuses on the factors influencing the use of a technology. The goal is to gain insights as on the question of why an individual chooses to adopt one technology and rejects another one. (Pedersen and Ling, 2003).

The process leading to adoption is characterised by-

- Initial awareness of the innovation
- The development of an opinion about it.
- The decision to adopt or reject it.
- If it is adopted, the use of the adopted innovation.
- Reinforcement of the adoption decision.

This process is undergone by each individual, leading to either adoption or rejection of the innovation (Rogers, 1995)

Mobile banking is a critical service in the banking industry and therefore it is essential that mobile banking services are adopted by the customers. Although the banks providing mobile banking services have increased the number of mobile banking users have not increased at the same pace. It is argued that adoption will not take place unless customers perceive the service to be useful (Ali & Bharadwaj, 2010).As mobile technologies and devices advance, mobile banking has emerged as a major component of the financial services system because of mobile technology, such as ubiquity, convenience, and interactivity (Turban et al., 2006).

Banks have become customer centric, as customer is the focus of modern banking and customer service is its differentiating factor. However, despite its advantages, the use of mobile banking has not spread in fact as was expected (Kim et al., 2009; Laukkanen, 2007; Laforet and Li, 2005). As such there have been repeated calls for the investigation of factors that predict or explain the adoption, acceptance and use of M-banking (Kim et al., 2007; Laforet and Li, 2005; Luarn and Lin, 2005). Furthermore, both customer satisfactions on mobile banking and service quality of mobile banking have positive influence on customers' behavioural intention to use mobile banking (Shih- I Cheng et. al., 2013). It is essential to have a preliminary knowledge of motivators and inhibitors that influence customers' attitude towards and intention to use mobile banking leading to its adoption. After an extensive literature review of related topicsof this study a model has been developed displaying the antecedents of mobile banking adoption and their relation to actual adoption.

THEORIES AND MODELS OF TECHNOLOGY ADOPTION

There have been various theories and models that attempted to explain technology adoption and most of these have proved to be successful in this respect. However, many models have been combined and used in various studies and have been proved to be more effective and stronger than when they are used independently. Certain other models have been extended and supplemented by adding additional constructs for various research works and proved effective and beneficial.

In an extensive literature review of 32 studies that have concentrated on adoption of mobile technology and mobile banking 18 of them have included Technology Acceptance Model (TAM), either by extending the same by including various constructs in other Technology Adoption Model or in combination with other technology adoption models or theories. The studies in which TAM was used in one form or the other are-

Vinod Kumar Gupta etal., (2013); Nithin Nayak etal., (2014);Ali Alsoufi and Hayat Ali, (2014); Chat Chugchuen (2016); Nganaga,(2013);Shaza.W.Ezzi, (2014);;Khasawneh Mha, (2015);Ki Soon Lee et al.,(2007); Marc .F. Audi et al., (2016);Ulun Akturan and Nuray Tezcan,(2012);Hanudin Amin et al., (2012);Jean Pierre Levy Mangin et al., (2014); Wadie Nasri and Lanouar Charfeddine,(2012);Abdul Kabeer Kazi,(2013);Samuel Henrique Silva Bidarra et al., (2013);H. Kalaiarasi and Dr.V. Srividya (2012);F.Munoz-Leiva et al.,(2017);Waranpong Boonsiritomachai and Krittipat Pitchayadejanant,(2017).

In addition there are studies that used different combinations of adoption models, they are- TAM, TBP and DIT (Vinod Kumar Gupta et al., 2013), TAM, TRA, TPB, IDT and UTAUT (Nithin Nayak et al., 2014),IDT and TAM (Marc .F. Audi et al., 2016),TTF, UTAUT and ITM (Tiago Oliveira et al.,2014), TAM and TPB(Wadie Nasri and Lanouar Charfeddine,2012), UTAUT and TAM (Waranpong Boonsiritomachai and Krittipat Pitchayadejanant,2017)

However there are studies that made use of a single model also by extending or not extending them with additional contructs. The studies by (Evon Tan and Jasmine Leby Lau, 2016) and (Goncalo Baptista and Tiago Oliveira, 2015) used Unified Theory of Acceptance and Use of Technology (UTAUT). Similarly, the one by (Manoranjan Dash et al., 2014) used Diffusion Innovation Theory (DIT).

Theories and Models of Technology Adoption

No	Theories and Models	Authors	Determinants of Adoption
1.	Theory of Reasoned Action (TRA)	Ajzen and Fishbein, (1975)	Behavioural Intention, Attitude & Subjective Norm
2.	Technology Acceptance Model (TAM)	Fred D Davis (1989)	Perceived Usefulness & Perceived Ease of Use
3.	Extended TAM2 Model	Venkatesh and Davis, (2000)	Social Influence Processes (subjective norm, voluntariness & image), Cognitive Instrumental Processes (job relevance, output quality, result demonstrability & perceived ease of use)
4.	Extended TAM3 Model	Venkatesh and Bala, (2008)	Individual Differences, System Characteristics, Social Influence, Facilitating Conditions along with Perceived Usefulness & Perceived Ease of Use
5.	Theory of Planned Behaviour (TPB)	Ajzen (1991)	Behavioural Intention, Attitude, Subjective Norm & Perceived Behavioural Control
6.	Diffusion Innovation Theory (DIT)	Everett Rogers (1962)	The innovation, communication channels, time & social system
7.	Unified Theory of Acceptance and Use of Technology (UTAUT)	Venkatesh et. al., (2003)	Performance Expectancy, Effort Expectancy, Social Influence & Facilitating Conditions
8.	Task Technology Fit (TTF)	D.L.Goodhue &Thompson, (1995)	Task fit, Technology fit, performance Impact, Utilisation
9.	Motivational Model (MM)	Davis, Bagozzi & Warshaw, (1992)	Extrinsic motivation (such as perceived ease of use, perceived usefulness and subjective norm) and Intrinsic motivation (such as perceptions of pleasure and satisfaction)
10.	Social Cognition Theory (SCT)	Bandura, (1986)	Affect & Anxiety
11.	Model of PC Utilisation (MPCU)	Thompson Higgins & Howell, (1991)	Job-fit, Complexity, Long-term Consequences, Affect towards use, Social Factors , Facilitating Conditions
12.	Model of Acceptance with Peer Support (MAPS)	Sykes et al., 2009	Behavioural Intention, System Use, Facilitating Conditions, Network Density, Network Centrality, Valued Network Density & Valued Network Centrality

ANTECEDENTS OF TECHNOLOGY ADOPTION

"A meta-analysis on adoption of mobile financial services" (Rajanish Dass and Sujoy Pal,2011) proved that all the seven dimensions affect mobile banking adoption.Perceived Usefulness (PU); Perceived Ease of Use (PEOU), Perceived Cost (PC) and Trust (TR) contribute towards mobile banking adoption (Nitin Nayak et al.,2014); The combined effect of three dimensions of trust are more prominent than Perceived Usefulness (PU) and Perceived Easeof Use (PEOU) in enticing initial use of mobile banking(Ali Reza Montazemi and Hamed Qahri Saremi, 2013);The study (Amit Shankarand Pooja Kumari, 2016)unveiled that awareness, usefulness, ease of use, compatibility, self-efficacy, security and privacy risk, social influence and financial cost were having a significant impact on m-banking adoption intention of consumer in India; Ki Soon Lee, (2007)revealed that Perceived Usefulness and Trust had a direct effect on adoption behaviour but trust had a more prominent effect; Similarly Marc .F. Audi et al., (2016) proved that Perceived Usefulness (PU) had the greatest effect on attitude to adopt mobile banking; (Huong Thi Thanh Tran and James Corner, 2016)proved that perceived cost was an important barrier in adoption intention of mobile banking and (Evon Tan and Jasmine Leby Lau2016) proved perceived risk has a negative impact onadoption of mobile banking:The results of the study (Sindhu Singh, 2016)proved that perceived ease of use, computer self-efficacy, security and perceived financial cost influenced the customers' use of mobile banking services.

The antecedents of mobile banking adoption selected for the purpose of this study are Perceived Usefulness, Perceived Ease of Use, Trust, Self-efficacy, Social Influence, Perceived Cost and Perceived Risk as identified from extensive literature review. Perceived Usefulness (PU)and Perceived Ease of Use (PEOU) of TAM were combined with constructs of other adoption models for the purpose of this study. The above literature have proved that the antecedents have a strong influence on actual adoption of mobile banking. Though all these constructs are related to adoption of mobile banking the intensity of influence of each varies.

Antecedents of Technology Adoption

NO	DIMENSIONS	MEANING	AUTHORS
1	Perceived Usefulness (PU)	It refers to the degree to which a user believes that using a particular system would improve job performance	Davis (1989)
2	Perceived Ease of Use (PEOU)	refers to the degree to which a person believes that using a particular system would be free of effort	Davis (1989)
3	Trust (TR)	it reflects a willingness to be in vulnerability based on the positive expectation toward another party's	Mayer et.al., (1995)

		future behaviour	
4	Self -Efficacy (SE)	an individual's self-confidence in his or her ability to perform a behaviour	Taylor & Todd,(1995)
5	Social Influence (SI)	a person's perception that most people who are important to him think he should or should not perform the behaviour in question	Fishbein&Ajzen, (1975)
6	Perceived Cost (PC)	It is definedas the extent to which a person believes that using mobile banking will cost money	Luarn & Lin, (2005)
7	Perceived Risk (PR)	A consumer's apprehension of suffering negative outcome, or losses	Hansen, (2006)

MODEL DEVELOPMENT

Among the different models that have been proposed, the Technology Acceptance Model (TAM) (Davis, 1989), adapted from Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980) and its variations were widely used by various scholars for explaining technology adoption intentions (Gefen and Straub, 1997; Malhotra and Galletta, 1999; Moon and Kim, 2000; Mccloskey 2004; Gu et.al, 2009; Yu & Fang, 2009; Chung & Kwon, 2009). Several attempts were made to extend and supplement the TAM model by various researchers in different studies. Constructs such as 'trust' (Gu et al., 2009; Luarn & Lin, 2005) and 'perceived risk' (Chung & Kwon, 2009; J.Donner and C.A.Tellez, 2008) were incorporated with 'perceived ease of use' and 'perceived usefulness' of TAM Model and found to have a significant influence on adoption. TAM was later on extended on two occasions. In the first attempt Venkatesh and Davis, (2000) explained TAM with reference to social influence (measured using indicators of subjective norm, voluntariness and image), in the second attempt Venkatesh and Bala, (2008) introduced computer self-efficacy (general beliefs about computers and its usages) along with TAM. In addition 'perceived cost' was yet another important factor that has a negative relation with the intention to adopt mobile banking (Sadi and Noordin, 2011) (Singh, Srivastava and Srivastava, 2010). Luarn and Lin, (2005) researched the applicability of TAM in a mobile banking context by adding one trust based construct (i.e. perceived credibility) and two resource-based constructs (i.e. perceived self-efficacy and perceived financial cost to the TAM, and demonstrated that their extended TAM had a higher ability to predict and explain behavioural intention to use an information system.

Thus it is clear from the above that TAM is the most widely accepted model of technology adoption and various attempts have been made to extend and supplement it either by adding new constructs or by combining it with one or more models of technology adoption. All the constructs considered in this study have been added to perceived usefulness and perceived ease of use of TAM at some point of time by various researchers and academicians. However

a new adoption model has been developed in the present study taking into consideration these constructs added over a period of time, which were proved influencing technology adoption along with perceived usefulness and perceived ease of use of TAM. The other constructs included along with perceived Usefulness (PU) and Perceived Ease of Use (PEOU) in the new adoption model are trust, self-efficacy, social influence, perceived cost and perceived risk. These constructs which were identified and supplemented to perceived usefulness and perceived ease of use of TAM have been part of other popular technology adoption models such as TPB, IDT, UTAUT, etc. Moreover the relation of these seven constructs with actual adoption have been examined in this study using step-wise multiple regression

Mobile Banking Adoption Model

Perceived Usefulness (PU)

Trust (TR)

Self-efficacy (SE)

Social Influence (SI)

Perceived Cost (PC)

Perceived Risk (PR)
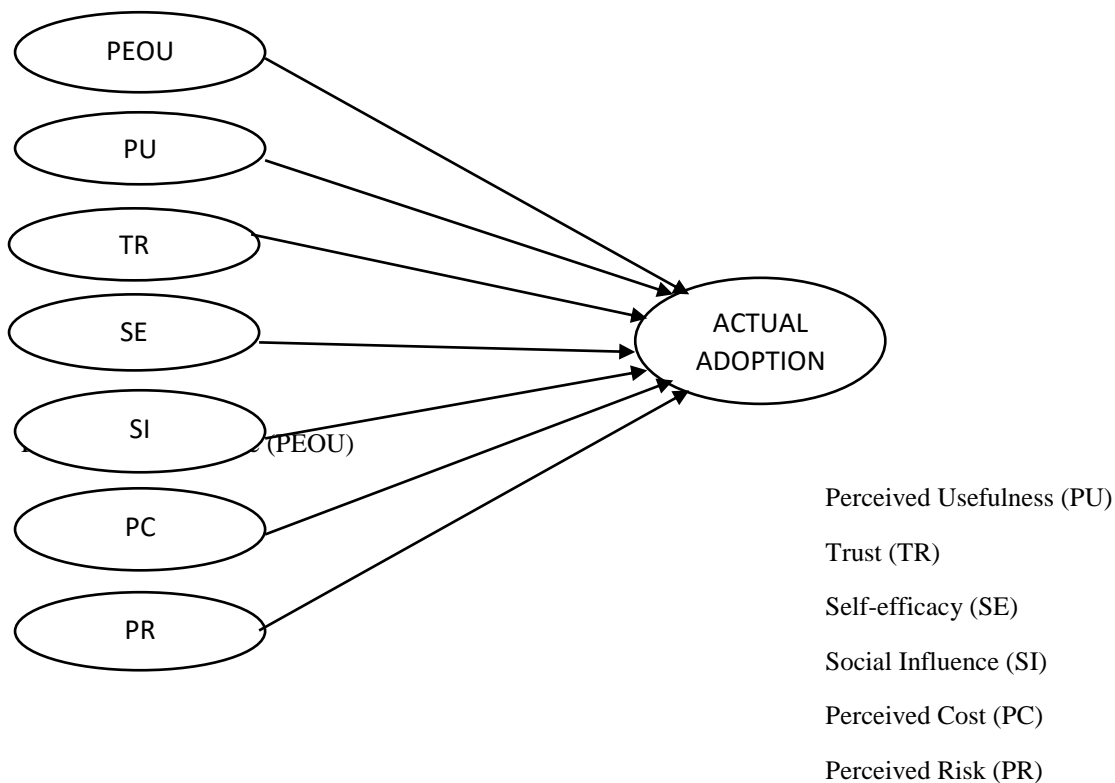
METHODOLOGY

The primary data was collected using a well-structured questionnaire from users of mobile banking. Users fromNorth, South and Central Kerala were considered for the study to get a proper representation of respondents from all over Kerala. Three districts of Kerala one each from North, South and Central were selected for the study. Kozhikode was selected from the North, Trivandrum from South and Ernakulam from Central Kerala. About 625 questionnaires were distributed out of which 400 usable ones were received which was later tabulated and analysed. The population for this study is unknown as banks were reluctant to disclose the details of mobile banking customers due to security reasons, therefore the only possible method for selection of samples was convenience sampling. The banks in Kerala for the purpose of the study were classified as Public Sector Banks (PSBs), Old Private Sector Banks (OPSBs) and New Generation Banks (NGBs) and users of all banking sectors were given proper representation in the sample. In addition special care was

taken to include samples in all age groups, genders, residing areas, educational background, occupation and income levels. Questions related to usage pattern and frequency were also included in the questionnaire to get an overall idea of the respondents. The antecedents of adoption chosen for the study were Perceived Usefulness, Perceived Ease of Use, Trust, Self-Efficacy, Perceived Risk, Perceived Cost and Social Influence. 37 statements of antecedents of adoption and 3 statements of actual adoption were finally included in the study. The relation of these antecedents to Actual Adoption (AADOP) is tested in this study using Stepwise Multiple Regression analysis.

ANALYSIS

The primary data collected were checked for their reliability/ internal consistency by means of Cronbach's Alpha and later the relation among the independent and dependent variables were tested using Step-wise multiple regression.

Reliability

Sl.No.	Variables	Cronbach's Alpha	Number of Items
1.	Trust (TR)	.900	8
2.	Perceived Usefulness (PU)	.875	6
3.	Social Influence (SI)	.907	5
4.	Self-Efficacy (SE)	.822	5
5.	Perceived Cost (PC)	.861	5
6.	Perceived Risk (PR)	.764	5
7.	Perceived Ease of Use (PEOU)	.842	5
8.	Actual Adoption (AADOP)	.837	3

	Cronbach's Alpha	Number of Items
Overall Adoption	.920	40

The values of Cronbach's Alpha ranges from 0.764 to 0.907 for components and its overall value is 0.920. It is clear from the above tables that reliability of components as well as its total is far above the threshold which ensures internal consistency of the data under study.

Stepwise Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.625[a]	.390	.389	1.65374	
2	.659[b]	.434	.431	1.59541	
3	.672[c]	.452	.448	1.57189	
4	.681[d]	.463	.458	1.55752	
5	.686[e]	.471	.465	1.54768	1.891

a. Predictors: (Constant), PU

b. Predictors: (Constant), PU, SE

c. Predictors: (Constant), PU, SE, TR

d. Predictors: (Constant), PU, SE, TR, PEOU

e. Predictors: (Constant), PU, SE, TR, PEOU, SI

f. Dependent Variable: AADOP

A forward stepwise regression was conducted to find out which of the seven predictor variables have a significant relationship with dependent variable Actual Adoption (AADOP). The stepwise regression identified five models. In the first model the value of R^2 is 0.39 and adjusted R^2 is 0.389, which means 39% of the variability of the dependent variable is determined by the predictor variable, Perceived Usefulness (PU). In the second model the R^2 is 0.434 and adjusted R^2 is 0.431, which means that 43% of the variability of the dependent variable is determined by the predictor variables Perceived Usefulness (PU) and Self-Efficacy (SE). The third model has an R^2 value of 0.452 and adjusted R^2 is 0.448, where 45% of the variability in the dependent variable is predicted by the independent variables Perceived Usefulness (PU), Self- Efficacy (SE) and Trust (TR). In the fourth model, in which the R^2 value is 0.463 and adjusted $R^2$is 0.458, approximately 46% of variability of the dependent variable is determined by the predictors Perceived Usefulness (PU), Self-Efficacy (SE), Trust (TR), and Perceived Ease of Use (PEOU). Finally, in the fifth model the value of R^2 is 0.471 and adjusted R^2 is 0.465, where approximately 47% of the variability of the dependent variable Actual adoption (AADOP) is explained by Perceived Usefulness (PU), Self-Efficacy (SE), Trust (TR), Perceived Ease of Use (PEOU) and Social Influence (SI).

Durbin-Watson is the statistic test for autocorrelation. If the value lies between 1.5 and 2.5, it indicates independence of observations (Garson, 2010). The value in the above table is 1.891, which is within the threshold limits and therefore there is no autocorrelation in the observations.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	691.058	1	691.058	252.686	.000[b]
	Residual	1080.267	395	2.735		
	Total	1771.325	396			
2	Regression	768.458	2	384.229	150.954	.000[c]
	Residual	1002.867	394	2.545		
	Total	1771.325	396			
3	Regression	800.285	3	266.762	107.964	.000[d]
	Residual	971.040	393	2.471		
	Total	1771.325	396			
4	Regression	820.383	4	205.096	84.545	.000[e]
	Residual	950.942	392	2.426		
	Total	1771.325	396			
5	Regression	834.762	5	166.952	69.700	.000[f]
	Residual	936.563	391	2.395		
	Total	1771.325	396			

a. Dependent Variable: AADOP

b. Predictors: (Constant), PU

c. Predictors: (Constant), PU, SE

d. Predictors: (Constant), PU, SE, TR

e. Predictors: (Constant), PU, SE, TR, PEOU

f. Predictors: (Constant), PU, SE, TR, PEOU, SI

F-test of regression coefficient explains whether the independent variable associated with it is contributing significantly to the variance accounted for in the dependent variable. The five F-tests reported in the above table correspond to the five models of the step wise regression. The p-value for all the five models is 0.000, which means that they are all significant at 1% level of significance. In other words, the variance explained by the independent variables that are represented by each of the models is statistically significant.

The first model is statistically significant F $(1, 395)$ = 252.686, p value = 0.000 and account for 39% of variance in the dependent variable, Actual Adoption (AADOP) which is explained by Perceived Usefulness (PU). The second model is statistically significant F $(2, 394)$ = 150.954, p value = 0.000 and account for 43% of the variance in the dependent variable, Actual Adoption (AADOP), which is explained by Perceived Usefulness (PU) and Self Efficacy (SE). The third model is statistically significant F $(3,393)$ = 107.964, P value = 0.000 and account for 45% of variance in the dependent variable Actual Adoption (AADOP), which is explained by Perceived Usefulness (PU), Self -Efficacy (SE) and Truth (TR). The fourth model is also statistically significant F $(4,392)$ = 84.545, P value =0.000 and account for 46% of the variance in the dependent variable Actual Adoption (AADOP), which is explained by Perceived Usefulness (PU), Self-Efficacy (SE), Trust (TR), and Perceived Ease of Use (PEOU). The predictor model i.e., the fifth model, contained five of the seven predictors and it reached the fifth step with no variables removed. The model was statistically significant F $(5, 391)$ = 69.700, p value 0.000 accounting for 47% of variance in the

dependent variable Actual Adoption (AADOP), which is explained by the independent variables Perceived Usefulness (PU), Self-Efficacy (SE), Trust (TR), Perceived Ease of Use (PEOU) and Social Influence (SI).

Step-wise Regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.547	.624		4.081	.000		
	PU	.389	.024	.625	15.896	.000	1.000	1.000
2	(Constant)	.419	.715		.587	.558		
	PU	.324	.026	.519	12.243	.000	.798	1.253
	SE	.176	.032	.234	5.514	.000	.798	1.253
3	(Constant)	-.449	.745		-.603	.547		
	PU	.297	.027	.477	10.981	.000	.739	1.353
	SE	.131	.034	.174	3.867	.000	.688	1.453
	TR	.077	.021	.160	3.589	.000	.701	1.427
4	(Constant)	-.788	.747		-1.054	.292		
	PU	.241	.033	.387	7.251	.000	.482	2.075
	SE	.115	.034	.152	3.369	.001	.669	1.494
	TR	.066	.021	.137	3.060	.002	.679	1.472
	PEOU	.118	.041	.157	2.878	.004	.462	2.164
5	(Constant)	-.849	.743		-1.143	.254		
	PU	.222	.034	.356	6.541	.000	.457	2.190
	SE	.123	.034	.164	3.626	.000	.662	1.510
	TR	.054	.022	.112	2.455	.015	.645	1.550
	PEOU	.111	.041	.147	2.712	.007	.460	2.175
	SI	.052	.021	.102	2.450	.015	.773	1.294

Multiple Regression Analysis with stepwise procedure was performed to determine the most dominant variables affecting the dependent variable, Actual Adoption (AADOP). It is illustrated that Perceived Usefulness (PU), Self-Efficacy (SE), Trust (TR), Perceived Ease of Use (PEOU) and Social Influence (SI) affect Actual Adoption (AADOP). The p-value ranges from 0.000 to 0.015. On examining the fifth model in the above table, Perceived Usefulness (PU) is the most dominant predictor of Actual Adoption (AADOP) with (Beta = 0.356, t-value = 6.541, Sig =0.000). The other predictors are Self-Efficacy (SE) with (Beta =0.164, t-value = 3.626, Sig = 0.000), followed by Trust (TR) with (Beta = 0.112, t-value = 2.455, Sig = .015), Perceived Ease of Use (PEOU) with (Beta = 0.147, t-value =2.712, Sig = 0.007) and lastly the predictor Social Influence (SI) with (Beta = 0.102, t-value = 0.015, Sig = 0.015). These five variables in the fifth model have an R^2 value of 0.471 and adjusted R^2 value of 0.465 contributing to an approximate 47% of the variance in the dependent variable Actual adoption (AADOP). The regression equation can be framed as follows

AADOP = - 0.849 + 0.222 PU + 0.123 SE + 0.054 TR + 0.111 PEOU + 0.052 SI

FINDINGS

The above table reveals that the relationship of Perceived Cost (PC) and Perceived Risk (PR) on the fifth model is insignificant and therefore does not appear in the table. This result in conformity with the findings of (Ki Soon Lee et al., 2007) that perceived risk had an insignificant direct relationship with adoption behaviour, the effect of it is only indirect.Similarly, perceived cost and perceived risk did not show any effect on users' intentionto use mobile banking directly(Ali Alsoufi and Hayat Ali, 2014). Both Perceived Cost (PC) and Perceived Risk (PR) have a negative effect on intention to use and actual adoption of mobile banking. A multicollinearity situation is declared when high correlation is identified between two or more predictor variables under consideration which can potentially cause problems in investigating the roles of the independent variables in the success of the model being analysed (Brace et.al, 2006; Dwivedi et.al, 2006). It is identified through tolerance and Variance Inflation Factor (VIF). The tolerance has to be above 0.2 the maximum allowed VIF value is 5 (Garson 2010). In the above table it is clear that tolerance values are all above 0.2 and the VIF ranges from 1.000 to 2.190 much below 5. Therefore no multicollinearity is found in the analysis.

However, Perceived Usefulness (PU), Self-efficacy (SE), Trust (TR), Perceived Ease of Use (PEOU) and Social Influence (SI) have a significant relation with Actual Adoption (AADOP) of mobile banking. This is consistent with the findings of the study by (Amit Shankarand Pooja Kumari, 2016)in which it is unveiled that awareness, usefulness, ease of use, compatibility, self-efficacy, security and privacy risk, social influence and financial cost were having a significant impact on m-banking adoption intention of consumer in India.

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Influence of MnCl₂ on the properties of an amino acid complex single crystal-ʟ-arginine perchlorate (LAPCl) for optical limiter applications

Prince Thomas[1] · Rajendhar Junjuri[2] · Nithin Joy[3] · Michael Siemer[4] · Manoj Kumar Gundawar[2] · Reji Philip[3] · Katharina Al-Shamery[4] · Ginson P. Joseph[1]

Abstract

The slow solvent evaporation technique has been employed for the synthesis of ʟ-arginine perchlorate (LAPCl) single crystals. The grown crystals are doped with 1, 2 and 3 mol% of MnCl₂. The Powder X-ray Diffraction (PXRD) analysis confirmed that the pure and doped crystals belong to the orthorhombic crystal system with non-centrosymmetric space group $P2_12_12_1$. The incorporation of dopants has been confirmed by Laser-Induced Breakdown Spectroscopy (LIBS) and Energy Dispersive X-ray Analysis (EDX). The modification in the linear optical properties has been analyzed by measuring the cut off wavelength, band gap, Urbach energy and the refractive index of the pure and doped crystals. The changes in the nonlinearity of the LAPCl have been studied by open aperture Z-scan technique and found that two-photon absorption (2PA) coefficient increased with increasing the dopant concentration. The dielectric properties, electronic polarizability and thermal properties of the pure and doped crystals are also studied.

1 Introduction

Recently, great efforts have been made by many materials scientists to search for an appropriate semi-organic material exhibiting high nonlinearity and reasonable success in synthesizing bulk size single crystals which are favorable for device fabrication [1–7]. The studies on organic and semi-organic nonlinear optical materials have got greater attention due to their high flexibility in molecular design and high nonlinear optical efficiency [8]. The research on this way resulted in the invention of a new phase matchable amino acid based semi-organic crystal. The unique characteristics of amino acids like molecular chirality, the absence of strongly conjugated bonds and zwitterionic nature make them an ideal candidate among organic single crystals [9]. ʟ-Arginine is an essential amino acid with a basic side chain and hydrophilic character. The ʟ-arginine perchlorate (LAPCl) prominent among L-arginine complexes has been synthesized by Monaco et al. [10]. The LAPCl crystallizes in the orthorhombic crystal system with space group $P\,2_12_12_1$ [11]. The Second Harmonic Generation Efficiency (SHG) test performed by Tapati Mallik and Tanusree Kar shows that it is higher than KDP [12]. The mechanical and dielectric studies conducted by Aruna et al. [13] revealed that the LAPCl crystal has anisotropic mechanical properties along different crystallographic directions and low values of the dielectric constant at high frequencies. The low dielectric constant value of LAPCl makes it a tool for high-speed electro-optic modulation [14] and indicates that this material is suitable for the development of NLO devices. Even though the growth and characterization studies of the LAPCl single crystals have been studied by many researchers [15–18], the effect of MnCl₂ on the electrical, thermal and optical properties of the LAPCl is studied for the first time.

The effects of the substitution and inclusion of metallic dopants in various single crystals with nonlinear optical properties have already been reported by many researchers. Studies conducted by Haja Hameed et al. [19] showed that addition of Magnesium (Mg) into the ʟ-Arginine Phosphate

✉ Ginson P. Joseph
ginsonpj@gmail.com; ginsonpjoseph@gmail.com

1 Department of Physics, St.Thomas College, Palai, Kerala 686574, India

2 Advanced Centre of Research in High Energy Materials (ACRHEM), University of Hyderabad, Prof C R Rao Road, Gachibowli, Hyderabad, Telangana 500046, India

3 Raman Research Institute, Bangalore, Karnataka 560080, India

4 Institute of Chemistry, School of Mathematics and Natural Sciences, Carl von Ossietzky University Oldenburg, P.O. Box 2503, 26111 Oldenburg, Germany

crystal enhances the crystal growth and dipolar strength. Kar et al. [20] studied the optimization of Chromium (Cr) doping on Lithium Niobate ($LiNbO_3$) crystals for tunable laser applications. The SHG efficiency of Zinc Tris-thiourea Sulphate (ZTS) has been enhanced by the doping of Potassium Iodide (KI) [21]. Lithium (Li) doping on L-Alanine crystals enhanced the thermal stability, hardness and SHG efficiency of the parent crystal [22]. Terbium ion (Tb^{3+}) addition on L-Histidine Hydrochloride Monohydrate (LHHC) single crystals showed that the doped crystal is a potential candidate for radiation detector applications [23].

Manganese ions have the greatest spin ($S = 5/2$) in the ground state so that there may be a considerable change in the physico-chemical properties of the host matrix by the addition of $MnCl_2$ [24]. The optical nonlinearity on wide band gap semiconductor material ZnO increased in increasing the concentrations of Mn has been reported [25]. L-arginine perchlorate (LAPCl) is a wide band gap (5.56 eV) material and its optical transparency is in the entire visible region, so it can be used as a good second harmonic generator.

From the literature, we came to know that one can easily optimize the growth conditions and tailor the physico-chemical properties in a desired manner by the addition of suitable dopants.

2 Experimental procedure

2.1 Synthesis of LAPCl crystal

It is observed from earlier investigations that, the temperature coefficient of solubility is relatively large and positive, so it is possible to grow large single crystals of LAPCl by slow cooling and slow evaporation methods [26]. So the slow evaporation method is employed for the growth of pure and doped LAPCl. The pure LAPCl single crystals are synthesized by the reaction of AR grade reactants L-arginine and Perchloric acid in the equimolar ratio in Millipore water of resistivity 18.2 M Ω-cm according to the following chemical reaction (Fig. 1).

Since $MnCl_2$ dissociates into Mn^{2+} and Cl^- ions, which is important for the incorporation into the parent crystal, the doped crystals are prepared by adding 1, 2 and 3 mol% of $MnCl_2$ into the saturated solution of the LAPCl at ambient temperature. Small seed crystals are formed by spontaneous

nucleation within a week. The defect-free good quality crystals are chosen for further growth. Good quality crystals with a slightly brown colour of dimensions $15 \times 4 \times 2$ mm^3, $18 \times 4 \times 2$ mm^3 and $10 \times 3 \times 21$ mm^3 are obtained according to the increasing doping concentration after a month. The synthesized crystals are purified further by re-crystallization. The as-grown crystals of pure and $MnCl_2$ doped LAPCl are shown in Fig. 2a–d. As the doping percentages increase, the LAPCl crystal becomes darker and darker.

3 Characterization techniques

The diffracting planes of the crystal are indexed from the Powder X-ray diffraction data. The diffraction data were collected using a Rigaku Miniflex 600 X-ray diffractometer with CuK$_\alpha$ radiations. The presence of the $MnCl_2$ in the LAPCl single crystals is confirmed through Laser-Induced Breakdown Spectroscopy (LIBS) and Energy Dispersive X-ray Analysis (EDX). The SEM integrated with EDX was done with Hitachi S-3200N scanning electron microscope operating at 20 kV (EDX system: Oxford INCA system with PentaFET Precision INCA X-act). The linear optical characteristics of the pure and doped LAPCl single crystals are studied using Jasco V 670 spectrophotometer in the wavelength range 200 nm to 700 nm. The nonlinear absorption coefficients of the pure and doped LAPCl single crystals are found using the open aperture Z-scan technique [27], in which the transmittance of the material is measured for different input light intensities. For this, a laser beam is first focused using a convex lens (the focal point is taken as $z = 0$), and the sample is moved through the beam path from $-z$ to $+z$, with the transmittance being measured at fixed intervals. From the transmission values thus collected for various sample positions with respect to the beam focus, the nonlinear absorption coefficient of the sample can be calculated using appropriate equations. The photoluminescence (PL) spectra of the pure and doped crystal are recorded using Horiba Fluorolog Fluorescence Spectrometer.

The dielectric properties of the pure and doped crystals are studied by the measurement of capacitance and dielectric loss using HIOKI 3532 LCR HiTESTER. The polarizability calculations are also done from the high-frequency dielectric constant. Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC) are carried out for the
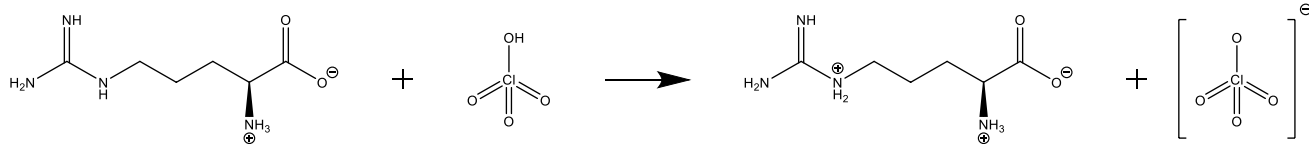

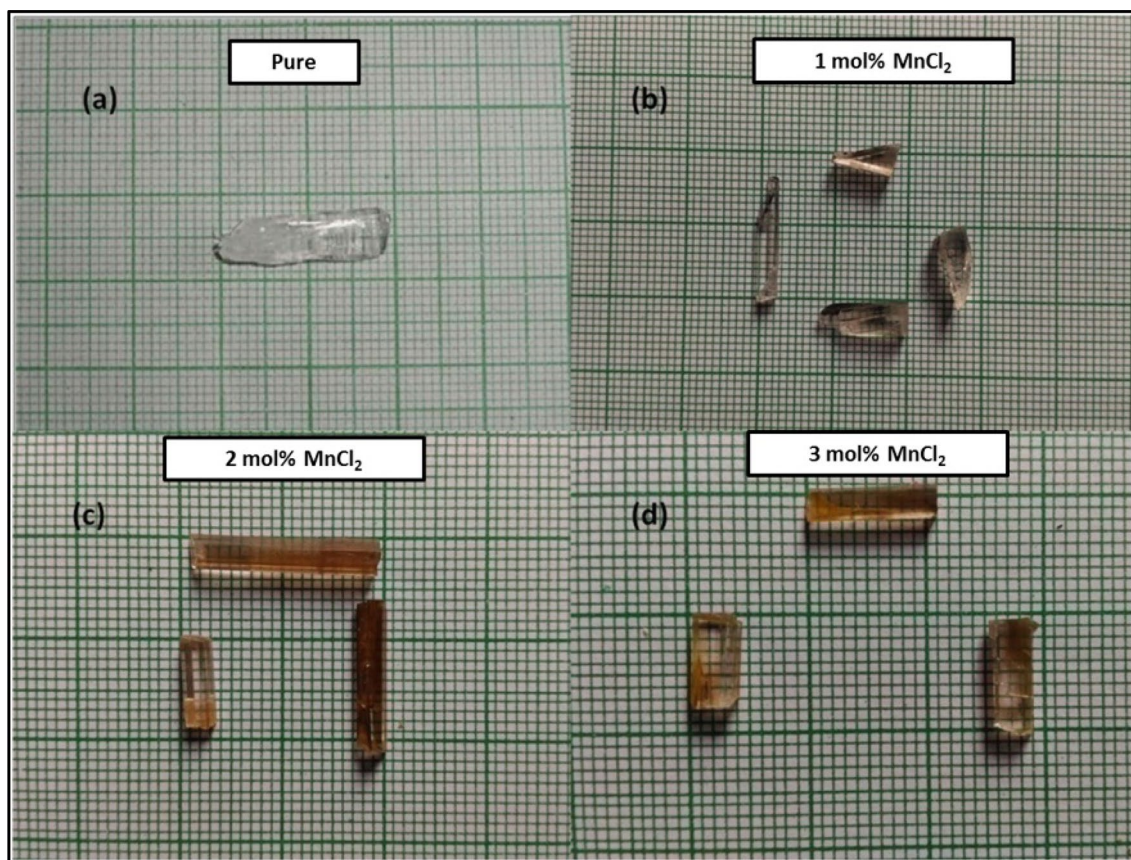Fig. 1 Structural formulae representation of reactants and products

Fig. 2 **a** Pure LAPCl crystal, **b–d** MnCl$_2$ doped LAPCl crystals

pure and doped samples of LAPCl using PerkinElmer's STA 6000 Simultaneous Thermal Analyzer within the temperature range 35 °C to 400 °C. The measurements are done in nitrogen atmosphere with a heating rate of 10 °C/min.

4 Results and discussion

4.1 Powder X-ray diffraction (PXRD) study

The structure of the pure and doped LAPCl single crystals is confirmed through Powder X-ray Diffraction (PXRD) analysis and is given in Fig. 3. The reference X-ray diffraction profile of the pure LAPCl is generated from the crystallographic information file (.cif) deposited in the Cambridge Structural Database (CSD) [28] by Srinivasan and Rajaram [11] with reference code 110014(CSD –REFCOD: 110014). The powder X-ray diffraction profile is generated using the Mercury software [29]. The powdered samples are scanned over the range 10° to 60° with CuK$_\alpha$ radiation of the wavelength of 1.54059 Å at room temperature. The changes in the lattice parameters are studied by indexing the powder pattern of pure and doped LAPCl single crystals using EXPO

2014 [30] program. The calculated crystal parameters are tabulated in Table 1. From the table, it is observed that the cell parameters of pure and doped crystals are almost the same and it belongs to the orthorhombic crystal system with space group $P2_12_12_1$. However, there is an increase in unit cell volume with the increase in doping concentration. The slight changes in the peak intensities on the X-ray diffraction profiles of doped LAPCl crystal as compared to the pure may be due to the occurrence of strain in the lattice due to the presence of the dopant MnCl$_2$.

4.2 Laser-induced breakdown spectroscopic (LIBS) studies

The LIBS spectra of pure and MnCl$_2$ doped LAPCl crystals are shown in Fig. 4a, b.The complete experimental setup can be found elsewhere [31]. In brief, the plasma produced on the sample surface by focusing a 7 ns Nd:YAG laser pulse operating at 532 nm with a repetition rate of 1 Hz. Figure 4a, b leads to spectral emissions in 245–260 nm and 260–850 nm region respectively.

It is observed that, the LIBS spectra contain several discrete peaks which correspond to the emission of the different

Fig. 3 X-ray diffraction patterns of pure and MnCl$_2$ doped LAPCl single crystals
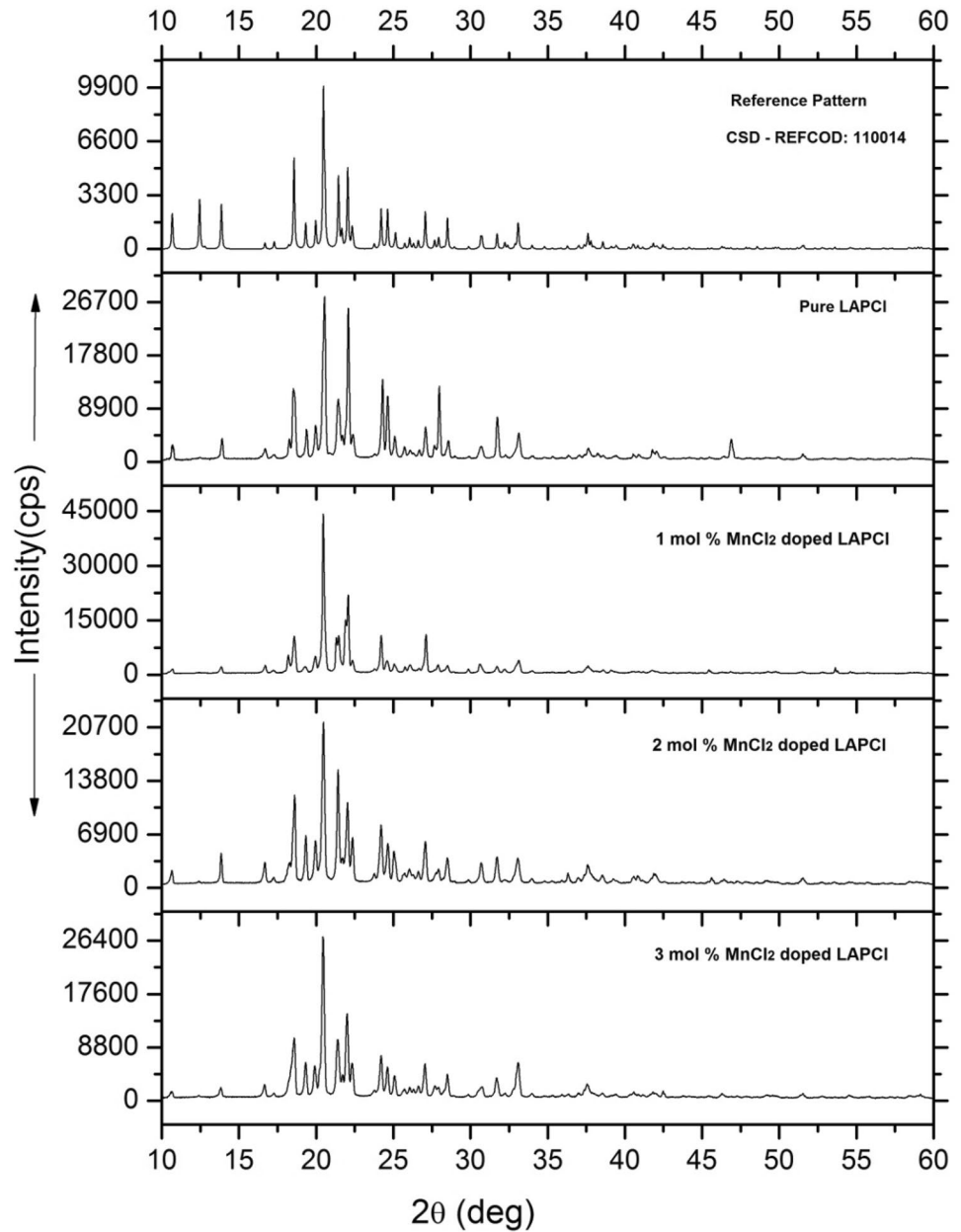
Table 1 Lattice parameters of pure and MnCl$_2$ doped LAPCl single crystals

Lattice parameters	Pure LAPCl	1 mol % MnCl$_2$ doped LAPCl	2 mol % MnCl$_2$ doped LAPCl	3 mol % MnCl$_2$ doped LAPCl
a (Å)	13.8192	13.8273	13.8319	13.8390
b (Å)	16.5738	16.5765	16.573	16.5812
c (Å)	5.0827	5.0817	5.0813	5.0822
α (deg)	90.000	90.000	90.000	90.000
β (deg)	90.000	90.000	90.000	90.000
γ (deg)	90.000	90.000	90.000	90.000
Volume (Å^3)	1164.15	1164.78	1164.84	1166.22
Space group	$P2_1 2_1 2_1$	$P2_1 2_1 2_1$	$P2_1 2_1 2_1$	$P2_1 2_1 2_1$
Crystal system	Orthorhombic	Orthorhombic	Orthorhombic	Orthorhombic
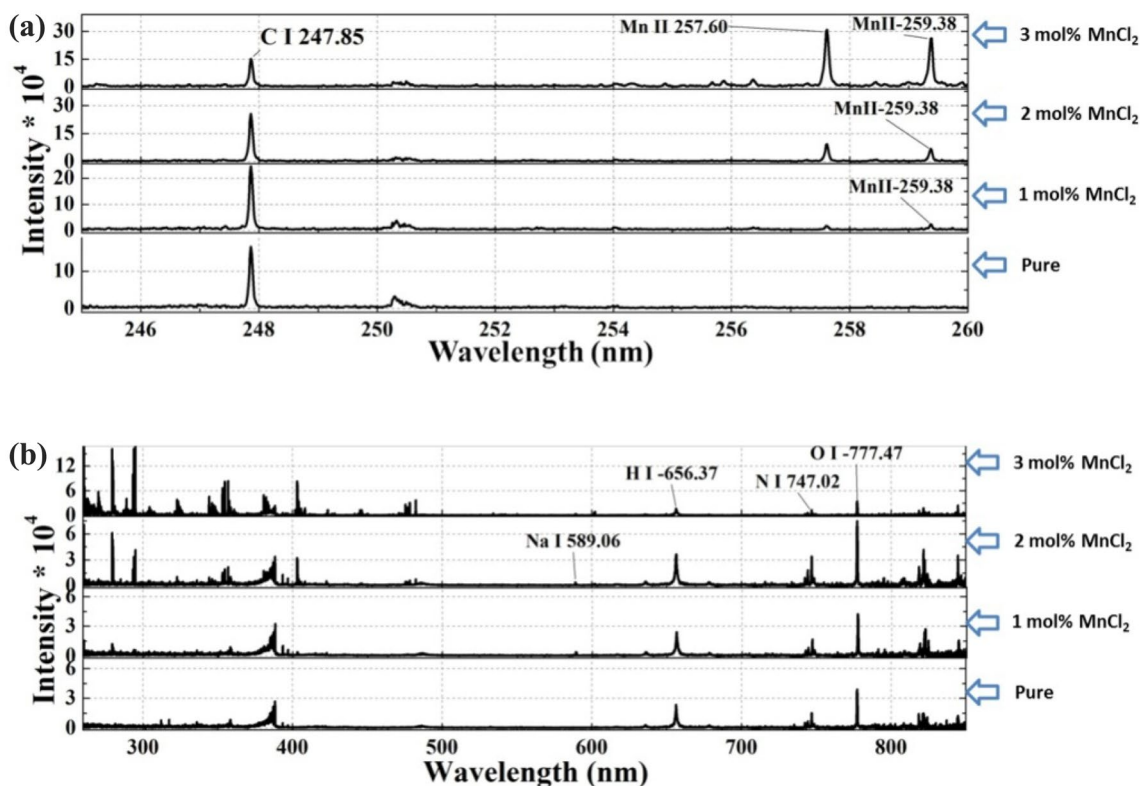
Fig. 4 Typical LIBS spectra of pure and MnCl$_2$ doped LAPCl single crystal. **a** and **b** represents the spectral data in 245–260 nm and 260–850 nm regions respectively

elements present in the sample. All the peaks have been identified and assigned to different neutral and ionic states using Atomic Spectra Database (ASD) available on the NIST website [32]. All the characteristic emission lines are represented at their corresponding wavelengths as illustrated in Fig. 4a, b. The presence of Na, Ca and Mg lines could be due to the impurities from the time of material preparation/handling. Chlorine (Cl) spectral lines are not observed in the LIBS spectra as most of the strong Cl spectral lines are observed in deep UV region (80–140 nm) where the spectral sensitivity of the spectrometer starts from 220 nm.

It has been observed that the spectral intensity of the characteristic manganese line (Mn II-259.38 nm) is increased almost linearly with the doping percentage as shown in Fig. 5.

4.3 Energy dispersive X-ray analysis (EDX)

The incorporation of the manganese (Mn) and chlorine (Cl) in the LAPCl single crystals is also confirmed by using the Energy Dispersive X-ray Analysis (EDX). It can be seen that the estimated percentages of the manganese is less than chlorine. This is because the element chlorine is a part of the parent sample LAPCl. The Table 2 gives the atomic percentages (%) of the elements present in pure and doped LAPCl single crystal. From Fig. 6a it is clear that the characteristic peaks of
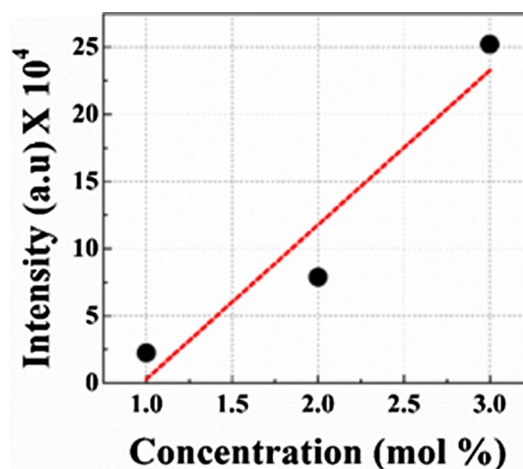
Fig. 5 Concentration against observed intensity of the Mn line of the LIBS spectra. The dotted line represents the fitted data and dots represent the experimental data

the elements manganese (MnKα_1 = 5.898 keV) and chlorine (ClKα_1 = 2.622 keV) [33, 34] are present in the spectra. The element maps in Fig. 6b show the spatial distribution of elements in the sample. The presence of bright spots in the element maps indicates that some of the doping material form areas of concentrated Mn and O on the material surfaces.

Table 2 Atomic percentages of pure and MnCl$_2$ doped LAPCl single crystals

Element	Atomic percentage (%)			
	Pure LAPCl	1 mol% MnCl$_2$ doped LAPCl	2 mol% MnCl$_2$ doped LAPCl	3 mol% MnCl$_2$ doped LAPCl
OK	76.41	76.02	71.00	75.11
ClK	23.59	22.87	27.20	22.96
MnK	–	1.12	1.79	1.93

However, the further studies on the material properties show that, doping is strong enough to alter some material properties of the sample.

4.4 Optical studies

The knowledge of the optical characteristics of the material such as the range of optical transparency or cut off wavelength and optical band gap are essential for the frequency conversion applications. The study has been carried out using the method of Diffuse Reflectance Spectroscopy (DRS). The reflectance data are collected from the finely powdered samples of pure and MnCl$_2$ doped LAPCl single crystals. If the sample is infinitely thick i.e., if a further increase in thickness will not change the reflectance, then we can denote the reflectance by the term $R_\infty \left(R_\infty = \frac{R_{sample}}{R_{standard}} \right)$ [35]. For the calculation of band gap and Urbach energy one should calculate the absorption coefficient of the material. Kubelka and Munk [36] formulated a relation using scattering coefficient (S), the absorption coefficient (K), and R_∞.

$$\frac{K}{S} = \frac{(1 - R_\infty)}{2R_\infty} \equiv F(R_\infty) \tag{1}$$

where $F(R_\infty)$ is the remission or Kubelka–Munk function. Reflectance spectra of pure and MnCl$_2$ doped LAPCl crystals are shown in Fig. 7. The reduction in the transmission window and optical redshift for doped crystals are evident in the figure. Previous studies on doping in L-arginine acetate (LAA) single crystals showed that the optical absorption character of the pure LAA changed considerably due to the dopant Lithium Chloride (LiCl) [37]. An optical redshift in the cut off wavelength and corresponding reduction in the band gap (5.49 to 5.35 eV) is observed in the case of chromium-doped L-arginine Phosphate Monohydrate (LAP:Cr) single crystals [38].The optical band gap of the material is calculated using Tauc plot [39] method. The Tauc equation is given by,

$$(\alpha h\vartheta)^2 = C_1\left(h\vartheta - E_g\right) \quad \text{[for direct inter band transition]} \tag{2}$$

where C_1 is a parameter which depends on transition probability, α is the linear absorption coefficient, h is Plank's

constant, ϑ is the frequency and E_g is the optical band-gap. If the material scatters in perfectly diffuse manner Kubelka–Munk absorption coefficient, K becomes equal to 2α (K = 2α) [40]. Thus we can rewrite the Tauc equation using Kubelka–Munk function as given below

$$\left[F(R_\infty)h\vartheta\right]^2 = C_2\left(h\vartheta - E_g\right) \tag{3}$$

The extrapolation of the linear portion of the curve to the X-axis in the plot of $\left[F(R_\infty)h\vartheta\right]^2$ versus $h\vartheta$ (Fig. 8), gives the value of the band gap. It is observed that the band gap of LAPCl crystals decreases as MnCl$_2$ concentration increases and thereby increases the conductivity of the doped crystals. The measured values of band gaps are given in Table 3.

The refractive index of the material is calculated using the formula put forward by Reddy and Nazeer Ahammed [41], and is given by

$$n^4\left(E_g - 0.365\right) = 154 \tag{4}$$

where n^4 is the fourth power of refractive index and E_g is the band gap, and the values are tabulated in Table 3. The addition of dopant causes a small change in the refractive index.

Tailing in the forbidden band gap due to the presence of defects have been studied using the method developed by Urbach. During the electronic transition between the top of the valence band to the bottom of the conduction band, any disorder encountered by the electron causes density of states tailing into the energy gap. This defect tail extending into the energy gap is called Urbach tail [42]. The spectral dependence of the absorption coefficient α or $F(R)$ in the electronic transition region involving the tail states can be represented by Urbach rule [43] and is given by

$$\alpha = \alpha_0 e^{\frac{h\vartheta}{E_u}} \tag{5}$$

where α_0 is a constant, $h\vartheta$ is the photon energy and E_u is the Urbach energy that reflects the structural disorder or the width of the exponential absorption edge.

Taking the logarithm of the Eq. (5), we get,

$$ln\alpha = ln\alpha_0 + \frac{h\vartheta}{E_u} \tag{6}$$

which is a linear equation with slope $\frac{1}{E_u}$ and $ln\alpha_0$ as Y intercept. Therefore the inverse of the slope of the straight line portion in ln $[F(R)]$ versus $h\vartheta$ plot gives the value of Urbach energy. The Urbach plot is depicted in Fig. 9.

The obtained optical parameters are tabulated in Table 3. It is observed that the cut off wavelength, Urbach energy and the refractive index of the doped crystal increases as the concentration of MnCl$_2$ increases while that of the band gap energy decreases.

Fig. 6 **a** EDX spectra of pure and MnCl$_2$ doped LAPCl single crystals. **b** SEM images and Element map of pure and MnCl$_2$ doped LAPCl single crystals

Pure LAPCl Cl Ka

Pure LAPCl O Ka

Pure LAPCl signal overlay

1 mol% Cl Ka

1 mol% O Ka

1 mol% Mn Ka

1 mol% signal overlay

Fig. 6 (continued)

2 mol% Cl Ka

2 mol% O Ka

2 mol% Mn Ka

2 mol% signal overlay

3 mol% Cl Ka

3 mol% O Ka

3 mol% Mn Ka

3 mol% signal overlay
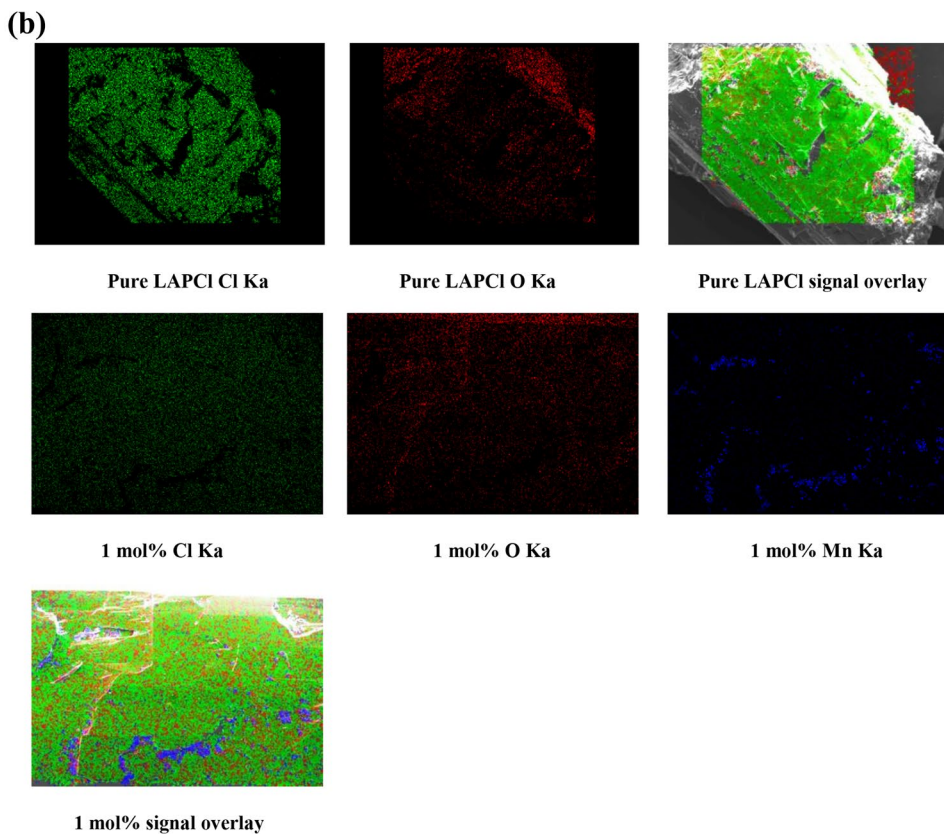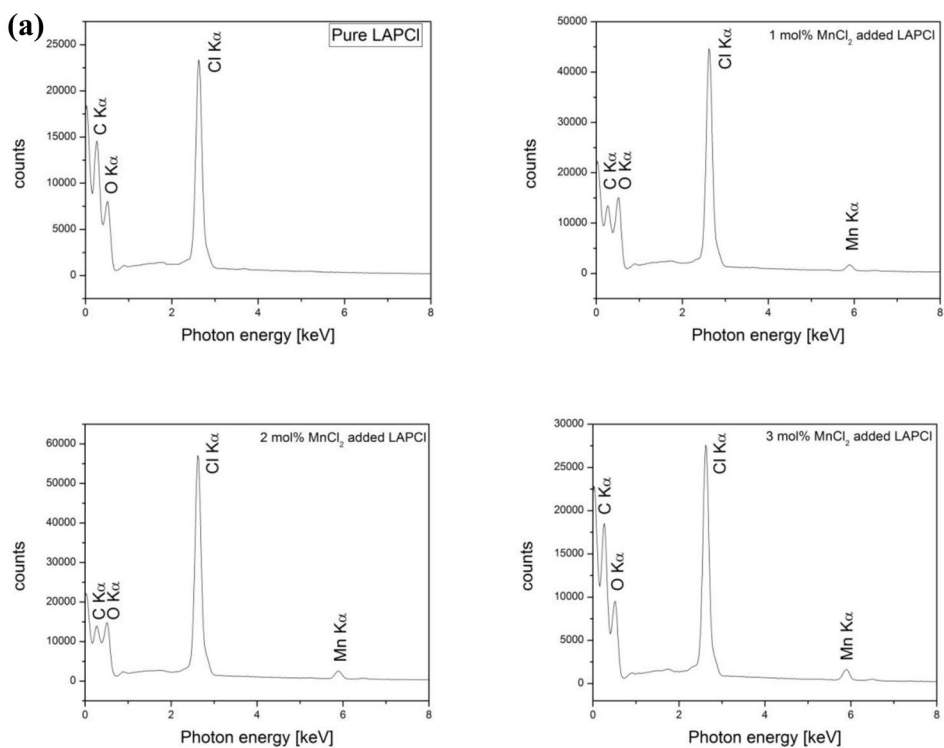
Fig. 7 Reflectance spectra of pure and MnCl$_2$ doped LAPCl single crystals

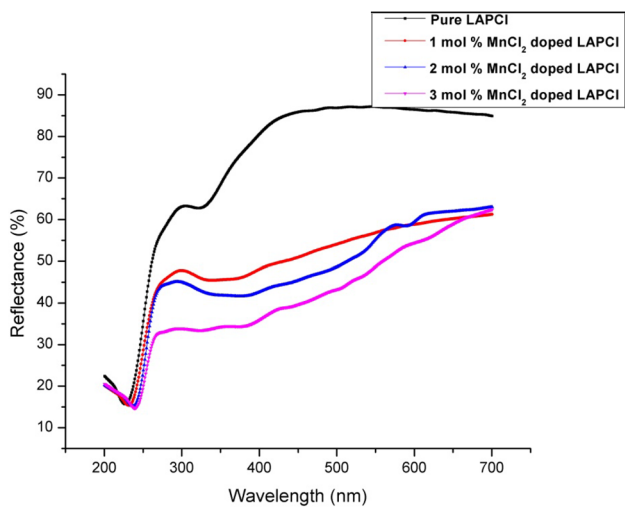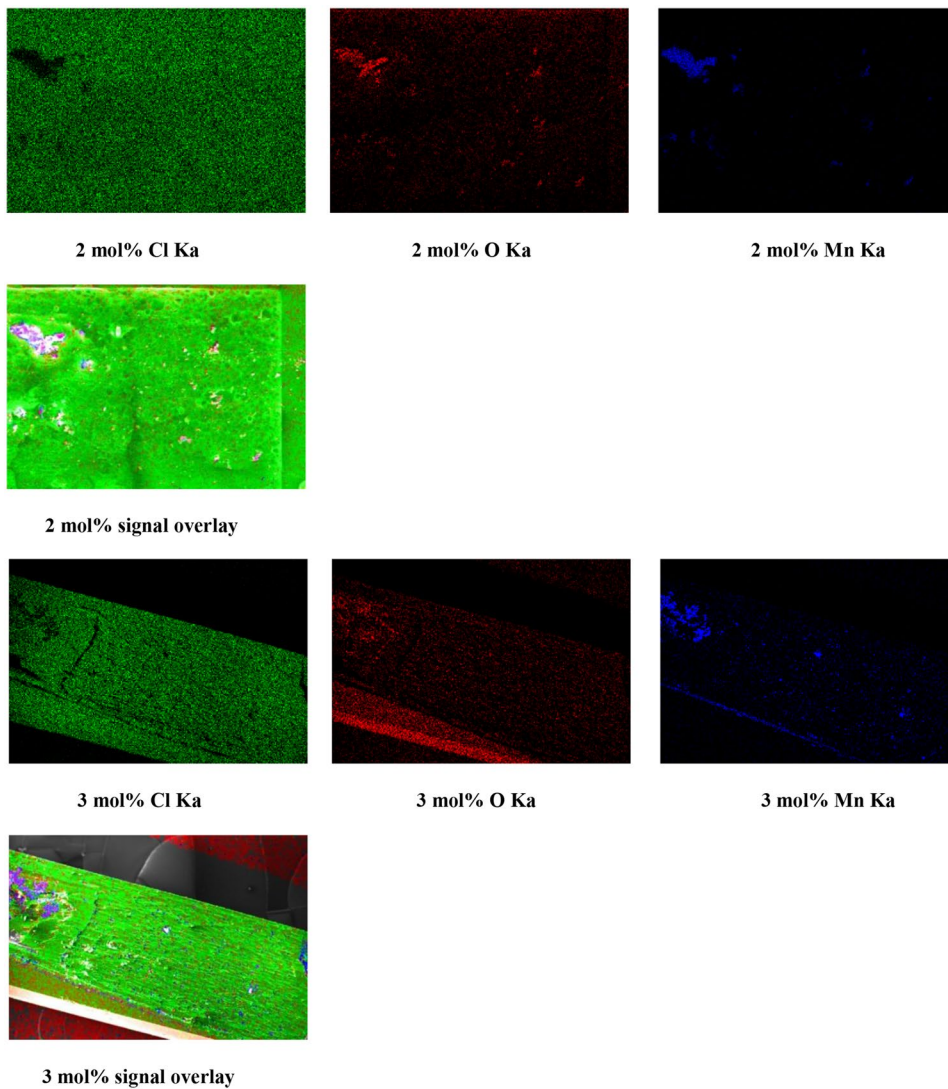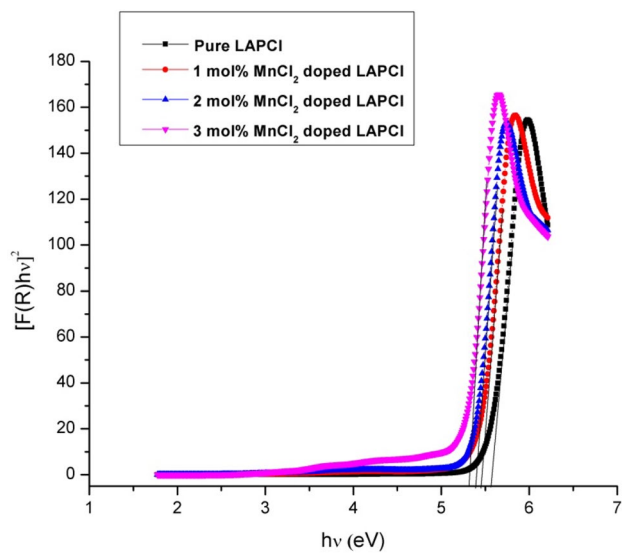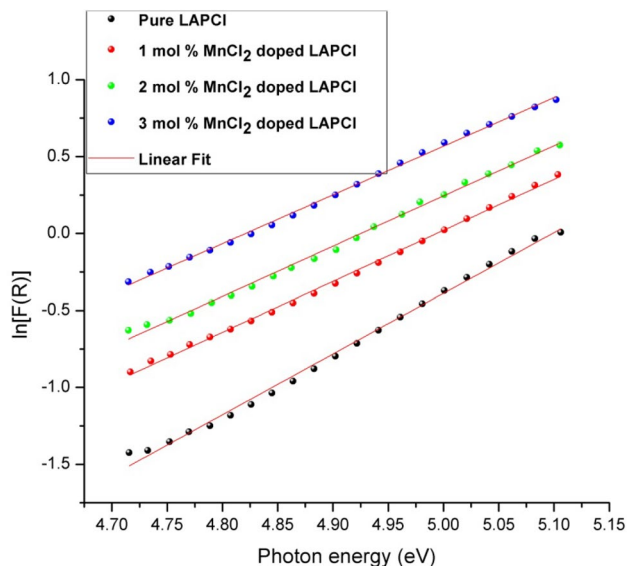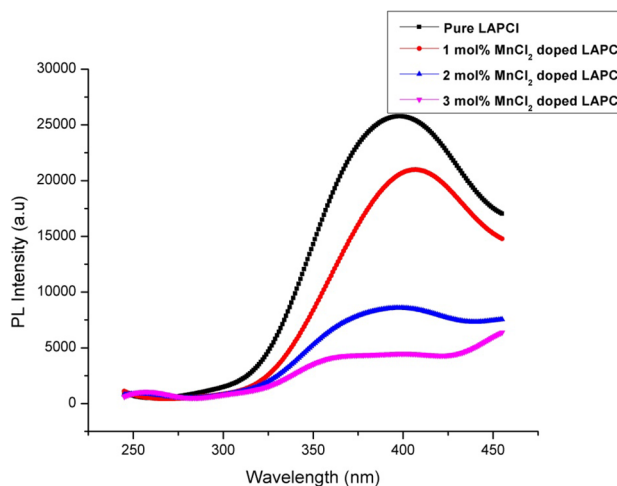**Fig. 8** Tauc plot of pure and MnCl$_2$ doped LAPCl single crystals

Table 3 Optical parameters of pure and MnCl$_2$ doped LAPCl single crystals

Sample	Cutoff wavelength (nm)	Bandgap energy E_g(eV)	Urbach energy E_u (meV)	Refractive index (n)
Pure LAPCl	227	5.56	252	2.33
1 mol% MnCl$_2$ doped LAPCl	230	5.45	301	2.34
2 mol% MnCl$_2$ doped LAPCl	235	5.39	306	2.35
3 mol% MnCl$_2$ doped LAPCl	239	5.31	315	2.36

Fig. 9 Plot of $ln[F(R)]$ versus photon energy

Fig. 10 PL spectra for pure and MnCl$_2$ doped LAPCl crystals

Photoluminescence studies give information about different energy states which are responsible for the radiative recombination between the valence band and conduction band. The LIBS and EDX studies clearly show the presence of manganese and chlorine ions in the doped sample with increasing MnCl$_2$ concentration. Photoluminescence (PL) spectroscopy can be used to study the influence of metallic ion Mn^{2+} at the inter-band transition of electrons. Transition metal ions have an incompletely filled d-shell. Mainly the number of 3d electrons and the crystal field determine the optical properties of the transition metal ions such as Mn^{2+}. The Mn^{2+} ion has 3d^5 electronic configurations and is hole attractive in nature. The PL spectra of pure and doped LAPCl are shown in Fig. 10. It is observed that the intensity of the spectra decreased with doping concentration and the peak centers show slight shifts. All the peaks are found near to the visible region. The peak of the pure LAPCl centered at 402 nm (3.09 eV) is shifted to 410 nm (3.02 eV) for 1 mol% of MnCl$_2$ concentration. For 2 mol% and 3 mol% of MnCl$_2$ concentration, the peak centers shifted towards the lower wavelength region. The observed peak centers are 407 nm (3.05 eV) and 393 nm (3.15 eV) respectively. The addition

of the metallic dopant increases the defect states in the material and causes to the reduction in intensity of the PL peaks.

4.5 Z-scan measurement

Z-scan measurements of the pure and MnCl$_2$ doped LAPCl single crystals are carried out using the frequency-doubled output (532 nm) of a Q-switched Nd:YAG laser (MiniliteI-Continuum). The laser pulse duration is 5 ns. The laser had a Gaussian beam cross-section and the focal length of the used plano-convex lens is 10 cm. The LAPCl sample is dissolved in double distilled water and the solution is taken in a 1 mm path length glass cuvette, which is fixed on a stepper motor controlled translation stage. The sample is moved through the beam path [from $-z$ to $+z$]. The sample experiences different optical intensities at different positions. The transmitted energy at each position is measured using a pyroelectric detector (Rjp 735, Laser probe Inc). From the collected data, a graph between sample position (z) and normalized transmittance (T$_{nor}$) can be plotted. The nonlinear nature of the sample can be identified from the shape of the obtained graph. A smooth valley shaped curve symmetric about the focal point (z=0) reveals the non-linear absorptive nature of the sample. The open aperture Z-scan curves obtained for the pure and doped crystals are shown in Fig. 11.
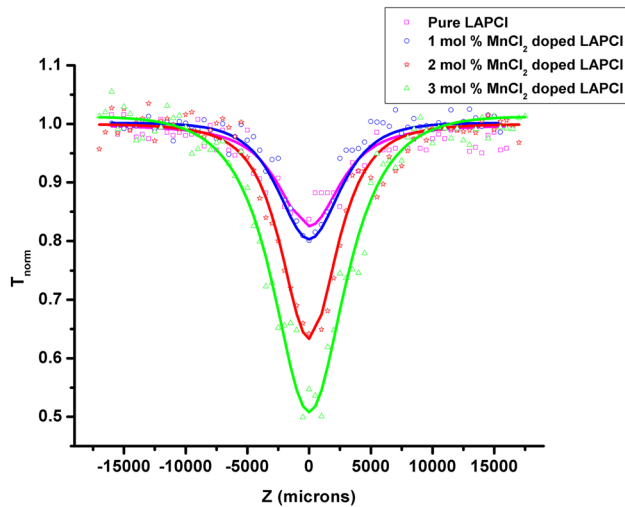
Fig. 11 Open aperture Z-scan curves measured in pure and doped LAPCl crystals, using 5 ns laser pulses at 532 nm

For estimating the nonlinear optical parameters, we note that for a spatially Gaussian laser pulse of energy E_{in}, the fluence (energy density) $F_{in}(z)$ at any position z can be obtained from the relation,

$$F_{in}(z) = 4(ln2)^{\frac{1}{2}} E_{in} \Big/ \pi^{\frac{3}{2}} \omega(z)^2 \tag{7}$$

where the beam radius $\omega(z)$ is given by

$$\omega(z) = \omega_0 \left[1 + \left(\frac{z}{z_0} \right)^2 \right]^{\frac{1}{2}} \tag{8}$$

ω_0 is the focal spot size and z_0 is the Rayleigh length given by $z_0 = \pi\omega_0^2/\lambda$. In general, the nonlinear transmission will have contributions from both reverse saturable absorption (RSA, sometimes referred to as effective two-photon absorption in literature) [44, 45] and saturable absorption (SA) [46]. The net nonlinear absorption coefficient is then given by,

$$\alpha(I) = \frac{\alpha_0}{1 + \left(\frac{I}{I_s} \right)} + \beta I \tag{9}$$

where α_0 is the linear absorption coefficient, I and I_s are input laser intensity and saturation intensity, respectively, and β is the RSA coefficient. I_s and β can be obtained by fitting the nonlinear pulse propagation equation (Eq. 10) numerically to the measured transmission data. The obtained values are tabulated in Table 4.

$$\frac{dI}{dx} = -\left[\frac{\alpha_0}{\left(1 + \frac{I}{I_s}\right)} + \beta I \right] I \tag{10}$$

From Fig. 11, it is clear that the experimental data and the theoretical fits are in good agreement with each other. The optical limiting curves for the samples, which are shown in Fig. 12, are calculated from Fig. 11. From the figures and the table, it can be seen that the RSA coefficient and the optical limiting efficiency increased with the doping concentration. Because of the good limiting efficiency, these materials have the potential to be used as efficient optical limiters for the protection of human eyes and sensitive optical detectors from harmful laser radiation.
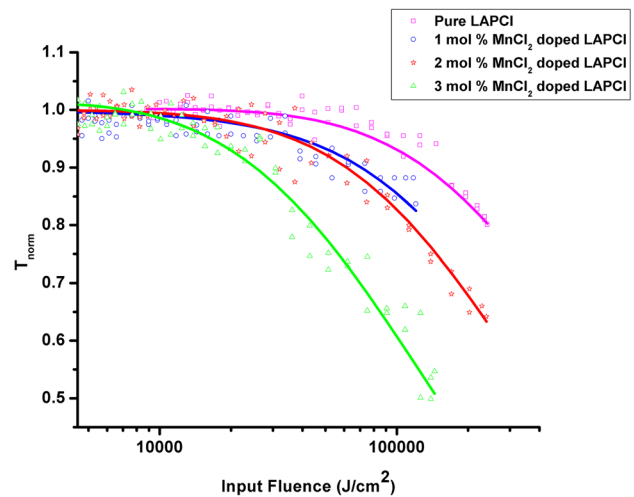
Fig. 12 Optical limiting curves of pure and doped LAPCl crystals, calculated from the open aperture Z-scan curves

Table 4 Nonlinear optical parameters (β and I_s) determined for pure and MnCl$_2$ doped LAPCl single crystals, at the excitation wavelength of 532 nm

Sample name	Linear transmission	Energy (μJ)	Spot radius ($*10^{-6}$) m	Absorption coefficient β ($*10^{-11}$) m/W	Saturation intensity I_{Sat} ($*10^{12}$) W/m^2
Pure LAPCl	0.91	200	23	0.72	10
1 mol% MnCl$_2$ doped LAPCl	0.88	100	23	1.3	15
2 mol% MnCl$_2$ doped LAPCl	0.91	150	20	1.5	6
3 mol% MnCl$_2$ doped LAPCl	0.91	100	21	4.0	1

4.6 Dielectric studies

The dielectric constant of the material is analyzed as a function of frequency for different doping concentrations. The dielectric constant was calculated from the measured capacitance using the equation,

$$\varepsilon_r = \frac{Cd}{\varepsilon_0 A} \tag{11}$$

where 'C' is the capacitance, 'd' is the thickness of the crystal, 'ε_0' is the permittivity of free space and 'A' is the area of the crystal. The variations of the dielectric constant and dielectric loss as a function of frequency for different doping concentration are plotted in the Figs. 13 and 14. It is observed that the dielectric constant and loss decrease with frequency and attain almost a constant value at higher frequencies. This is because of the fact that the four polarizations namely, ionic, orientational, space charge and electronic are active at lower frequencies and contribute to the dielectric constant. But at high frequencies, the dipoles cannot change their orientation with the applied frequencies and are deactivated due to the 'inertia' of the dipoles to the sudden flipping of the field. So that dielectric constant decreases and attains a constant value at high frequencies. It is also inferred from the figures that the dielectric constant and dielectric loss increase with the dopant addition.

The ac conductivity of the material is also calculated from the dielectric constant, loss and applied frequency using the equation,

$$\sigma_{ac} = 2\pi f \varepsilon_0 \varepsilon_r \tan\delta \tag{12}$$

where 'f' is the applied frequency and 'tanδ' is the loss tangent. The conductivity curve (Fig. 15) reveals that ac

Fig. 14 Effect of MnCl$_2$ doping on the dielectric loss curve of LAPCl crystals

conductivity increases with applied frequency and doping concentration.

The electronic polarizability and related parameters can be calculated from the high-frequency dielectric constant (ϵ_∞) and some crystal sample parameters such as the number of valence electrons (Z) density of the material (ρ) and its molecular weight (M). The relation between electronic polarizability and Penn gap was established by Ravindra and Srivastava [47]. The valence electron plasma energy is given by

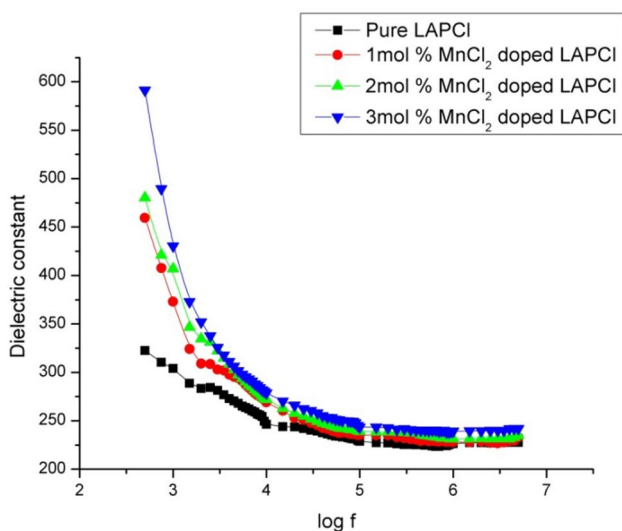$$\hbar\omega_p = 28.8 \left(\frac{Z\rho}{M} \right)^{\frac{1}{2}} \tag{13}$$

Fig. 13 Effect of MnCl$_2$ doping on the dielectric constant as a function of frequency
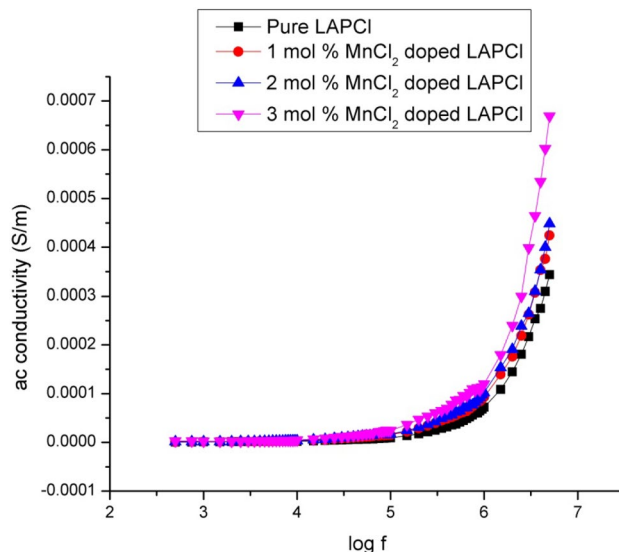
Fig. 15 Effect of MnCl$_2$ doping on the ac conductivity as a function of frequency

where Z is the total number of valence electrons, ρ is the density of the LAPCl sample, M is the molecular mass of the sample, $\hbar = \frac{h}{2\pi}$ and ω_p is the plasma angular frequency. The Penn gap E_p and Fermi energy E_F has a direct relation to $\hbar\omega_p$ and it can be written as

$$E_p = \frac{\hbar\omega_p}{(\varepsilon_\infty - 1)^{\frac{1}{2}}} \qquad (14)$$

and

$$E_F = 0.2948\left(\hbar\omega_p\right)^{\frac{4}{3}} \qquad (15)$$

The polarizability can be calculated from Penn gap using the following relation

$$\alpha = \left[\frac{\left(\hbar\omega_p\right)^2 S_0}{\left(\hbar\omega_p\right)^2 S_0 + 3E_p^2}\right] \times \frac{M}{\rho} \times 0.396 \times 10^{-24}\ \mathrm{cm}^3 \qquad (16)$$

where S_0 is a constant for the material given by,

$$S_0 = 1 - \left[\frac{E_p}{4E_F}\right] + \frac{1}{3}\left[\frac{E_p}{4E_F}\right]^2 \qquad (17)$$

The value of the electronic polarizability α can also be calculated from the Clausius–Mossotti equation, which is given by

$$\alpha = \frac{3M}{4\pi N_a \rho}\left[\frac{\varepsilon_\infty - 1}{\varepsilon_\infty + 2}\right] \qquad (18)$$

where N_a is the Avogadro number. The calculated solid state parameters are presented in Table 5. It is observed that the Polarizability values obtained from Penn gap method and using Clausius–Mossotti equation are increasing with doping concentration. The increase in the polarizability values is a good character enhancement for the increase in nonlinear optical properties of the material. The increase in nonlinearity is also evident from Z-scan studies. The variations in the polarizability with doping concentration are depicted in Fig. 16.
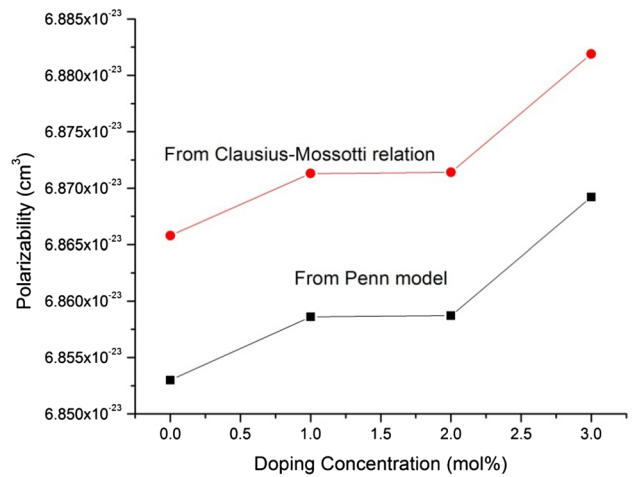
Fig. 16 Effect of MnCl$_2$ doping on polarizability of the LAPCl single crystals
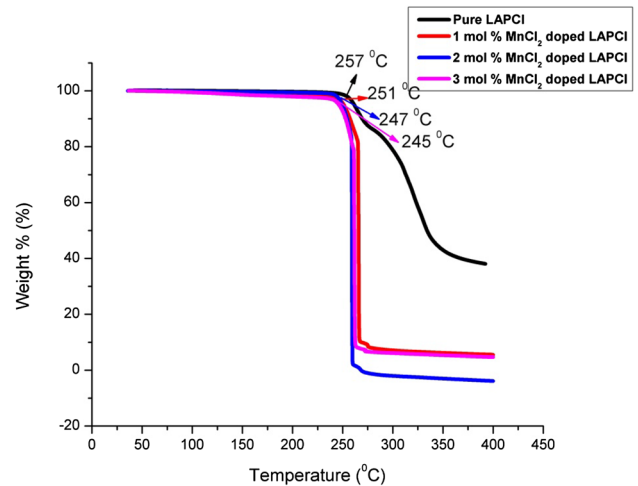
Fig. 17 TGA curves of pure and MnCl$_2$ doped LAPCl single crystals

Table 5 Electronic polarizability data of pure and MnCl$_2$ single crystals

Parameters	Pure LAPCl	1 mol% MnCl$_2$ doped LAPCl	2 mol% MnCl$_2$ doped LAPCl	3 mol% MnCl$_2$ doped LAPCl
Electron plasma energy $\left(\hbar\omega_p\right)$	21.9629 eV	21.9571 eV	21.9583 eV	21.9455 eV
Penn gap $\left(E_p\right)$	1.4577 eV	1.4415 eV	1.4354 eV	1.4136 eV
Fermi energy $\left(E_F\right)$	18.1320 eV	18.1256 eV	18.1269 eV	18.1129 eV
Polarizability (α) from Penn Model	6.8530×10^{-23} cm^3	6.8586×10^{-23} cm^3	6.8587×10^{-23} cm^3	6.8692×10^{-23} cm^3
Polarizability (α) from Clausius–Mossotti equation	6.8658×10^{-23} cm^3	6.8713×10^{-23} cm^3	6.8714×10^{-23} cm^3	6.8819×10^{-23} cm^3

4.7 Thermal studies

The TGA and DSC curves of pure and doped LAPCl single crystals are shown in Figs. 17 and 18 respectively. It is observed from the TGA curves that the decomposition of the pure LAPCl sample is two-step decomposition. The first step is found at 257 °C, which may be due to the elimination of the volatile substances such as CO_2, NH_3 and oxides of chlorine [12]. In the case of doped samples, the decomposition also happened in two steps but the temperature difference between these steps reduced appreciably and the complete weight loss occurred suddenly. It is seen that the decomposition temperature decreased with doping concentration. That is the thermal stability of the doped crystals is less than that of the pure crystals. This is due to the changes in the bond strengths by the addition of the metallic dopant into the pure LAPCl crystal. Same kind of thermal behavior is also seen Copper (Cu) and Magnesium (Mg) doped L-arginine phosphate (LAP) and sulphate substituted L-arginine phosphate (LASP) crystals. These crystals had shown reduction in their decomposition temperature compared to the pure LAP and LASP due to the changes in the bond strength by the addition of metallic dopants Cu and Mg [19]. The endothermic peak is observed at 257.04 °C followed by

Fig. 18 DSC thermograms of pure and $MnCl_2$ doped LAPCl single crystals
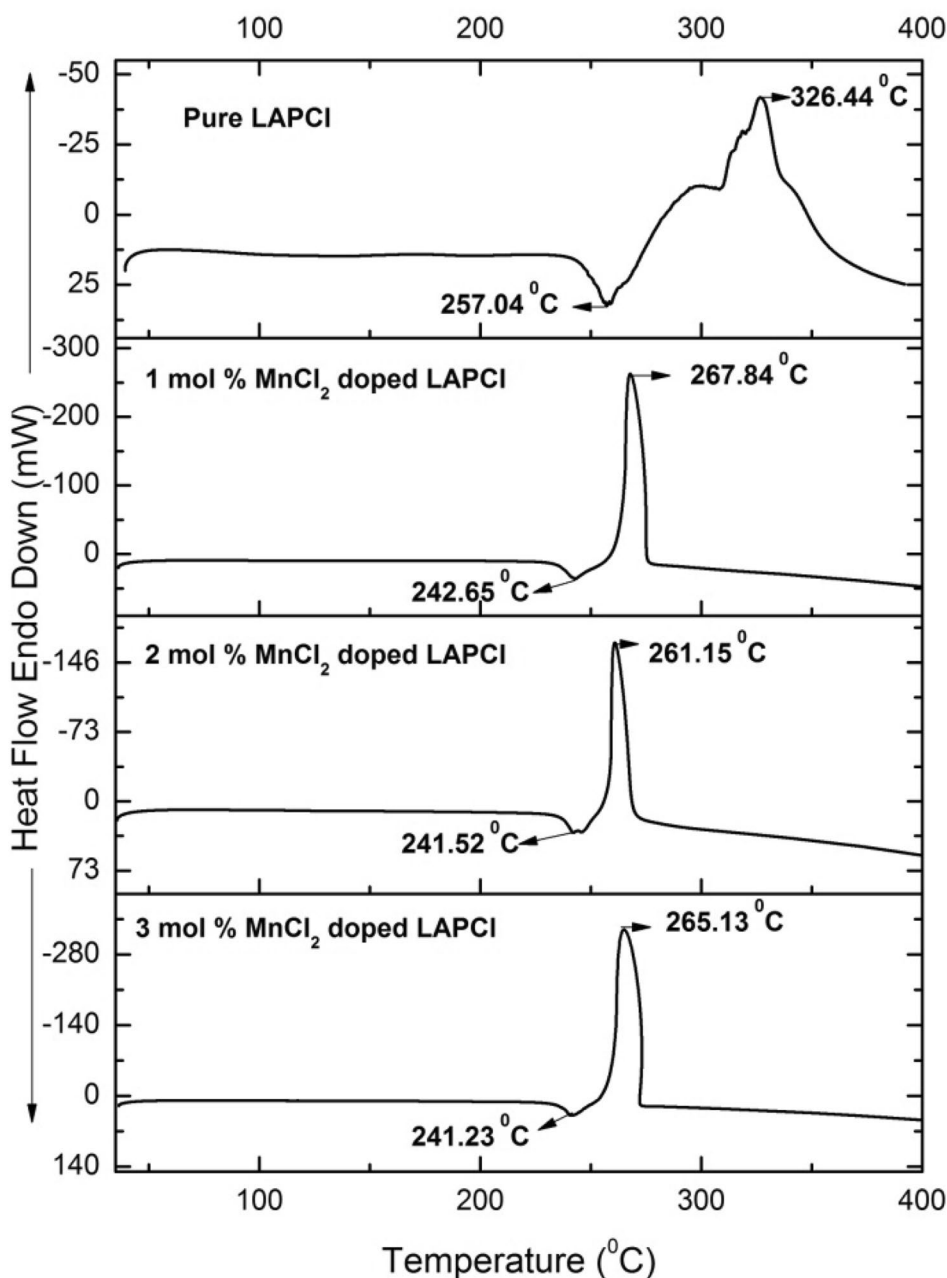
an exothermic peak for parent crystal. The endothermic peak found to be decreased with increasing the concentration of the dopants.

5 Conclusions

The pure and $MnCl_2$ doped LAPCl single crystals have been successfully grown by the slow solvent evaporation technique. The changes in the structure of pure and doped LAPCl crystals are studied using powder X-ray diffraction analysis. It is found that the cell parameters are almost same for pure and doped crystals. However there is a slight increment in the unit cell volume of the doped crystals. LIBS and EDX spectra confirmed the presence of dopant in the parent crystal. The optical studies proved that the band gap decreases whereas the refractive index and Urbach energy of the LAPCl increases with increasing the doping percentages. The dielectric properties such as dielectric constant, loss and ac conductivity are found to be increased by increasing the percentages of $MnCl_2$. The electronic polarizability is also increased in the doped crystal. The doped crystal is thermally less stable as compared with the parent crystal. The nonlinearity studies revealed that the RSA coefficient and the optical limiting efficiency of the parent crystal are increased in the doped crystal. Thus by varying the mole percentages of $MnCl_2$, one can easily tailor the optical and electrical properties of the LAPCl single crystals and can be made use for optical limiter applications in optoelectronic industry.

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Effect of Occupational Stress Factors on Motivation and Job Satisfaction: A Study of IT Professionals in Kerala

Anu Jossy Joy[1], Dr. Gireesh Kumar G.S.[2]

anujossyjoy@gmail.com , gireeshkartha@gmail.com ,

[1] Assistant Professor in Commerce, Nirmala College, Muvattupuzha, Kerala, India, 686661
[2] Principal, Henry Baker College, Melukavu, Kottayam, Kerala, India, 686652.

Abstract: *IT/ software professionals are the elite category workforce in the IT industry that paved the way for transformation of the Indian economy. The virtual work atmosphere and inherent characteristics of the IT job induced the professionals to work under a hectic environment. Global economic transformation has added something to this crisis. All these aspects lead to occupational stress among the young 'techies' in the sector and has broad effects at the hierarchical dimension. Current study investigates the job stress factors and the impact of these factors on the motivation and job satisfaction of software professionals in Kerala. An analysis of 438 professionals working in the three IT parks of Kerala was carried out. Regression analysis reveals that occupational stress factors negatively impact the motivation and job satisfaction of the professionals with role ambiguity, fear of obsolescence, grievance redressal mechanism, appraisal and promotion issues, work-life collision, strained relations and cognitive and other demands as major predictors.*

Key words: *Occupational stress, IT professionals, job stress factors, motivation, job satisfaction.*

I. Introduction

Stress is a person's reaction to a changing, requesting condition (LeBlanc, 2009). It is about one's capacity to manage the change, as opposed to whether the change leaves one to remain pleasant or not. Change happens unendingly and stress is the response of an individual when he is reacting to it. Attracting and retaining qualified and talented human resource is a prerequisite for the effective functioning of any business organisation.

Motivation and job satisfaction are two such perspectives fundamental to stay away from brain drain at any cost. While motivation is an internal urge that empowers the workers through activities towards the fulfillment of results, job satisfaction is the inward delight that gets from the accomplishment of results. There is a solid positive linkage between job satisfaction and motivation. Motivation is communicated as the readiness of an individual to apply high level of effort towards the accomplishment of organisational objectives, conditioned by the effort's capacity to fulfill some individual need. Job Satisfaction is considered as a positive passionate feeling resulting from jobs.

Stressed workers are generally poorly motivated, unhealthy, less productive and less satisfied at work (Goswami, 2015; Lopes & Kachalia, 2016; Park, 2007). Thus occupational stress factors contribute to decreased motivation, job satisfaction, decreased quality of work, high rate of absenteeism and staff turnover, diminished employee and organisational performance.

II.   *Literature Review*

Occupational stress is a developing concern (Altangerel, Ruimei, Elahi, and Dash, 2015; Bickford, 2005; Damle, 2012; Mirela and Madalina-Adriana, 2011; Ngomani, 2015) for workers in IT sector especially those who perform their jobs as software professionals. As an exceptionally gifted and testing territory of work, they are exposed to numerous contributors of stress such as demand, work overload, skill variety, time pressure, role ambiguity, role conflict, strained workplace relationships, keeping themselves updated with rapid technological change, responsibility towards the organisation, job insecurity, poor incentive structure etc. (Bamba, 2016; Jalagat, 2017; Karunanithy and Ponnampalam, 2013; Priya, 2016).

Numerous studies listed out the factors that act as motivators for software engineers in their work contexts. These aspects include recognition, job security, technically challenging work, feedback, flexible work arrangements, supportive management, employee participation, opportunities for growth and rewards and incentives (Beecham, Baddoo, Hall, Robinson, & Sharp, 2008; Cesar, 2014; Rehman, Mahmood, Salleh, & Amin, 2011; Sharp, Baddoo, Beecham, Hall, & Robinson, 2009). Unfair reward system, lack of promotional opportunities and less competitive pay were the main de-motivators for the software professionals (Rehman et al., 2011).

Job stress is emerged as one of significant predictors of various individual and organisational outcomes (Singh & Singh, 2009). Impact of stress on satisfaction has been a subject of thorough investigation in different work fields (Adenike, 2007). While some studies correlated the causes of job stress to motivation and job satisfaction (Cooper, Rout, & Faragher, 1989; Fairbrother & Warn, 2003; Gyamfi, 2014; Sabir, Akhtar, Zakir, Nadeem, & Rehman, 2014), others correlated, the level of job stress to motivation and satisfaction ((Abolghasemi, Azizi, Lasky, Kochaki, & Sarai, 2014; Adenike, 2007; Chaudhry, 2012; Khalatbari, Ghorbanshiroudi, & Firouzbakhsh,, 2013; Saeed & Farooqi, 2014; Sen, 2015; Zakkariya, 2015). Many studies in the area of job stress and satisfaction reported negative relation between the two (Bhatti, Hashmi, Raza, Shaikh, & Shafiq, 2011; Cooper et al., 1989; Hendrickson, 2007; Sivacharan & Vijayakumar, 2014).

III.   *Objective of the Study*

The main objective of the present study is to assess the *impact of occupational stress factors* on *motivation* and *job satisfaction* of software professionals in Kerala.

IV.   *Methodology*

Results of the study are based on a sample survey among software professionals working in various IT companies which were registered with NASSCOM and are located at Technopark, Infopark and Cyberpark,. Out of the 56 companies, 42 were selected and 438 responses were received out of 1120 questionnaires distributed. Only those professionals with more than 1 year of experience in the industry were chosen. Occupational stress dimensions were assessed through 37 statements and motivation and job satisfaction in terms of 13 statements. All the scale options were marked as 'strongly agree', 'agree', 'neutral, 'disagree'

and 'strongly disagree' on a 5-point Likert scale with scorings as 5,4,3,2 and 1 respectively. Pilot study was conducted among 100 software professionals. Final questionnaires were distributed both as hard copy and as online survey form by hosting a separate site for the purpose.

Factor analysis explored 11 constructs as occupational stress factors among the software professionals, 7 out of the 13 statements as measures of motivation and 6 as the measures of job satisfaction. Kaiser- Meyer- Olkin Measure of Sampling Adequacy was 0.883 in respect of motivation and job satisfaction and 0.891 for sources of occupational stress. Cronbach's alpha for motivation was 0.801 and that of job satisfaction was 0.747. Reliability coefficients for various constructs of occupational stress ranged from 0.682 to 0.835. The coefficients are much higher than 0.60 (Hair, Black, Babin & Anderson, 2015) and is close to the required minimum of 0.70 (Nunnally, 1978).

V.   *Limitations of the Study*

Data collection was a tedious and time consuming effort as the IT companies primarily rejected to cooperate with the survey and also due to busy schedule of the professionals. The study was limited to companies engaged in IT services and software alone. There were many small and medium sized companies in and outside the three technology parks that had been excluded from the study. Only one category employees designated as software professionals were included in the sample.

VI.   *Analysis and Interpretation of Data*

Results of the study are presented in the following sections:-

A. Descriptive Analysis

Descriptive analysis deals with the computation of mean and standard deviation scores for occupational stress dimensions, motivation and job satisfaction of the software professionals. Results are exhibited in Table 1.

Table 1 Descriptive Statistics on Occupational Stress Factors, Motivation & Job Satisfaction		
Factor label	**Mean**	**Standard Deviation**
Sources of Job Stress		
Appraisal and Promotion Issues (API)	3.17	1.08
Work-life Collision (WLC)	3.18	1.15
Workload (WL)	3.87	1.01
Cognitive and Other Demands (COD)	4.14	0.79
Job Insecurity(JI)	3.34	1.07
Strained Relations(SR)	3.81	0.98
Role Ambiguity (RA)	3.79	0.84
Fear of Obsolescence (FO)	3.43	1.11
Salary and Rewards (SaR)	3.42	1.08
Grievance Redressal Mechanism (GRM)	3.38	0.89
Time Pressure (TP)	3.39	1.02
Motivation and Job satisfaction		
Motivation	3.51	0.61
Job Satisfaction	3.33	0.69

Source: Primary data

Mean values calculated on various occupational stress factors vary between 4.14 and 3.17. Mean score of cognitive and other demands is the highest (4.14) and that of appraisal and promotion issues (3.17) is the least among 11 constructs of job performance. The mean scores of motivation and job satisfaction are 3.51 and 3.33 respectively. Execution of one sample t-test revealed that the mean values of all the sources of occupational stress, motivation and job satisfaction are significant at 5 per cent significance level ($p < 0.05$).

B. Correlation Analysis

Correlation analysis is made find out the relationship of sources of occupational stress to motivation and job satisfaction. Independent variables were the sources of occupational stress. Motivation and job satisfaction were assumed as the dependent variables. The correlation matrix is presented in Table 2.

Table 2 Correlation Matrix of Factors				
Job Stress Dimensions	**Motivation**		**Job Satisfaction**	
	Correlation	**Sig.(2 tailed)**	**Correlation**	**Sig.(2 tailed)**
Appraisal and Promotion Issues	-0.244	0.000*	-0.344	0.000*
Work-life Collision	-0.159	0.001*	-0.340	0.000*
Workload	-0.130	0.006*	-0.199	0.000*
Cognitive and Other Demands	-0.124	0.020*	-0.041	0.048*
Job Insecurity	-0.110	0.021*	-0.203	0.000*
Strained Relations	-0.138	0.009*	-0.198	0.021*
Role Ambiguity	-0.369	0.000*	-0.357	0.000*
Fear of Obsolescence	-0.290	0.000*	-0.322	0.000*
Salary and Rewards	-0.207	0.000*	-0.264	0.000*
Grievance Redressal Mechanism	-0.176	0.000*	-0.093	0.041*
Time Pressure	-0.199	0.000*	-0.272	0.000*

Source: Primary data   (* Correlation significant at 5 per cent level)

Pearson correlation indicated in Table 2 shows that the correlation between all the constructs of job stress to motivation and job satisfaction is significant at 5 per cent significance level ($p < 0.05$) and sources of occupational stress report negative correlation to motivation and job satisfaction. Job insecurity indicates the highest negative correlation and role ambiguity, the lowest negative correlation to motivation. In respect of job satisfaction, highest negative correlation is reported by Grievance redressal mechanism and the least by role ambiguity.

C. Regression Analysis

Result of the regression analysis performed to analyse the extent of effect of sources of occupational stress on motivation and job satisfaction is presented in Table 3.

Table 3 R^2 and Result of ANOVA				
R	**R^2**	**Adjusted R^2**	**F Value**	**Sig.**
0.473[a]	0.224	0.215	24.83	0.000*

| 0.509[b] | 0.260 | 0.251 | 30.14 | 0.000* |

a. Predictors (constant): RA, FO, GRM, API and COD Dependent Variable: Motivation
b. Predictors (constant): RA, API, FO,WLC and SR   Dependent Variable: Job Satisfaction

Occupational stress factors such as role ambiguity, fear of obsolescence, grievance redressal mechanism, appraisal and promotion issues and cognitive and other demands account for 21.5 per cent of the variation in motivation and role ambiguity, appraisal and promotion issues, fear of obsolescence, work-life collision and strained relations explain 25.1 per cent of the variation in job satisfaction among software professionals in Kerala. Both the regression model fits are statistically significant at 5 per cent level of significance, since the p value is (0.000) less than 0.05 as per the table. Beta coefficients along with the t values are explained in the following tables.

Table 4			
Beta Coefficients – Occupational Stress Factors (RA, FO,GRM,API,COD) and Motivation			
Model	Beta (β)	t-value	Sig.
(Constant)		8.65	0.000*
Role Ambiguity	-0.291	-6.61	0.000*
Fear of Obsolescence	-0.185	-3.87	0.000*
Grievance Redressal Mechanism	-0.130	-3.02	0.003*
Appraisal and Promotion issues	-0.131	-2.73	0.007*
Cognitive and Other Demands	-0.095	-2.17	0.030*

Predictors (constant): RA, FO, GRM, API, COD   Dependent Variable: Motivation
(*Significance at 5 per cent level)

Computation of t-test statistic in Table 4, for the significance of independent variables report that *Role ambiguity* with β of -0.291 (t = - 6.61), *Fear of obsolescence* with β of -0.185 (t = -3.87), *Grievance redressal mechanism* with β of -0.130 (t = -3.02), *Appraisal and promotion issues* with β of -0.131 (t = -2.73) and *Cognitive and other demands* with β of -0.095 (t = -2.17) are significant at 5 per cent significance level (p < 0.05). The effect of these five variables is negative as far as motivation is concerned.

Table 5			
Beta Coefficients –Stress Factors (RA, API, FO,WLC and SR) and Job Satisfaction			
Model	Beta(β)	t-value	Sig.
(Constant)		12.39	0.000*
Role Ambiguity	-0.265	-6.18	0.000*
Appraisal and Promotion issues	-0.182	-3.49	0.001*
Fear of Obsolescence	-0.144	-3.07	0.020*
Work-life Collision	-0.168	-3.33	0.001*
Strained Relations	-0.096	-2.18	0.030*

Predictors (constant): RA, API, FO, WLC and SR   Dependent Variable: Job Satisfaction
(*Significance at 5 per cent level)

Results shown in Table 5 shows that *Role ambiguity* with β of -0.265 (t = -6.18), *Appraisal and promotion issues* with β -0.182 (t = -3.49), *Fear of obsolescence* with β of -0.144 (t = -3.07), *Work-life collision* with β of -0.168 (t = -3.33) and *Strained relations* with β

of -0.096 (-2.18) are significant at 5 per cent significance level (p < 0.05). These five sources of occupational stress negatively contribute to job satisfaction of software professionals.

VII.   Conclusion

Regression analysis revealed that sources of occupational stress have profound significant impact on the motivation and job satisfaction of software professionals in Kerala. As far as motivation of the software professionals are considered, five out of the eleven stressors such as role ambiguity, fear of obsolescence, grievance redressal mechanism, appraisal and promotion issues and cognitive and other demands are emerged as the significant predictors with statistically significant negative impact. The present finding is in line with the findings of study conducted by Khalatbari et al. (2013) and Wani (2013) that job stress indicates negative relation to motivation. Role ambiguity, appraisal and promotion issues, work-life collision, fear of obsolescence and strained relations have significant negative impact on the job satisfaction of the professionals. These five constructs are the prominent stressors in determining the job satisfaction. The finding of the study corroborates the findings of previous studies (Adenike, 2007; Bhatti et al., 2011; Fairbrother & Warn, 2003; Hendrickson, 2007; Zeytinoglu et al., 2007) that there is a negative relation between job stress and job satisfaction. Other sources of occupational stress have no significant impact on motivation and job satisfaction of the professionals and efforts should be made to reduce the occupational stress emanating from these important predictors.

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Examining the honorificabilitudinitatibus of Teachers' Perceptions on job satisfaction, Locus of Control and Commitment in Selected self-financing Colleges in Kerala

Thomas Sebastian

Research Scholar, Department of Commerce

Bharathiyar University, Coimbatore

Email: *puthussery2000@gmail.com*

Dr. Gireesh Kumar G.S

Principal, Henry Baker College, Melukavu, Kerala

Email: *gireeshkartha@gmail.com*

Abstract

The present study was conducted on a sample of 150 Self-financing College teachers in the stateof Kerala. The sample was selected for this study randomly from districts of Kottayam and Trivandrum. The main purpose of the study is to identify the level of commitment towards working climate and charisma developed by the teachers themselves. The perception of distinct appearances may affect their work output: desires, demands, perceptions, acceptance, aptitude to learn, creativeness, including working atmosphere, remunerations, colleagues, leading pattern, legal frame work of organization, professional achievement. The policy makers have to make appropriate amendments in the current system of payment mechanism through accepting diversity in the present educational system. The Professional commitment of self-financing college teachers in the various districts was also found significantly different. The association between locus of control and teachers commitment were insignificant while applying correlation analysis. The results concluded that Locus of Control and job satisfaction negatively affected the commitment level of the teachers working in self-financing colleges.

Keywords: Job satisfaction, Locus of control, Commitment

Introduction

Teachers are the heart and soul of education. Honorificabilitudinitatibus means "the state of being able to achieve honours". Good values and attitudes developed by a good teacher and they are competent for getting honours. Honours will erected on through excellent performance in career. Better performance will come only through job satisfaction and better working climate. Job satisfaction, locus of control and commitment in teaching profession also motivates and inspires the teachers. High level of motivational factors helps the employees for better performance. Excellent commitment and locus of control lead them to job satisfaction. Quality of teaching depends upon many factors. It will decide with the aspirants and internal urge of working teachers along with the vision of leaders of the institution. The personal and professional eagerness in teaching of a teacher influence their professional commitment.Various studies reveal that the nation is built by its citizens, citizens are molded by teachers. The teachers accomplish their duties along with locus of controlgenerated from the working climate, families and colleagues etc.The success of any education system depends much on the requisite qualities of the teacher. It is the quality of teachers, which creates excellence in every walk of life. Effective teachers are required in the class room because even the best curriculum and most perfect syllabus remain ineffective in the absence of a good teacher. Attracting and retaining high quality teachers is a prime necessity for a strong education system because a high quality teaching staff is the cornerstone of a successful education system. One step in developing a high quality faculty is to understand the factors associated with teaching quality and retention.Educational institutions require committed teachers who care for the well-being of their institution and students.Thus teacher performance and commitment is a crucial input in the field of education. This research would

helpful for identifying the various problems faced by the teachers in their work climate and help to identify the level of locus of control and commitment towards job satisfaction of self-financing college teachers in Kerala.

Job Satisfaction

Sekar and Ranganathan (1988) analysed the issues of job satisfaction of college teachers and its relationship with certain factors. Salary, work characteristics, personnel policies, personal achievement in the profession, relationship with superiors, subordinates and colleagues, job security, recognition and appreciation and working conditions were identified as factors for job satisfaction.

Locus of Control

Julian B. Rotter (1954) defined Locus of Control may be the explained as an extent to which individuals think they could manage occasions inducing them. A person's locus is assumed as either internal or external. Internal refers to the person's belief they can control their life and External refers to a person's belief that environmental factors directs their decisions and life, which by chance or fate will not be influenced. An external locus of control may cause teachers to sense like everything that is happening in their life is because of the external influence, such as because of colleagues, administration and God's intervention. They don't feel responsible for their own outcomes. Whereas, teachers with internal locus of control feel that they can change agents in their lives and have control over what is going on in the environment.

Professional commitment

According to Meyer, J.P. and Allen, N. J. (1996), the three dimensions that form organizational commitment can also apply to occupational (professional) commitment. These three dimensions

are affective commitment, normative commitment and continuance commitment. Here affective commitment refers to the employees' emotional attachment to his or her occupation. Normative commitment reflects feelings of obligation to continue with your profession. Continuance commitment- This refers to an awareness of the costs associated with leaving the profession, such as difficulty in getting another job.

Literature Review

Many researchers and administrators have noticed the importance of job satisfaction on a variety of organizational variables (Chu et al., 2003). Job satisfaction is defined by Locke (1976) as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (p. 1304). A review of the literature on work-related attitudes indicated that job satisfaction is a multidimensional construct consisting of many dimensions. For example, Spector (1997) identified nine (9) dimensions of job satisfactions as follows: pay, promotion, supervision, fringe benefits, contingent rewards operating procedures (required rules and procedures), coworkers, nature of work, and communication.

Extant employee-attitude literature indicated the link between organizational commitments with various work-related outcomes. For example, in a meta-analysis Meyer, et al (2002) found that all three dimensions of commitment (affective commitment, continuance commitment and normative commitment) were negatively related to withdrawal cognition and turnover, and affective commitment was be more strongly related to with organization-relevant (i.e. attendance, performance, and organizational citizenship behavior) and employee-relevant (i.e. stress and work-family conflict). In a similar study, Khatibi, Asadi, and Hamidi (2009) found a significant negative relationship between job stress and

organizational commitment (i.e., affective commitment and normative commitment), but no significant relationship was found between job stress and continuance commitment.

The research explained that professors with greater internal Locus of control have high affective and normative commitment while others which have greater external Locus of control have high continuance commitment. Malik et al (2010) examined the teacher's perceived organizational commitment in public sector universities of Pakistan and impact of their satisfaction with job dimensions. The examination was a survey-based descriptive research; about 650 survey questionnaire were distributed. Regression analysis and one sample t-tests were used to confirm the research hypotheses. The result showed that the quality of supervision and pay satisfaction and satisfaction with work-itself had significant positive influence on organizational commitment. Özkan H. (2012) examined and studied the pre-service teachers' attitudes towards the profession using some variables. The results showed that the teachers showed high level of commitment towards the profession with interest and enjoyment.

Research gap

Here the participation of male teachers in the present study is very low. Therefore, this study is unable to define clearly the job satisfaction level of male teachers. Male teachers are not too much available in the teaching profession in self -financing colleges. Therefore Future research should be conducted on this issue.

Objectives of the study

1. To analyze and evaluate the different characteristics associated with Job satisfaction, Locus of control and professional commitment in college teachers.

2. To study the relationship between locus of control and professional commitment.

3. To assess the relationship between job satisfaction and professional commitment.

Research Methodology

For identifying and reporting the characteristics related to Locus of control, job satisfaction and teachers commitment there were three tools taken.Levensons's Locus of Control developed by Vohar S. (1992) was used to identify and report the characteristics related to Locus of Control.The sample was drawn at random with the help of Professional Commitment Scale for Teachers (Kaur, Ranu, &Brar, 2013).Secondary data has been collected through published sources like journals, books, magazines, report of government agencies; report of commissions and from online journals.SPSS software (Version 20.00) was used for data analysis. For identifying relationship among variables Regression & Correlation method of data analysis was adopted.

Results and Discussion

Questionnaire was circulated to thefive self-financing college teachers in Kerala.

Reliability Analysis

The reliability test applied with the help of SPSS (Version 20.). The reliability coefficient value is high which is obtained from Table No.1 which was highly significant (.90) for Locus of control. The reliability score of job satisfaction is average satisfactory (0.88) as mentioned in Table No.2. The analysis shows commitment value was (0.58) on the basis of Table No.3.

Table No.1

Reliability Analysis: Locus of Control

Cronbach's Alpha	No.of items
.902	20

Table No.2

Reliability Analysis: Job Satisfaction

Cronbach's Alpha	No.of items
.884	12

Table No.3

Reliability Analysis:Commitment

Cronbach's Alpha	No.of items
.587	20

Correlation
Correlation between Locus of Control and Commitment

Table 5 shows that Locus of control average and commitment average are correlated positively, but the association reported was weak. A weak positive relationship between these two constructs was obtained It suggests that a fluctuation in Locus of Control average would bring an insignificant deviation in commitment average.

Table No.5

Correlation between Locus of Control & Commitment

		Locus of control Average	Commitment Average
Locus of control Average	Person Correlation	1	.116
	Sig. (2 Tailed)		.528
	N	45	45
Commitment Average	Person Correlation	.116	1
	Sig. (2 Tailed)	.528	
	N	45	45

Correlation between Job Satisfaction& Commitment

Based on Table-6, the association between job satisfaction and commitment was seems negative. It was defined that relationship between these two characteristics was inverse and not significant. This was evident from the correlation coefficient of -0.192 (-19.2%).

Table No.6

Correlation between Job Satisfaction& Commitment

		Job Satisfaction	Commitment Average
Job Satisfaction	Person Correlation	1	-.186
	Sig. (2 Tailed)		.178
	N	45	45
Commitment Average	Person Correlation	-.186	1
	Sig. (2 Tailed)	.178	
	N	45	45

ANOVA

From the following ANOVA Table 7 the association between the independent constructs and dependent construct (Commitment Average) was not significant since the significance value shown above was .538which was more than the standard measure of 0.05 and the level of confidence (F) is .781 which was less than the standard level of 3.

Table No.7

Table Showing ANOVA

Model 1	Sum of Squares	df	Mean Square	f	Sig.
Regression	.319	4	.080	.781	.538b
Residual	4.627	40	.102		
Total	4.946	44			

Conclusion

This study was aims to find out the relationship between Job satisfaction, Locus of control and commitment among the honorificabilitudinitatibusself-financing college teachers in

Kerala. On the basis of this study the reliability coefficient was significant higher for job satisfaction and Locus of control.A small amount of reliability was obtained in the case of commitment. The output suggests that teachers performed more in locus of control and job satisfaction with lesser amount of commitment. Along with this, correlation between locus of control and commitment was positively correlated and also with week relationship.

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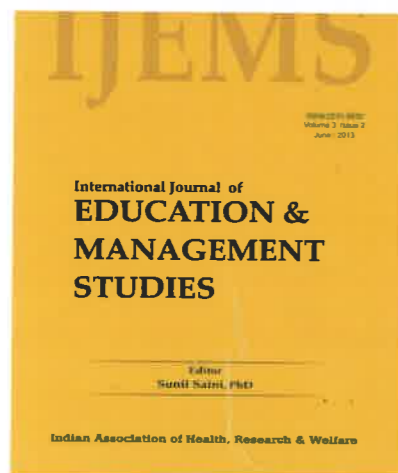
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Interpretation

After analyzing the Table 1, it shows that out of 98 respondents 40 respondents less likely to be interrupted during their studies when they listen and watch. Also,38 respondents get more ideas during their learning times.

Whereas 34 respondents like less to watch during their learning. Out of 98, 29 respondents more like to watch when they learn. 38 respondents feel less reserved during their learning. 33 respondents are less responsible during their learning. 34 students belief that they get less experience during their learning times.

36 respondents observe less new ideas and things during their learning times. 40 respondents like less to get involved personally in the content they are studying and 32 respondents rely on their observations during learning times. 33 respondents accept more and 32 respondents feel more distracted during learning times and they learn more when they are careful. 34 respondents less analyses new ideas and thoughts during their learning.

Conclusion

In preset scenario, technology is increasing day- by- day and the role of technology is also increasing in learning styles of students. So the present study concludes that students easily understand the topics and gives more practical approach. The present study also conclude that 90% of the students found studying online either as effective or more effective than face to face learning .The previous study also spot the above finding (Morave et al., 2015; Mothibi, 2015; Judrups, 2015; Al-Shurideh, 2012; Jakobsone & Cakula, 2015).

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The tribal development policies of government and underdevelopment of tribes: A critique

Nisha Joseph

PG Department of History, Henry Baker College, Melukavumattom, Kottayam, Kerala

The Central and State Government had formulated number of development programmes for the uplift of tribal and other backward communities. As regards State's responsibility, the government periodically monitors the working of its Development Programmes to ascertain their progress. Also, the Government considers that it is the time to reassess the situation as to how far these programmes reached the objectives or whether the development plans really benefited the people. It is very clear that from the early period particularly from the time of the beginning of the British rule, these people were under the control of the administrators who introduced a number of development programmes for them. But still there are number of tribes who are leading a nomadic life, living in the interior of the forests, away from all development concepts. Hence, it needs a critical analysis to find out why the development programmes did not reach them? In addition, it is also necessary to know how far the government's policies succeeded in bringing them out from their primitive life to take up to modern living.

Keywords: Development, tribes, ILO, five point formula, British period and aftermath, debar commission

The main aim of development is to provide increasing opportunities for a descent life for all kinds of people. It is essential to bring about more equitable distribution of income and wealth for promoting social justice and efficiency of production to provide greater variety of facilities like education, health services, shelter, job opportunities etc.

The International Labour Organization (ILO) defines development as a process, which involves improvement in the quality of life of weaker sections and a greater participation and involvement of the masses in the process of decision making in the economic, social, political and cultural life of a society. Joseph Schumpeter defines development as only a change in economic life that is not forced upon it from without, but arises by its own initiative from within.

But here the definitions mainly center on economic development. However, the International Labour Organization's (ILO) definition of development includes every field of development - social, political, cultural and economic. This is the mode of process which can uplift a society that is really suffering from backwardness. The involvement of government in this process is inevitable, because it can only achieve the planned or predicted goals. It does not mean others cannot do that, but in the case of tribal people, there is no other responsible institution than government. Therefore, it is too important to get the support from the concerned government authority for their progress.

It is very clear that the focus of development is now increasingly on the equitable distribution of wealth and income, full utilizations of manpower, better utilization of natural resources and the protection of natural environment etc. In all these developments there must be change and growth, which includes, increase in social facilities, modernisation and protection of human environment. Thus, development generally focuses on all these aspects.

Review of literature

The tribal development in India is based in Nehru's *"Tribal Punchsheel"*. This is summarized in a foreword to Verrier Elwin's book on NEFA. The Nehru's Five Points on tribal development is the following. People should develop along lines of their own genius and we should avoid imposing anything on them. We should try to encourage them in every way such as their own traditional art and culture. Tribal rights in land and forest should be respected. We should try to train and build up a team of their own people to do the work of administration and development. Some technical people from outside will no doubt be needed, especially in the beginning. But we should avoid introducing too many outsiders into tribal territory. We should not over-administer these areas or overwhelm them with multiplicity of Schemes. We should rather work through and not in rivalry to, their own social and cultural instructions, and We should judge results not by statistics or by the amount of money spent but by the quality of human character that is involved.

KS Sing's *Jawaharlal Nehru, Tribes and Tribal Policy* this five point formula enunciated by Nehru stand as the corner- stone of the India's Government policy in respect of tribals. This was further elaborated by Elwin, who emphasized the need for the tribal people to come to terms with their own past avoiding danger of pauperism and without creating a sense of inferiority. Elwin stressed on recognizing the contribution of the tribal people in helping the Indian society as a whole, so that they may feel that they are part and parcel of India as any other citizens. And also, he felt, that the inclusion and exclusion of a community to the tribal category can be made only by Parliament under Article 342 (2). The Five Point formula of Nehru had some defects also, because the tribal people can attain development only by breaking all their previous mode of life. Otherwise they cannot come out from their environment without breaking it. What they need for development is that they must give-up to some extent what they uphold as their inheritance. In

Author:

Dr. Nisha Joseph
Assistant Professor, PG Department of History
Henry Baker College, Melukavumattom, Kottayam, Kerala
E-mail: nishajsph7@gmail.com

the work *Tribal Development in the 20th Century* the term development means a change from undeveloped condition and that denotes change from one stage to another. Thus the only aspect that they can continue to practice is their religious beliefs and customs. With all these the society must also accept them since they are helpless and their need is the protection from exploitation.

Thus, tribal development aims at progress in strengthening the material aspects of tribal culture and increase the income through better utilization of the environmental resources - forests, minerals, agriculture, animal husbandry as well as the skill of the tribal people. *Scheduled Tribes and Development* discusses about the utilization natural resources which is always available in each tribal settlement. However these resources are utilized by non-tribal people of the society. Tribes cannot exploit their nature they believes there is sole in each and every beings.

Method

The Government of India and Government of Kerala had initiated a number of schemes for the development of the tribes. But the real beneficiaries of these schemes are very few. Those who receive these benefits are not getting expected benefits. The policies for the uplift of these tribes of Kerala by the Government of Kerala are many. It will be more effective if a narrative is made from the British period onwards on the schemes of development and major tribal issues of the State. If

Government policies for the uplift of the tribes

During the period of British rule there was no Kerala state as such; it was divided into three parts. Malabar was under direct control of Madras Presidency and other two parts Travancore and Cochin were ruled by local Princes. Malabar was the northern part, Cochin was the middle and Travancore was the southern part of Kerala. The larger concentration of tribal population of Kerala was in Malabar region particularly in the Wynad district. During the British period the policies towards tribal communities had diverse impact. For instance, in 1903, the Hamilton Settlement Act was passed to offer special protection to tribes in Travancore.But at this time in the British Malabar, especially in Wynad majority of the tribes except Kurichiyas were under slavery and bonded labour. The main features of this Act are:

- The hill men may collect and use for their own consumption or sale or for both any minor forest produce not collected by the government or leased by the Government contractors or lessees.
- The hill men were free to catch fish and engage in animal hunting. For this purpose, and for the protection of person and property each settlement could keep one gun ordinarily in the custody of the headman.
- Divisional Forest Officers were appointed to check whether there were any kinds of trouble among them from outsiders especially in trade transactions.
- The hill men's contact with the outsiders is to be strictly regulated by the Government.
- If the hill men willfully violate these rules they will be liable to be expelled from their settlements, temporarily or permanently, besides being subject to the penalties prescribed in the Forest Laws.

However these provisions were worse than the trespassers from plains who captured their land. This was the situation that prevailed

then. Even today one can see that majority of them are still landless. Thus the condition of the tribals in Kerala was far from satisfactory during the British rule.

Scenario after independence

The debar commission - 1961

The Scheduled Areas and Scheduled Tribes Commission was appointed under Article 339 of the constitution and it was headed by U.N. Debar. The Article 339 ensures the control of the Union over the administration of the Scheduled tribes; that is, the President may at any time and shall at the expiration of ten years from the time that the Constitution came into force by orders can appoint a commission to report the administration of the Scheduled Areas and the welfare of the Scheduled Tribes in the State. The Commission recommended that all tribal land alienated since January 26, 1950 - the day Constitution came into force be returned to the original Adivasi owners. But nothing considerable came out of it. It was only after a decade substantial progress was seen in the direction of tribal welfare.

Orders and recommendations by Kerala state-1962

After the formation of Kerala State, major decision on the Scheduled Communities of the State was taken in 1962. In 1962, an Evaluation Committee was formed on the welfare of Scheduled Castes, Scheduled Tribes and Other Backward Communities, the main objectives of the programme were:-

- Assess the volume of work done for the uplift of SC, ST and other Backward Communities during the First and Second Five year Plan periods.
- Suggesting ways and means to rectify the defect found.
- Include the deserving that had been left out from the SC, ST and OBC list.
- The Committee recommends to the government the deletion of those who attained economic stability from the list of SC, ST and OBC.

This evaluation committee did a fruitful attempt from its methodology itself. They visited all the important Tribal Settlements in the State, and held discussions with the tribal people and their representatives. The committee then submitted a detailed report on programmes of tribal welfare and development undertaken during the first two Five Year Plans.

Rehabilitation schemes for tribes

Several measures have been undertaken by the government before and after Independence for the development and rehabilitation of tribal people. Under the Tribal Welfare Department's control a number of major projects were started with the financial support of the Central Government. They are:

- Suganthagiri Cardamom Project.
- Attappadi Co-operative Farming Society (ATCOFARMS).
- Chokkad Colonization Scheme.
- Priyadarshini Tea Estate.
- Vattachira Collective Farm.

After Independence, the most remarkable move taken for the rehabilitation of these landless tribes were the projects mentioned above. At Chingeri in Wynad a Co-operative Coffee Plantation was established in about 600 acres of land and houses were built for the

tribals. After the implementation of Bonded Labour System Abolition Act, 1976, many of the Adiya and Paniya tribes became jobless. With a prime objective of rehabilitating them the Sugantha Giri Project was initiated. It is one of the biggest plantation enterprises in the country spreading over an area of 1200 hectares of forest land accommodating about 750 tribal families.

The ATCOFARMS was established using about 1080 hectares of forest land under cultivation of different crops and 420 tribal families belonging to Irula and Muduga communities were rehabilitated there. Another colony was established at Chokkad at Nilambur in Malapuram district to rehabilitate 60 tribal families. Rubber and coconuts were cultivated in 105 hectares of vested forest land allotted for this project. The Priyadarshini Co-operative Tea Plantation was established near Mananthavadi in Wynad in 1988 in about a compact area of 512acres of land and rehabilitated there about 100 families of Adiya and Paniya communities.

The tribal collective farm at Vattachira was established in 1981 to rehabilitate 60 selected freed bonded labourers. An area of about 120.5 hectares of vested lands were utilized for this project. Besides Chokkad and Priyadarshini all other schemes are running at a financial loss. With the project and Programmes, altogether 1089 persons were resettled in 3,295 hectares of land.

Tribal welfare department - 1975

In connections with the Fifth Five year plan Kerala Government founded the Tribal Welfare Department in 1975. For the

implementation of tribal development programmes, they divided the State into five tribal development areas - Wynad, Nilambur, Attappady, Idukki and Punalur.

The 1975 Act was significant in that it had acknowledged the inalienability of tribal land and the need for restoration of alienated land. The Kerala State Scheduled Tribes Restriction on Transfer of lands and Restoration of Alienated Lands Act 1975 was an optimistic step to reduce the land problems of Kerala tribes. This act passed unanimously by the Kerala State Assembly promised to restore all the alienated lands of the tribes since January 26th 1960 after seizing it from encroachers.

The most remarkable personality who deserves special mention and remembrance in relation to this Act of 1975 is Dr. NallaThampy Thera. Though he was born and brought up in Madurai, better part of his life he lived among tribes of Wynad. After his M.B.B.S. from the University of Madras, he went to Wynad got married a Adiya woman and lived among the tribes until his death in 17 June 2010. Though he was a medical doctor, his active role was remarkable in tribal land rights agitations. It was with his constant struggle against the Government of Kerala that made NallaThampy to submit public interest petition seeking the intervention of the Kerala High Court; consequently the Kerala High Court issued an order in October 1993 calling for restoration of alienated lands. That led to the opening up of new laws on tribal land alienations in Kerala. The other major surveys and Committees to enquire and recommend tribal and other backward people's progress are given in the following table A.1.

Table A-1: Major survey reports of the committees formed for castes, tribes, and other backward class people under the government of Kerala (1965-79)

Year	Agency that Published Survey Reports	Repeated or Not Repeated Surveys	Name of the Survey
1965	Bureau of Economics and Statistics Kerala	Not Repeated	Report on the Sample Survey on the Problem of Indebtedness among Scheduled Castes and Scheduled Tribes
1968	Bureau of Economics and Statistics Kerala	Not Repeated	Socio -Economic Survey on castes and communities
1968	Bureau of Economics and Statistics Kerala	Not Repeated	Drafted Preliminary Report on Integrated Areas Development Programmes and sub-plan for Tribal Area Development
1976	State Planning Board, Kerala	Not Repeated	Integrated Tribal Development Project for Attapady
1977	Bureau of Economics and Statistics Kerala	Not Repeated	Report on the Survey of Bonded Labour in Wynad Area
1979	Bureau of Economics and Statistics Kerala	Not Repeated	Report on the Socio-Economic Survey of Tribals in Kerala

Each report, particularly the Report of 1968, 1976, 1977 (Bonded labour Wynad and Schemes implemented in Tribal Development Block Attapady) 1979 are exclusively for the Scheduled Tribes. The 1968 Socio-Economic Survey on Castes and Communities, succeeded in improving the Socio-economic position of the Scheduled Tribes and the non-tribal communities. It also facilitated the survey of inter-tribal comparison with regard to the degree of socio-economic development attained by the various tribes.

"*The 1975 Report on Tribal Integrated Area Development Programme and Sub- Plan for Tribal Area Development*" was another important report submitted to the Kerala Government by State Planning Board, Kerala Government. This was actually the outcome of the fifth Five year Plan. The aim of this approach was to quicken the pace of development of the tribal areas with emphasis on the advancement of Scheduled Tribes by implementing a variety of beneficial schemes pooling the resources under various development

sectors. But the Surveys and field studies conducted for bringing out the real undeveloped poor section ended as a failure this severely affected the programmes for uplifting the tribes. During 1973, Special Officers were appointed for it. From their report no useful or supportive measures came out. Because of the delay in appointing Special Officers, and the lack of time made them relay on the secondary data. All these made the report unstable. Thus the fragile and distorted information became responsible for the paradoxical situation to understand the real poor tribes, today that causes the tribal area to remain undeveloped.

After that in 1976-78 another Socio-Economic Survey of Tribals in Kerala was conducted. The main objective of this Survey was to study the educational and socio - economic conditions of all the tribes in the state and to study their agrarian problems. A separate bonded labour survey was conducted in the Wynad area since the beginning of the Socio-Economic Survey, but this survey didn't find anything useful to save these tribes from their troubled life. Had it collected hamlet-level details then it would have been useful for the formulation of the strategy of tribal development at all level. It also did not provide valuable information about the aggregate output produced and the productivity of tribal agriculture.

Major and minor development progrmmes among the tribes

In this major and minor development plans it can be divide into two major plans as Five year plans and minor plans as schemes of development.

Scheme for tribal development

The tribal majority areas in the country are broadly divided into three categories, viz., (i) predominantly tribal state/ union territories, (ii) Scheduled area and (iii) Non-Scheduled areas in the state. They placed the tribal majority union territories and states to a separate category to allot funds. The development of these areas considered as a responsibility of the central government even though they are integral part of concerned states. Financial provisions for their development were considered in detail by the constituent assembly itself.

The schemes have been divided into two categories, viz., (i) central sector programmes which are fully financed by the central government, (ii) the centrally sponsored programmes which are partly financed by the central government and partly by the state government. On the basis of this each states passing development programmes for the tribal poor. However the exact benefit of these is not properly reaching to them is a great setback to the tribal development.

Conclusion

The merits of this plans and schemes are that the development programmes to an extent reached in the tribal Poor's houses. That helped them to change their traditional way of life to a modernism influenced life. Even a few among them had got good education, got opportunities to government jobs and many of them improved their infrastructure facilities. But when one analysis the development

schemes/plans then only it will show the exact effect of these programmes. Say for instance the Forest Act 2006 was a direct neglect of the rights of each Adivasi in India. This was also just like each programmes which government introduced in the previous years. There are ITDP's in each districts of Kerala that mainly provide funds for higher studies to students belong to the scheduled communities. But most of these are unknown to the tribal students. Those who know have to overcome many hazards to get this amount in hand. Thus the development schemes have its own merits and defects, what government can do to solve these problems are to give opportunity to the educated tribal youths and experienced people in the implementation of development programmes.

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Author:

Kumari Divya Singh
Assistant Professor, P. G. Department of Psychology
Veer Kunwar Singh University, Ara, Bihar
E-mail: divya.singhbhu85@gmail.com

Perceived HIV stigma and perceived social support among people living with HIV

Kumari Divya Singh

P. G. Department of Psychology, Veer Kunwar Singh University, Ara, Bihar

HIV stigma constitutes a major stressor for People living with HIV/AIDS that negatively influence their health and well-being. Social support serves to protect the individual against the negative effects of stressor and may aid in better adjustment as well as improved quality of life. The present study is an attempt to compare the types and sources of perceived social support across high, moderate and low levels of perceived HIV- stigma. A cross-sectional sample of 100 HIV- infected individuals was recruited from ART centre, Sir Sundar Lal Hospital, Banaras Hindu University, Varanasi, India. Perceived stigma index and social support Questionnaire were used to assess the types and different sources of social support received by low, moderate and high levels of perceived stigma group of HIV infected individuals. One way ANOVA followed by tukey's post hoc test was used to draw the level of significance between mean differences to test the hypothesis framed. Result shows that high perceived stigma group (HPSG) has significantly lower assessment of 'received' emotional, informational, practical, and companionship support. HPSG also reported substantially low received social support from family than their low perceived stigma counterparts.

Keywords: perceived stigma, social support, HIV, AIDS

People living with HIV are still grappling with HIV stigma that negatively influences their health and well-being. Goffman (1963) defined stigma as an "attribute that is significantly discredited". It is an aspect of the possessor's which is negatively viewed by the society and results in devalued status. It marginalized the affected individuals or groups from the normalized social order (Link & Phelan, 2001). AIDS stigma refers to "prejudice, discounting, discrediting and discrimination directed at people perceived to have HIV/AIDS, and the individuals, groups, and communities with which they are associated" (Herek et al., 1998). It is widely recognized but individual's experience of stigma may vary in degree in different cultural setting. Primarily there are three ways by which people with HIV experiences stigma namely, enacted stigma, perceived stigma and internalized stigma. Bharat (2011) stated more research work is required in order to understand the role and functional value of different types of stigma, specifically, the correlates, causes and dynamics of perceived stigma. Perceived stigma, also termed as felt stigma or normative stigma capture the interpersonal experience of stigma. It refers to people living with HIV awareness of negative social identity, reduced opportunity and negative societal attitudes (Berger, Ferrans, & Lashley, 2001; Steward et al., 2008). Perceived stigma is experienced by a greater part of people living with HIV (Thomas et al., 2005; Subramanian, Gupte, Dorairaj, Periannan, & Mathai, 2009). It complicates the prevention, treatment and care needed for the effective management of the disease. Fear of stigma reduces testing-seeking ability of PLWH (Golub & Gamarel, 2013; Roger's et al., 2006) that results in undiagnosed cases of HIV and hence increased the risk of HIV

transmission as well as delays the initiation of treatment. Among those who have been tested and are positive, deters infected individuals from accessing ART services (Benotsch et al., 2008). In addition, those who have access to treatment are not likely to properly adhere to the medication (Naidoo, Dick, & Cooper, 2009; Kempf et al., 2010; Ware, Wyatt, & Tugenberg, 2006). Most of them reported fear of stigma from family members, relatives, friends, neighbors, and health providers (Yu et al., 2009; Zukoski & Thorburn, 2009). To prevents the probability of being stigmatized HIV positives maintains secrecy or selectively disclose about their seropositive status to their family members, care providers, and sexual partners (Chandra, Deepthivarma, & Manjula, 2003; Steward et al., 2008) which in turn deters them from accessing valuable social support resources from them (Earnshaw & Chaudoir, 2009; Gilbert & Walker, 2010) such as, emotional, informational, companionship and practical support. Existing support system and their supportive behavior may constitute the major coping resource for HIV positives in their adjustment toward the disease and in maintaining a good quality of life.

Social support that refers to "emotional, informational, or practical assistance from significant others, such as family members, friends, or co-workers and that support actually may be received from others or simply perceived to be available when needed" (Thoits, 2010). Theorists figure out that it is not the availability or the receipt of support that is important, but ones perception that he/she has a supportive network and can get support during the time of crisis has beneficial and facilitative positive effect (Barrera, 2000; Uchino, 2004; Wills & Shinar, 2000). The benefits of social support have been attributed to its functional aspects including emotional, instrumental or informational in varying degree and combination (Cohen, 2004; Umberson, Crosnoe, & Reczek, 2010). Family constitutes the important source of care and support for people living with HIV/AIDS (Bray & Campbell, 2007; Oluwagbemiga, 2007). Friends and significant others or special persons also can be an effective source of support

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Book Review ● K. Jeevan Kumar

Reading Subcultures: A History of the Bizarre Margins

Dominique Kalifa's **Vice, Crime and Poverty: How Western Imagination Invented the Underworld.** Trans. Susan Emanuel. New York: Columbia University Press, 2019, Page 304.

Subcultures that exist in the civilized urban life, are often unacknowledged, and unsung in everyday life. They form part of a phenomena that is constructed in opposition to the ordered social mores that represent the nation, civil society and humanity at large. Often this construction takes on the air of the unbelievable or the fantastic for they seem too real to be true. Dominique Kalifa's Vice, Crime and Poverty: How Western Imagination Invented the Underworld attempts to delineate the evolution of the 'lower depths' in western imagination. It is an essential reference for analysing popular culture as well as the manifold ramifications of the trajectories of cultural studies in multicultural socie-

K. Jeevan Kumar, Associate Professor, Department of English, Henry Baker (Fr.) College, Melukavu.

ties. It is part of the series 'European Perspectives: A Series in Social Thought and Cultural Criticism.' As Sarah Thornton opines in the introduction to The Subcultures Reader, subcultures differ from communities in the lack of kinship and family among the members. Moreover, they are denoted as a mass, unlike communities which are often referred to by the term 'public' (2).

Criminals, lunatics, prostitutes, outcasts, vagabonds and beggars form the populace of the underworld, shunned by the so-called civilized society. Yet they haunt the existence of those who eschew them, especially in the world of the social imaginary, for they are paradoxically an entity that appals as well as defines their very existence. Fagin is essential for Brownlow to exist just as the stinking sewers are imperative to the survival of the cosy malls. Kalifa regards the underworld as discursively formed in the nineteenth century western imagination lured by the possible menace it posed to urban life.

Kalifa traces the evolution of perspectives on the poor and the marginalised, focussing how they came to be depicted as an antithesis to civilization, security and order which the society cherishes. In the processes this subculture becomes an analogy of the colonized natives. The French term 'bas-fonds' means 'the lower depths' and the 'underworld.' It refers to "the hell down into which hordes of vagabonds, wretches, mendicants, 'lost girls,' criminals and convicts seem to be constantly dragged—all of them hideous figures in a hellish landscape that is partly real and partly fantasized" (1). It is a world whose map and census are absent. Whether it is the dark alleys steeped in the glum filth in Oliver Twist, the reeking sewers of Paris in Les Miserables, or the cavernous cellar shelter in Maxim Gorky's play The Lower Depths peopled by an ensemble cast that thrive on the streets, the lower depths connote a cultural imaginary beyond geographical boundaries that persistently haunts western literature. As a historian of the social margins, Kalifa has been pursuing this territory for more than twenty years of rigorous research.

The current meaning attributed to the lower depths emerged in the nineteenth century. French lexicographer Paul-Emile Littre defined it as a "class of vile and contemptible men, a class of men degraded by vice and poverty." Kalifa argues that the three words – vice, crime, poverty – are ineluctably linked in the social imaginary through theoretical and fictional endeavours to represent the subculture of the lower depths.

While tracing the untold history of the notion of the underworld and its representations in the cultural imaginary, Kalifa surveys how the myth of the lower depths came into being in nineteenth-century Europe. His

analysis is at once profound and broad searching through biblical figures and Christian lore to the society ravaged by the immense transformations brought about by industrialization, democratization, and mass culture. He casts a searing critical eye, that registers the Parisian fringe to the squalid Victorian London streets, the downhearted slums of New York to the filthy cesspits of Buenos Aires. In the process Kalifa decrypts the evolution of an image that has enchanted the social imaginary of the west. And he seems vigilant to assure that it is never a cursory glance that relishes on the superficial glitter. Even though the sociocultural milieu that constructed the underworld has undergone considerable transformation, Vice, Crime, and Poverty reminds us that in the contemporary sociological notions about of the underclass and its representations in cinema and steampunk culture, its spectres continue to haunt us.

The world of crime has always been enticing for the popular art forms. History of publishing records pamphlets that dealt with gory details of murders and broadsides that printed the final utterances of hardened criminals from the from the gallows even in the sixteenth century. Kalifa examines how the depiction of crime that began around 1840 and continued the following decades shows a fascination with the lower depths where the sleazy desires have a free reign and therefore, indulgence in criminal activities is nothing less than the norm. The 'lower depths' denotes something the term 'slum' cannot bring into the fore. It is at once spatial, imaginary and psychological and depicts the geographical, fictional and psychic landscapes alike.

There is no dearth for seamy figures and debauched characters in the in the lower depths, as Kalifa notes: "The people of the bas-fonds are classified in an interminable list; the legion of miscreants includes all those prostitutes, beggars, thieves, assassins, prowlers, rag-and-bone men, convicts, and so on who are all born from the unclean cross-fertilization of vice, crime and poverty" (3). Thus, poverty becomes associated with vice and crime in the representations of the poor so that they are seen as a threat to the stable social fabric tinged with morality and civilized behaviour. Kalifa traces the evolution of the term bas-fonds and its acquisition of such a social sense in 1840 in the works of three writers. Honore de Balzac used the expression in his novella Z Marcas; Constantin Pecqueur, a socialist dreamt of a utopian society, in his Introduction to the Study of Social and Political Economy, and Honore Antonine Fregier, a police officer used it in his book The Dangerous Classes of People in the Big Cities and the Means of Making

Them Better. That is, the term simultaneously appeared in three registers, fiction, social theory and policing, which have been responsible for its being in vogue rather quickly. By the 1860s bas-fonds became a familiar term that Victor Hugo uses as the title of Part III, Book 8 of Les Miserables, translated as "The Noxious Poor" (Hugo 627), the English version consciously or unconsciously echoing the hatred for the poor.

This elegant study of a significant subculture is structured into three sections. The first part, 'The Advent of the Lower Depths,' focuses on the origin of the concept of the lower depths as revealed through places, decors, actors and motifs through writings in diverse realms and scrutinises the contexts that led to its origin in the mid-nineteenth century. It also examines the recurrence of certain representations which are anchored in the remote past. The second part, 'Scenarios of Society's Underside' concentrates on the social imaginary that functions through its representations, giving it form and meaning. This section also identifies four major scenarios that organize the stories of the lower depths. The final part of the book, 'Ebbing of an Imaginary' evaluates how the nineteenth century notion of the lower depths gradually gets exhausted by the middle of the twentieth century.

Kalifa refers to the social imaginary of the lower depths as "a place that does not actually exist anywhere; rather it emerges from a multitude of inquiries, accounts, reporting, and also from myriad fictions that endeavoured for more than a century to depict the places of poverty and perdition" (11). It was Eugène Sue's sensational novel The Mysteries of Paris serialised during 1842-43 that delineated the lower depths with shocking candour and wild feats of imagination so that it became a sort of cult fiction widely imitated. The novel begins with a reference to the language of the lower depths, explaining the meaning of the title of Chapter I, 'The Joint': "In the slang of murderers and thieves, a 'joint' is the lowest sort of drinking establishment. Sue reiterates this fact while drawing attention to the essential difference of the lower depths from the civilised society: "These men have their own morality, their own women, their own language – a mysterious language full of morbid imagery and metaphors steeped in blood" (3). Dick Hebdige remarks that a subculture is not only "a metaphor for potential anarchy 'out there' but an actual mechanism of semantic disorder (587).

The 'lower depths' was exclusively a feature of the cities for there was no underworld in the peasant and rural societies of France and Europe in the nineteenth century. Kalifa is aware of the constructed

nature of this squalid underworld for he adds: "Poverty, crime, rape and incest did indeed dwell in the depths of the rural world – and perhaps especially there – but the lower depths and underworld existed only in large cities" (12). As the notion of the lower depths reached the colonial world it undergoes slight modifications which are undoubtedly grim, tinged with darker hues. The renewed interest in colonial expansion made colonial cities like Bombay, Algiers, Tangier and Manila replicas of the western bas-fonds in murky shades "where indigence and prostitution were dyed with racist overtones" (14). And later these cities become centres of the mingling of races and ethnic impurity (22). The structural hierarchies of the lower depths continue to have its hold on the colonial notions and the world of fantasy encroaches upon reality, through fictional representations and works on social science.

Kalifa does not intend to make a true record of life in the underbellies of metropolises like Paris or London and make the reader feel that it corresponds to the depictions in the fictional works of Hugo or Dickens. He is more concerned with the process by which these images coalesce with the non-fictional representations to reinforce the menacing picture of a subculture that all urbanised societies happened to partake. The lower depths that form part of the social imaginary constitutes the "repertoire of collective figures and identities that every society assembles at given moments in its history," through which its members "perceive … groups, classes and categories to hierarchize their divisions and elaborate their evolutions" (117). The stock of images and ideas that accumulated around the lower depths reflect the anxieties of the upper classes that the violence unleashed during the French revolution evoked (124). They were also an attempt to curb the social underclass that were essential in the industrialized societies. But the curious fact is that the lower depth though a social imaginary was something real as well: "The essential elements were quite real: the frightful poverty that was crushing the new proletarians, the insalubrity, the promiscuity, the absence of a horizon other than the one sketched by depression, the suffering or revolt. Nevertheless, the general focus on vice, 'demoralization' and transgression did arise from fantasy. The intention was clear: to stigmatize the intolerable, to remove responsibility from the elites and to reaffirm the values that underlay the dominant identity" (204).

But the social narrative on poverty created the idea of the bad beggar, the menacing immoral poor maddened by vice and violence got reinforcement in the fictional world. A belief began to get instilled in the

social psyche which viewed the lower strata of the society as a subversive force: "Laboring classes were dangerous classes, every poor person was a potential criminal or a potential prostitute, every vagrant was a threat. Vice, crime, and poverty walked hand in hand" (171). Kalifa says that the growing obsession with the this menacing subculture was ambivalent as it reveals the pleasure and gratification along with horror and disgust with which the lower depths were gazed upon: "There is the desire to lose yourself, to go to the limit of debauchery, to descend, to encounter the obscure part of yourself that you habitually try to elude; to face up to evil, the dirty, the perverse, the damned, the reality you try to escape which at the same time becomes a powerful motif, even a cultural myth" (232). Thus, Kalifa subjects the social imaginary to an incisive analysis which delves deep into the history of a subculture. His analysis reveals why during the period between 1830 and 1930 the western world created myriad narratives of the miserable, crooked and perilous alternate cultures that existed beneath the so called normative, civilized urban society.

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TRAJECTORY OF POWER IN PERFORMING ARTS IN THE CONTEXT OF HERO WORSHIP AND BHAKTHI

Dr. Nisha Joseph

Assistant Professor, PG Department of History, Henry Baker College, Melukavumattom, Kottayam, Kerala, India, PIN-686652.

Abstract

The paper is an attempt to understand the socio-cultural influence of Arya Brahmin ideology in Dravidian culture and arts. Bharatanatyam is the oldest classical dance tradition of India and is the artistic expression of Tamil Nadu. It originally formed during the Sangam period but due to the influence of various cultures on Dravidian culture changed their original form. Now it is an admixture of polity and bhakti. Until the 1920s the dance was performed in the temples and was the exclusive preserve of the women called *Devadasis*. The *Devadasis* and her dance were important adjuncts to the religious and secular life of the Tamil people. However, in the late 19th century the socio cultural factors such as Westernization, Mobilization of social movements and urbanizations resulted in the transition of the dance from within the temple precincts to the urban city. Thus the Sangam age art and cultures merged in heroism and romance, when Bhakti movement came to south India that influenced the entire culture of the region which is very clear in their expressions and it is the key concept of this study.

Keywords: Sangam literature, power of chieftain, hero worship, Sadir, Bhakti, Bharathanatyam,.

Introduction

In South India, the classical dance of Bharatanatyam was greatly influenced and well entrenched in the social and cultural milieu of the society. Information about ancient indigenous Tamil culture is found in the *Sangam* literature spanning from Ca. 100 B.C to 300 AD onwards.[1] The literature of this period was dominated by two secular elements namely '*Aham*' dealing with love and romanticism and '*Puram*' dealing with the external world of heroism and generosity. The poetry was recited by male and female bards who were employed at the court of kings and chieftains. The male bards called the '*Panar*' (singer) '*Porunar*' (dancer) '*Paricilar*' (an artist who receives wealth from the king after praising him) and the female bards called the '*Virali*' (dancer) and '*Padini*' (singer) formed the innermost circle of the king[2]. The content of song and dance was a product of a feudal society in which the king, the nobles and the aristocracy of warriors and chieftains formed the subject matter of cultural expression. Their function was to sustain the glory of the king and expunge the evil spirit in society. The theme of the dance and song was in extolling the king for providing security to the people, or in praise of the spoils of a victorious king. Thus on one hand, the role of the artistic community was to sing love poetry and maintain the powers of the king along with dancing and playing the lute[3]. On the other hand, out side the courts the bards danced, fore told the future and played an important role in the society.[4]

REVIEW OF LITERATURE

There are many *Pazham Tamil* songs describing the *virali* (dancers), their body structure, dance and art in which they were interested. These dances are mainly used to play for pleasing the village chieftains. They are *Urkizhanmar, Malirmannan,Vendan*. They had peculiar political structure for implementing their powers.[5] "Very powerful chieftains were emerged through warfare's and competitions between *gothras* were quiet common in lineage societies. These chieftains were known as *Muvendan*. Such *vendan* is namely *Cheran* whose power was established in middle Kerala which was extending to *Thrissinappilly*. Other *vendans* included *Pandya and Chola* have collected wealth through wars. They are known as *Velirkal*. Their functions include the distribution of wealth of *Maravar, Vettuvar and Panans* who led with wars and sang songs praising the king" (Rajan Gurukkal 319). As earlier stated, the *virali's* were interested in required to maintain their beauty of body structure and danced in presence of chieftains. The term *viral* indicates the emotions which absorbed in mind and expressed thereafter. The chieftains always were making wars for gaining *Maruthu* which included paddy field.

Further during the *Sangam* period texts such as the *Silapathikaram* (Ca. 450 A.D) describe the nature of classical dance. Dance was known as *koothu.*[6] It was classified into two "*Santhi Koothu*" (Classical dance) and "*Vinoda Koothu*" (Popular dance).[7] *Santhi Koothu* referred to the classical dance and *Vinodakoothu* referred to the popular form. The performing of artists of this period was considered the likely antecedents of the later *devadasi* dancer of the temples[8]. The change in dance from the bardic milieu of the sangam period to the devadasi dance of the medieval period was due to Scio-cultural factors such as the *Bhakti* movement and the institution of dance in the temples. In *Chilappathikaram* the dance is divided and called as '*Eruvakaikoothu*'.[9] In *Pathittupathu* the body structure of dancers was praised by the poets.

Natyasastra of Bharatha was considered as the fifth Veda after four Vedas. It was written to keep Gods amused who were fed up with the philosophy of other Vedas. In Aryan culture and art *Natyasastra* plays a significant role. It is the basic text of Indian dance tradition and provides details of *Abhinaya, Nritha , Bhavarasas,* and even dress and ornaments. The text is considered to be written during the later Vedic period. At first the theme of this Natya was Deva and Asura war and final victory of Devas. Later Asuras contempt the performance and Bharatha changed its theme to good and evil in our life and sorrows and happiness in our life. Thus dance became a theatric of emotions, romance, anger and pain.

METHODOLOGY

The main issue which is to be analyzed in the context that south Indian performing art are structured within the rule of hero worship. While analyzing the historical aspect of the dance is the reflection of human emotion and its essence are developed upon the physical actions linked with each other which vary from region to region. A kind of regional element was clear in the theme of songs and style of dance. Rulers were the great patrons of these arts, and a kind of power over performing art is very clear in this context. The power as a tool interferes in every aspect of epistemology of society. A trajectory of this power relation can see in the case of transformation of *Sadir* into *Bharathanatyam.*

FINDINGS

Contextualizing the context of changes

In continuation with the dance convention of the *sangam* period, the dancers of the early medieval period continued to sing and dance the glory of the king after a victorious battle. However, during the medieval period failure to integrate the country politically resulted in an attempt to integrate it culturally. This heralded the *Bhakti* movement during the 6th century A.D[10].

The *Bhakti* movement was a protest against the dominating influence of *Jainism* and *Budhism*. From the period, 3rd to 7th century, Tamilnadu was ruled by the *Kalabhras* and influenced by Jainism. The *Jains* wielded enormous political influence and they tried to gain much influence in the Tamil Society through ethical works that stressed on austerities[11]. As a revolt against this ideology the Dravidian Tamil population and the Indo – Aryan Brahmins together evolved the culture, of Hinduism. In the process of Brahminization, local manifestations of the divine were incorporated into the

"Ritual – Cosmic" base provided by the Aryan Sanskrit based culture[12]. The incorporation and assimilation of local gods gave rise to a large corpus of myths and legends and were popularized by the Hindu saints through the medium of songs.

Further, economically the money from agricultural surplus was used for large – scale temple building[13].In the temples the divine formerly represented by the king, was replaced by the god. Also in an attempt to popularize Hinduism the saints derived from the Sangam literature the two popular elements of love, romanticism and heroism incorporated them[14]. They glorified the god as a generous patron and equated the deity in the temple as the king. The 'King – god" concept legitimized sensuousness in divine worship and entrenched dance in the temples. The sensuous offering to a munificent art – loving king – god formed the main theme in dance and music[15]. Thus the *Bhakti* movement encouraged the institutionalization of dance of the temples.

In the temples, as a result of the institutionalization of dance, the culture of sensuous offering of the arts was further entrenched. It was during the reign of Chola kings (985 – 1279 A.D), south Indian cultural life and social life were mould in a pattern that continued for centuries. The Chola kings sustained the king – god concept and became the permanent patron of the arts in the temple[16]. The glory of the king was represented by the dancers in the court and the temple[17]. During the Maratha rule, the dance was known as '*Sadir*' and '*Dasiattam*"[18]. In the court, the term, '*Sadir*' was the nomenclature used for the presentation of dance. The king employed thousands of dancers for the entertainment of the guests. A Chinese author of the early 13th century *Ju – Kua*, stated that "at state banquets the prince employs fully myriad dancing girls... (Who) break into music, song and dancing...?'[19]. In the temples, the term *Dasiattam* was used to represent the dance of the *devadasis*. The performance of dance in the temple was held in a stage decorated with beads called "*Maniarangal*[20]".

Dasiattam

In the later period one can see the changes in the dance, the rulers gave land grants to the performers of dance and music. The gift of land to the singers was called "*Padaliyarkani*" and the dancers were called "*Nattuvakani*[21]". In the temples the aspect of appointment of the dancer and the dance master was that their service was hereditary provided they were skilled[22]. Accomplished dancers were given the titles such as "*Talaikoli*" and "*santhi kutti*"[23].

Thus, the support of the temple as a permanent patron ensured the cultural reproduction and the transmission of cultural values through generations.[24]

Impact of Socio-Cultural Factors

In the temples during those times the artistic community was organized into *Chinna Melam* and *Peria Melam*. *Chinna melam* consisted of the female dancers and the male teacher, and the *Peria melam* consisted of the *Nagaswaram* (Wind instrument) players who were all men[25]. Further the *Devadasis* of the temple were associated with communities such as the *Melakarar* and the *Nayanakarar* who trained and recruited them for temple service. The social organizations of the artistic community evolved its own customs, laws of inheritance, rules of etiquette and its own Panchayats[26].

During the Maratha rule the influence of Sanskrit and Brahmanas increased in the realm of Bharatanatyam along with social domination by them. Their domination resented the non – Brahmin resentment in the temple. The use of Sanskrit also made changes in the artistic expressions. The division between the writers and the performers allowed the continuity of dance with little change, until the advent of the British[27].

Within the palace and in the temples the arts of music and dance were encouraged. Proper learning and training were the conditions stipulated for the dancers. However, no references are contained in the inscriptions regarding the method of teaching[28]. According to literary texts such as the *Silappadikaram*, strict training is necessary in order to become a professional dancer. Dance and Music formed an essential part of the *devadasi* training[29]. Therefore for the purpose of dance and music masters for both vocal and instrumental were appointed[30]. Sometimes, the music makers imparted in both dance and music[31]. In a few temples the drummers were employed to train the dancers[32]. Dance was generously supported by the kings and special attention was given towards the training of dancers. For the purpose of their training a special hall was built in the palace[33].

Changes in the form and content of dance

From the 14th century onwards the Tamil cultural milieu was marked by intensive change in all spheres of culture[34]. The assimilation of different cultures into Tamil Culture brought forth changes in the dance from and content. Firstly, the Vijayanagar kings placed deputies belonging to Telugu and Kannada nobility. Therefore the language of Telugu and Kannada was incorporated into the content of dance[35]. Secondly, Tamil literature of this period was a fusion of Tamil and Sanskrit cultures. The compositions contained a mixture of classical Tamil compositions, folk songs, Sanskrit descriptive poems, and auspicious songs which were an important part of the *devadasi* repertoire[36]. Thirdly, in the literature, old and archaic forms were retained and adopted to the cultural influence of the period. Classical songs such as the *Kirtana* (Song of Praise), *Kuravanji* (song of the gypsy) and *Unjal* (Swing song) were presented as independent literary compositions during the 16th century.

During the 17th century under the Maratha rule, the influence of Kannada and Telugu cultures on the local indigenous culture continued. The content of the dance dramas composed by the Maratha King Sahaji II included songs and dance from the concert repertoire, and also of the ritual offerings by *Devadasis* in the temple[37]. Thus a dance from tradition practiced in the temples, with the aesthetic and cultural sophistication of the courts.

Conclusion

Bhakti movement and Aryan domination over Tamil culture made lots of changes in art and culture of the region. One of the best instances was that the regions performing art, which fostered with the support of chieftains and kings, Sadir now came to be known as Bharathanatyam. The main theme of this theatrical was love, romance and heroism of the chieftains and kings of the Sangam literature transformed into Bhakti. Brhamanization transformed Dravidian Tamil literature from their day today life and hero worship to Bhakti. Once their bhakti was to heroes and now it replaced with Aryan gods.

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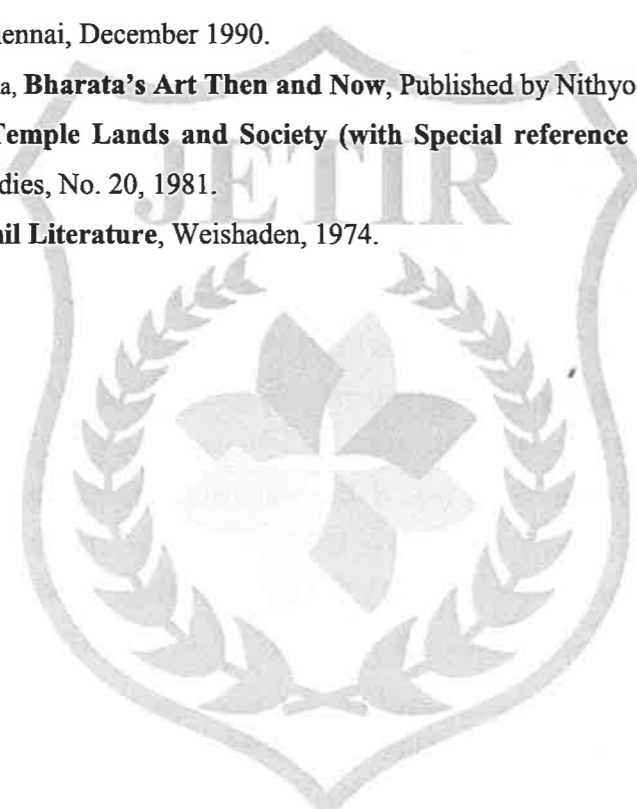
APPLICATION OF CHEMICAL TREATMENT TO ENHANCEMENT OF FUNCTIONAL PROPERTIES OF WHEAT GLUTEN

[1]Ajitkumar R. Kadam, [2]Vishal Parate, [2]M. I. Talib, [1]Subhash Pawde

[1] Designation: Research student

[2] Designation: Assistant professor

University Institute of Chemical Technology, North Maharashtra University Jalgaon 425001.

Abstract: The present study was carried out with the aim to enhance the functional and rheological properties of the gluten from chandousi Wheat variety by the L-Ascorbic Acid Chemical treatment. During project work, wheat flour of the Chandousi variety was kneaded to dough by adding the L-Ascorbic acid solution in ratio 20 ppm to 120 ppm (20 ppm, 40 ppm, 60 ppm, 80 ppm, 100 ppm and 120 ppm) the dough was submerged in the distilled water for one hour and then the dough was placed under the constant stream of water to isolate the gluten. The achieved gluten was freeze dried and was evaluated for various physicochemical properties. The result shown the optimum dose to be 60 ppm on the basis of the improvement in the water absorption capacity, sedimentation value, foaming capacity and emulsifying capacity, compared with non-modified gluten powder (control) Modified and non-modified gluten powder were then integrated in the noodles base dough of Lokwan variety of wheat flour. FE-SEM images of non-modified gluten and chemical modified freeze dried gluten were taken for identification and conformation of the modification on morphological basis. Dough obtained and the noodles dough were compared on the basis of Brabender's Farinograph and Extensograph. The result concluded improvement in the noodles dough as well noodles made from the chemical treated gluten as compared to control sample.

Key words: *Wheat, Wheat flour, Chandousi, Lokvan, Noodles.*

1. INTRODUCTION

Gluten is a protein macro-polymer in wheat flour which is a mixture of more than 100 heterogeneous polypeptides, that are formed in hydrated flour during dough mixing and Gluten is composed of two main storage proteins, namely, Gliadins and glutenins. Gluten plays a major role in viscoelastic properties of bread- making which is highly correlated to the quality of end products. Glutenins and gliadins are the polymeric and monomeric protein components of gluten, respectively. Glutenins (with molecular mass of 69 to 88 kDa based on SDS-PAGE) are responsible for elastic behavior, whereas gliadins (with molecular mass of 30 to 50 kDa) are responsible for viscous flow properties of the foods.

Tuning the optical, electrical and thermal properties of l-arginine maleate dihydrate (LAMD) single crystals for optical limiter applications

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Tuning the optical, electrical and thermal properties of L-arginine maleate dihydrate (LAMD) single crystals for optical limiter applications

Prince Thomas[1,2] · Greeshma C. Jose[1] · Veena Rose Mathew[1] · Priya Dominic[3] · Rajendhar Junjuri[4] · Reji Philip[3] · Manoj Kumar Gundawar[4] · Ginson P. Joseph[1]

Abstract

Pure and manganese chloride ($MnCl_2$) doped L-arginine maleate dihydrate (LAMD) single crystals are synthesized by slow solvent evaporation technique. Three different doping concentrations are used for the study. The grown crystals are confirmed by single crystal X-ray analysis. Laser-induced breakdown spectroscopy is used to ascertain the presence of the dopant. The changes in the optical parameters of the pristine and doped LAMD crystals are analyzed using UV–Vis spectroscopy and photoluminescence technique. The nonlinear absorption coefficient of pure and doped crystals is determined using open aperture Z-scan technique. The variations in the dielectric constant, dielectric loss, ac conductivity and electronic polarizability of the crystal by doping are also studied. The changes in the thermal properties of the pure and doped LAMD crystals are studied using TGA–DTG and DSC analyses.

1 Introduction

Amino acid complex crystals have been a subject of perennial concern of materials scientists due to their potential applications in the field of optoelectronic device fabrication. The organic counterparts with conjugate systems in amino acid-based crystals show enhanced electronic and nonlinear optical polarization responses [1]. The carboxylic acid group in the amino acid donates its proton to the amino group to form a salt of the structure $CH_3CHCOO^- \ NH_3^+$ [2]. The presence of an asymmetrical carbon atom and the formation of the complexes having non-centrosymmetric space groups are the important characteristics of amino acids as far as NLO properties are concerned. The recent studies show that the physical properties of the L-arginine based complex crystals have higher frequency conversion efficiency, nonlinear optical efficiency, damage threshold, transparency range and angular sensitivity than potassium dihydrogen phosphate (KDP) crystals [3]. L-arginine forms a number of salts with different organic and inorganic acids which show excellent nonlinear optical properties [4, 5]. Among them, L-arginine maleate dihydrate (LAMD) is the most prominent one.

Mallik and Kar [6] have succeeded in synthesizing LAMD crystals and have studied their solubility at different temperatures. LAMD crystals belong to triclinic crystal system with cell parameters a = 5.2710 Å, b = 8.0481 Å, c = 9.7942 Å, α = 106.155°, β = 97.265° and γ = 101.649° and the non-centrosymmetric space group $P1$ [7–10]. Priya et al. [11] synthesized the LAMD crystal through slow cooling technique and the optical nonlinearity of the material was studied using a single beam Z-scan technique. The unidirectional growth of the LAMD crystal using Sankaranarayanan and Ramasamy method and its characterization studies were done by Charoen-In et al. [12]. From the literature survey, we came to know that many researchers have reported the synthesis and fundamental properties of the titled compound [13–15]. However, this work explains how optical, electrical and

✉ Ginson P. Joseph
ginsonpj@gmail.com; ginsonpjoseph@gmail.com

1   Material Science Research Lab, Department of Physics, St. Thomas College, Palai, Kerala 686574, India

2   Department of Physics, Henry Baker College, Melukavumattom, Kerala 686652, India

3   Raman Research Institute, Bangalore, Karnataka 560080, India

4   Advanced Centre of Research in High Energy Materials (ACRHEM), University of Hyderabad, Hyderabad 500046, India

thermal properties can be tailored by the addition of $MnCl_2$ for the first time.

2 Experimental procedure

2.1 Synthesis of pure and doped LAMD crystals

Pure and doped LAMD single crystals are synthesized by the slow solvent evaporation method. Pure LAMD single crystals are prepared by dissolving the equimolar ratio of the AR grade reactants L-arginine and maleic acid in Millipore water (resistivity—18.2 MΩ cm) and stirred for 6 h to get a homogeneous solution according to the following chemical reaction

$NH_2CNHNH(CH_2)_3CH(NH_2)COOH$
$+ HOOCCHCHCOOH + 2H_2O$
$\rightarrow (H_2N)_2^+CNH(CH_2)_3CH(NH_3)^+COO^-$
$HOOCCHCHCOO^- 2H_2O$
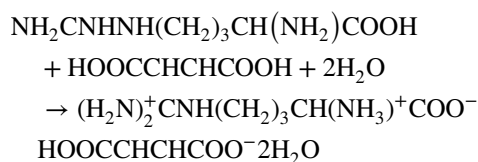
The stirred solution is filtered using Whatman filter paper and then poured into a beaker having a perforated lid. After 1 week, spontaneous nucleation starts and defect-free crystals are chosen from them for further growth.

The doped LAMD crystals are synthesized by adding three different concentrations of $MnCl_2$ namely 1, 2 and 3 mol%. The well-shaped pure and doped LAMD crystals of dimensions $24 \times 12 \times 3$ mm^3, $23 \times 15 \times 4$ mm^3, $18 \times 12 \times 4$ mm^3 and $9 \times 5 \times 2$ mm^3 are harvested within 30–40 days. The photographs of grown single crystals of pure and doped LAMD are shown in Fig. 1(a–d).

3 Characterization techniques

The cell parameters of pure and doped LAMD crystals were measured using a Bruker AXS Kappa Apex III (D8 QUEST) diffractometer equipped with CMOS detector with graphite monochromated MoK_α radiation of wavelength 0.71073 Å. Laser-induced breakdown spectroscopic (LIBS) analysis confirmed the incorporation of $MnCl_2$ into the LAMD crystals. The optical characteristics of the pure and doped crystals were studied by diffuse reflectance spectroscopy (DRS) with Jasco V 670 spectrophotometer ranging from 200 to 700 nm. The photoluminescence (PL) measurements were performed at room temperature with a Horiba Fluorolog Fluorescence Spectrometer. The nonlinear absorption coefficients of the pure and doped LAMD single crystals were determined using the open aperture Z-scan technique. The electrical properties of the samples were studied using
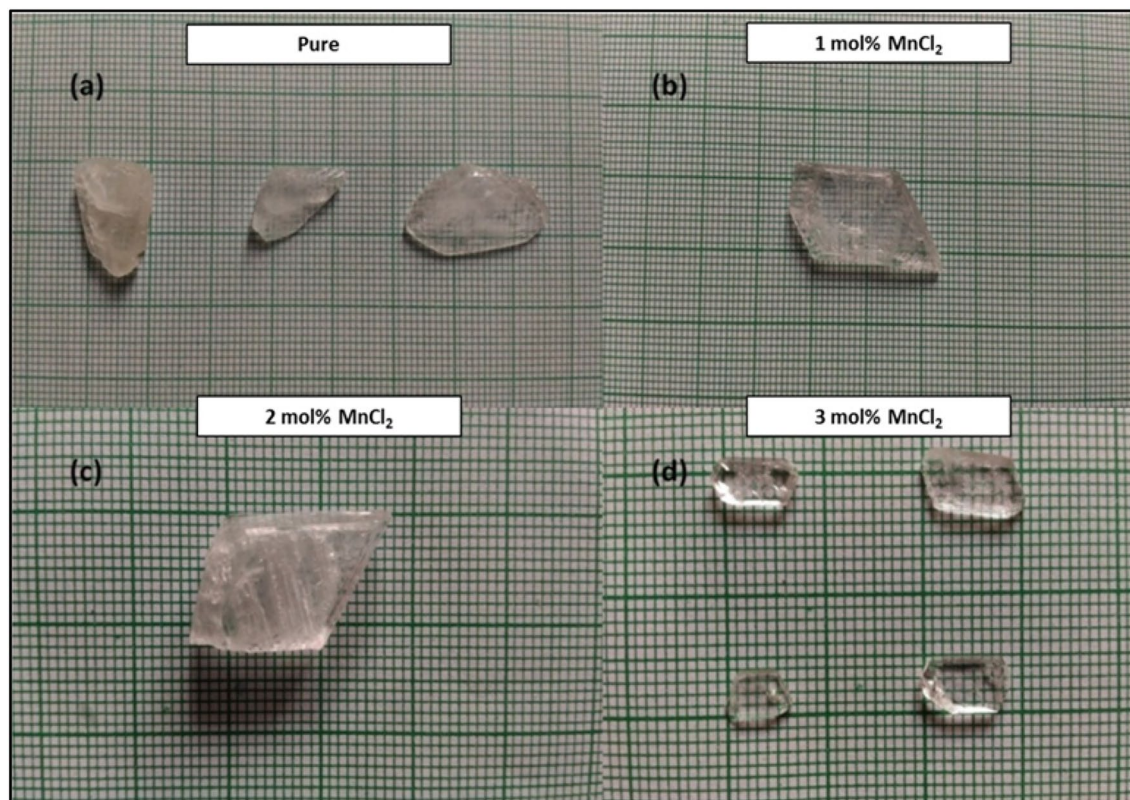
Fig. 1 (**a**) Pure LAMD crystals and (**b–d**) $MnCl_2$ doped LAMD crystals

Table 1 Cell parameters of pure and doped LAMD single crystals

Lattice parameters	Pure LAMD	1 mol% MnCl$_2$ doped LAMD	2 mol% MnCl$_2$ doped LAMD	3 mol% MnCl$_2$ doped LAMD
a (Å)	5.27	5.93	5.95	5.97
b (Å)	8.04	6.37	6.39	6.41
c (Å)	9.78	11.16	11.20	11.25
α (deg)	106.10	104.20	104.15	104.16
β (deg)	97.17	91.49	91.16	91.49
γ (deg)	101.80	100.16	100.20	100.22
Volume (Å^3)	382	401	406	409
Space group	$P1$	$P1$	$P1$	$P1$
Crystal system	Triclinic	Triclinic	Triclinic	Triclinic

a HIOKI 3532 LCR HITESTER at room temperature by changing the frequency. The thermal properties of pure and doped LAMD were investigated with the help of a PerkinElmer STA 6000 Simultaneous Thermal Analyser in the temperature range of 35–700 °C at a heating rate of 10 °C/min in the nitrogen atmosphere.

4 Results and discussion

4.1 Single crystal X-ray diffraction (SC-XRD) analysis

In order to confirm the structure of grown crystals, the cell parameters of pure and doped LAMD crystals were measured and the XRD data are tabulated in Table 1. From the data, it is clear that pure and doped crystals belong to the triclinic crystal system. The cell parameters and crystal system of pure LAMD crystal are in good agreement with the published data [13]. The cell volume increases by increasing the MnCl$_2$ concentration, but the crystal system remains unchanged.

4.2 Laser-induced breakdown spectroscopic (LIBS) analysis

The LIBS is a laser based spectroscopic analytical technique, which employs an intense laser pulse to create the plasma. De-excitation of the plasma species (atoms/ions) leads to characteristic spectral emission [16]. In brief, the plasma was produced by focusing a frequency doubled Nd:YAG laser of 7 ns onto the sample surface. The spectral emission is acquired in a range varying from UV to visible light using a Mechelle spectrometer connected to an Andor ICCD. The LIBS spectra of pure and doped LAMD crystal samples are shown in Fig. 2(a, b).

Several discrete peaks observed in the spectra were identified and assigned to different ionic and neutral states using the National Institute of Standards and Technology (NIST) database [17] and the results are given in Table 2.

While the spectra of the pristine samples show the presence of lines corresponding to the elements of carbon (C), hydrogen (H), nitrogen (N) and oxygen (O), the doped LAMD samples also show the presence of manganese. Also, the spectral lines of Na and Ca were observed in the LIBS spectra which could be due to the presence of impurities contaminated at the time of sample preparation/handling. The intensity of the Mn II line at 259.3 nm shows an increase in doping concentration. The spectral lines of the Cl are not observed in the spectra as most of the strong Cl lines are in deep UV region (80–140 nm), but the spectral sensitivity of the spectrometer is in the region of 220–880 nm. The intensities of the Mn II (259.38 nm) are plotted as a function of the doping concentration in Fig. 3.

4.3 UV–Vis analysis

The reflectance of the powdered samples is measured with Jasco V 670 spectrophotometer. From the obtained reflectance, the Kubelka–Munk function $F(R_\infty)$ is calculated using the relation [18, 19].

$$\frac{K}{S} = \frac{(1 - R_\infty)^2}{2R_\infty} \equiv F(R_\infty) \tag{1}$$

where S is the scattering coefficient, K is the absorption coefficient and $F(R_\infty)$ is the remission or Kubelka–Munk function.

The reflectance spectra (Fig. 4) show that the cut off wavelength shifts towards the longer wavelength region (optical red shift) may be due to the reduction in the energy difference between the bonding and anti-bonding molecular orbitals thanks to the delocalization of bonded electrons by the dopant MnCl$_2$. The optical band gap of pure and doped LAMD crystals is calculated from the Tauc plot [20].

Fig. 2 The spectral data in (**a**) 245–260 nm and (**b**) 260–850 nm regions
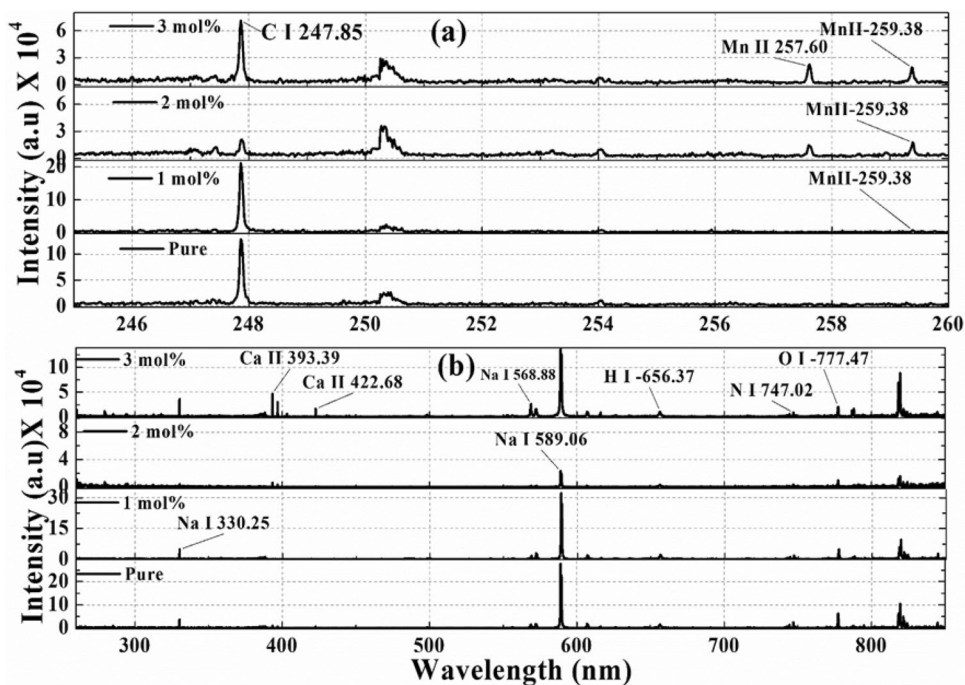
Table 2 Comparison of the observed emission wavelengths of different atomic/ionic species with NIST database

Peaks	Observed wavelengths (nm)	Wavelengths deposited in NIST database (nm)
C I	247.85	247.85
H I	656.37	656.28
N I	747.02	746.83
O I	777.47	777.19, 777.41
Mn II	257.60, 259.38	257.61, 259.39
Na I	330.25, 568.88, 589.06, 589.67	330.23, 568.81, 588.99, 589.59
Ca II	393.39, 422.68	393.36, 422.67
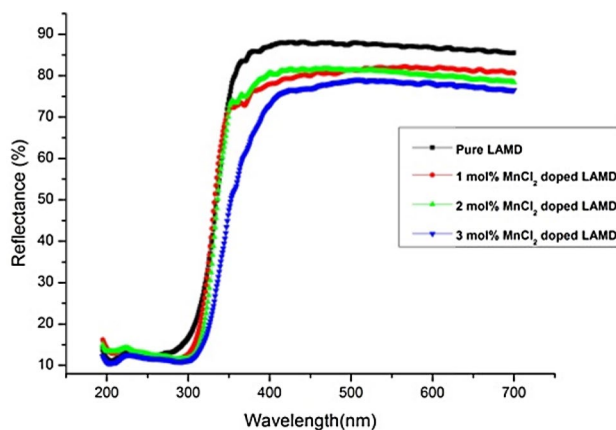
Fig. 4 Reflectance spectra of pure and doped LAMD crystals
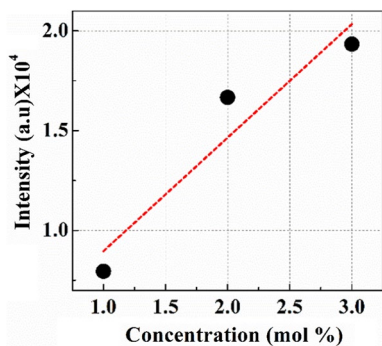
Fig. 3 LIBS intensity of Mn II (259.38 nm) line versus concentration. The experimental data are given by dots

For direct inter-band transitions, the absorption coefficient is given by

$$(\alpha h\vartheta)^2 = C_1\left(h\vartheta - E_g\right) \qquad (2)$$

where C_1 is a parameter which depends on transition probability, α is the linear absorption coefficient, h is the Planck's constant, ν is the frequency and E_g is the optical bandgap. If the material scatters in a perfectly diffuse manner or when it is illuminated at 60° incidence the Kubelka–Munk absorption coefficient, K becomes equal to 2α (K=2α) [21]. Thus, the Tauc equation using the Kubelka–Munk function, $F\left(R_\infty\right)$ transforms to

$$[F\left(R_\infty\right)h\vartheta]^2 = C_2\left(h\vartheta - E_g\right) \qquad (3)$$
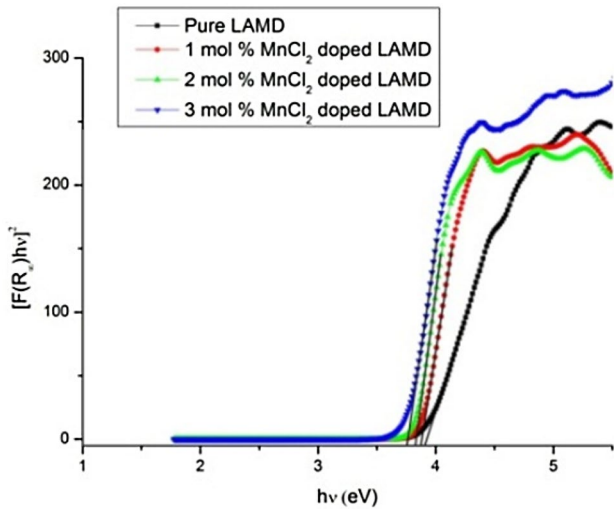
Fig. 5 Tauc plots of pure and doped LAMD crystals
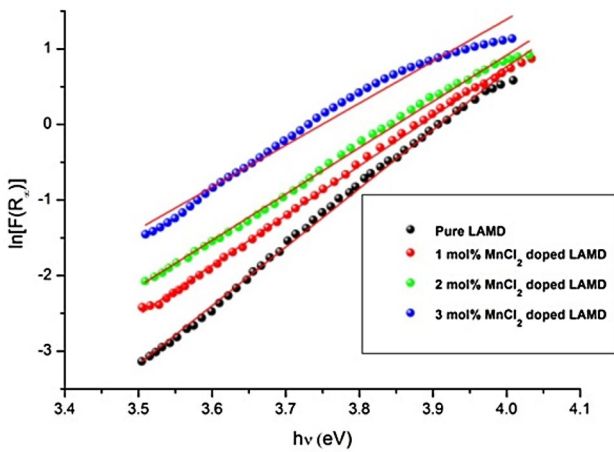
Fig. 6 $\ln[F(R_\infty)]$ versus photon energy in pure and doped LAMD crystals

and it is shown in Fig. 5. The refractive index is determined from the equation proposed by Reddy and Nazeer Ahammed [22], which is applicable to all type of materials are given by

$$n^4\left(E_g - 0.365\right) = 154 \tag{4}$$

where n^4 is the fourth power of refractive index and E_g is the band gap. Using the band gap values, it is found that the refractive indices are 2.57, 2.58, 2.59 and 2.60 respectively, for pure, 1 mol%, 2 mol% and 3 mol% $MnCl_2$ doped LAMD.

The photon energy dependence of the absorption coefficient α or $F(R_\infty)$ in the applied optical region, where the transitions involving the band tail states can be described using the Urbach rule [23], which is given by

$$\alpha = \alpha_0 e^{\frac{h\vartheta}{E_u}} \tag{5}$$

where α_0 is a constant, $h\nu$ is the photon energy and E_u is the Urbach energy which shows the structural disorder or the width of the exponential absorption edge. The plots of $\ln[F(R_\infty)]$ versus photon energy of pure and doped LAMD crystals are given in Fig. 6 and the optical parameters are tabulated in Table 3. From Table 3, it is observed that the cut off wavelength, refractive index and Urbach energy are increased with doping concentration increase, while the band gap energy is decreased with doping concentration.

4.4 Photoluminescence (PL) studies

The photoluminescence (PL) spectra of pure and doped LAMD single crystals are shown in Fig. 7. The wavelength 300 nm is used as the excitation wavelength and the experiment is carried out at room temperature. The broad peak centred at 406 nm for pure LAMD sample may be due to the protonation of the amino group to the carboxyl group [11]. But in the case of doped samples, the intensity decreases with doping concentration and the peaks becomes broader. The presence of the metal ion Mn may distort the crystal structure and reduce the electron–hole recombination process. Reduction in the radiative recombination leads to the decrease in intensity and broader peaks in the case of doped samples.

4.5 Z-scan measurement

The nonlinearity of pure and doped LAMD single crystals is measured using the open aperture Z-scan technique [24]. The saturation intensity I_s and reverse saturable absorption coefficient β can be obtained by fitting the nonlinear pulse

Table 3 Optical parameters of pure and doped LAMD crystal

LAMD sample	Cut off wavelength (nm)	Band gap energy, E_g (eV)	Urbach energy, E_u (meV)	Refractive index, (n)
Pure	300	3.90	130	2.57
1 mol% $MnCl_2$ doped	310	3.87	155	2.58
2 mol% $MnCl_2$ doped	315	3.81	166	2.59
3 mol % $MnCl_2$ doped	317	3.76	184	2.60
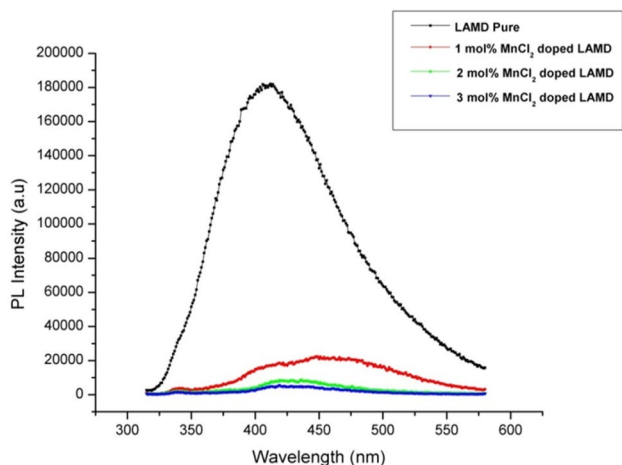
Fig. 7 PL spectra of pure and doped LAMD crystals

propagation Eq. (6) numerically to the measured transmission data. The experimentally obtained values are tabulated in Table 4.

$$\frac{dI}{dx} = -\left[\frac{\alpha_0}{\left(1 + \frac{I}{I_s}\right)} + \beta I\right] I \tag{6}$$

The Z-scan curves of the pure and doped LAMD crystals are shown in Fig. 8, and it is clearly seen that the experimental data and the theoretical fits are in good agreement with each other. The optical limiting curves are shown in Fig. 9. The experiment shows that the nonlinear absorption coefficient and the optical limiting efficiency increase with the doping concentration. The increase in nonlinear absorption coefficient with dopant concentration is depicted in Fig. 10.

Table 4 Nonlinear optical parameters (β and I_s) determined for pure and doped LAMD crystals, at the excitation wavelength of 532 nm

Sample name	Linear transmission	Energy, (μJ)	Spot radius, ($\times 10^{-6}$) m	Absorption coefficient, β ($\times 10^{-11}$) m/W	Saturation intensity, I_{Sat} ($\times 10^{12}$) W/m^2
Pure LAMD	0.9	60	13	0.29	18
1 mol% MnCl$_2$ doped LAMD	0.9	60	16	0.6	27
2 mol% MnCl$_2$ doped LAMD	0.9	60	16	0.71	20
3 mol% MnCl$_2$ doped LAMD	0.9	60	17	1.1	8
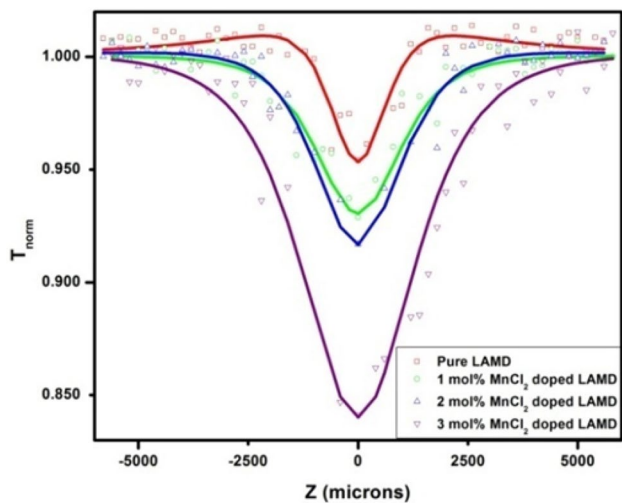
Fig. 8 Open aperture Z-scan curves of pure and doped LAMD crystals, using 5 ns laser pulses at 532 nm
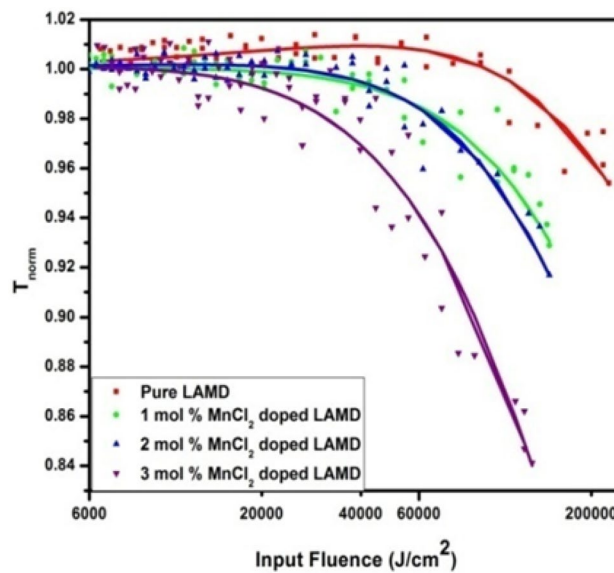
Fig. 9 Optical limiting curves of pure and doped LAMD crystals, as calculated from the open aperture Z-scan curves
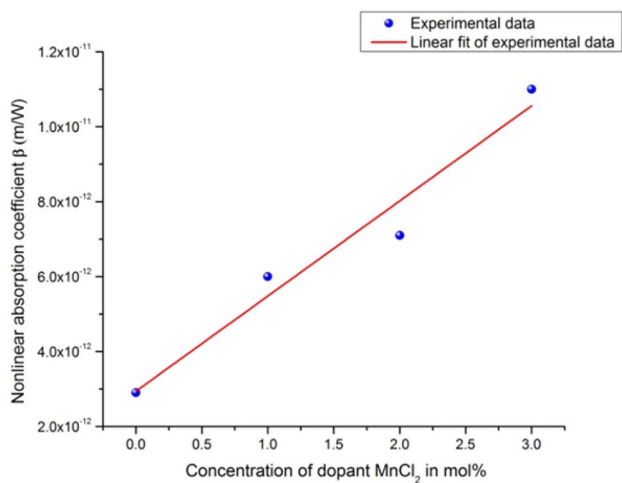
Fig. 10 Nonlinear absorption coefficient against concentration

4.6 Dielectric studies

The dielectric properties of pure and doped LAMD crystals are studied using a HIOKI LCR HITESTER within a frequency range from 500 Hz to 3 MHz. The variation of dielectric constant with frequency is shown in Fig. 11. The dielectric constants are high at lower frequencies and the values decrease on frequency increasing. The dielectric constant increases as the doping concentration increases. The dielectric constant at 1000 Hz are 268.49, 269.84, 301.17, 327.56 for pure, 1, 2, and 3 mol%, respectively. The dielectric losses of the sample show the same behaviour as dielectric constants (Fig. 12), i.e., the values also decrease with ac frequency and increase with doping concentration. The low values of dielectric loss at high frequencies may be due to the low defects, and the increase in the loss with doping concentration is due to the inclusion of foreign particle or

Fig. 11 Dielectric constant of pure and doped LAMD as a function of frequency
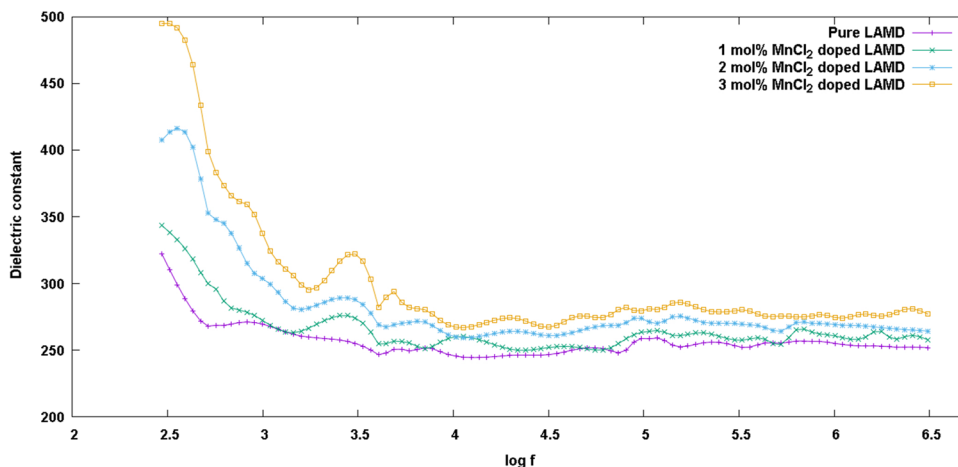
Fig. 12 Dielectric loss of pure and doped LAMD as a function of frequency

Fig. 13 AC conductivity of pure and doped LAMD as a function of frequency
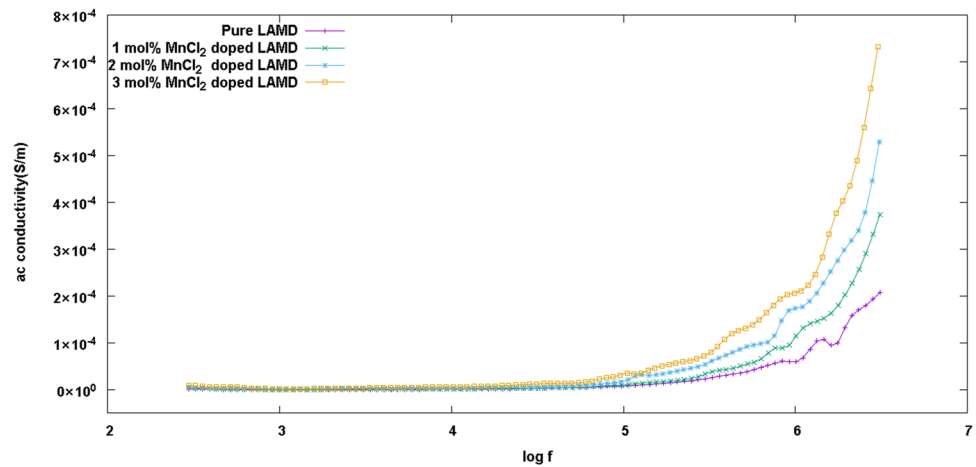
Table 5 Calculated polarizability parameters of pristine and doped LAMD crystals

Parameters	Pristine LAMD	1 mol% MnCl$_2$ doped LAMD	2 mol% MnCl$_2$ doped LAMD	3 mol% MnCl$_2$ doped LAMD
Electron plasma energy ($\hbar\omega_p$)	19.5435 eV	19.0802 eV	18.9627 eV	18.8927 eV
Penn gap (E_p)	4.1667 eV	3.6537 eV	3.4587 eV	3.3469 eV
Fermi energy (E_F)	15.5190 eV	15.0304 eV	14.9071 eV	14.8340 eV
Polarizability (α) from Penn Model	7.9514×10^{-23} cm^3	8.5621×10^{-23} cm^3	8.7559×10^{-23} cm^3	8.8701×10^{-23} cm^3
Polarizability (α) from Clausius–Mossotti equation	8.0346×10^{-23} cm^3	8.6296×10^{-23} cm^3	8.8180×10^{-23} cm^3	8.9291×10^{-23} cm^3

dopant to the system. The ac conductivity is also found to increase with frequency and doping concentration, as it is shown in Fig. 13.

The electronic polarizability of pure and doped LAMD are calculated from the valence electron plasma energy $\hbar\omega_p$, Penn gap E_p and Fermi energy E_F [25–28].

The valence electron plasma energy, $\hbar\omega_p$ can be calculated from the relation

$$\hbar\omega_p = 28.8\left(\frac{Z\rho}{M}\right)^{\frac{1}{2}} \tag{7}$$

where Z is the total number of valence electrons, ρ is the density, M is the molecular mass, $\hbar = \frac{h}{2\pi}$ and ω_p is the plasma angular frequency. The values of E_p and E_F depend on the valence electron plasma energy, $\hbar\omega_p$ and the relation can be written as

$$E_p = \frac{\hbar\omega_p}{\left(\varepsilon_\infty - 1\right)^{\frac{1}{2}}} \tag{8}$$

where ε_∞ is the value of the dielectric constant at high frequency. Then

$$E_F = 0.2948\left(\hbar\omega_p\right)^{\frac{4}{3}} \tag{9}$$

The electronic polarizability, α of the LAMD crystal can be calculated by using the relation

$$\alpha = \left[\frac{\left(\hbar\omega_p\right)^2 S_0}{\left(\hbar\omega_p\right)^2 S_0 + 3E_p^2}\right] \times \frac{M}{\rho} \times 0.396 \times 10^{-24} \text{ cm}^3 \tag{10}$$

where S_0 is a constant for the material and can be calculated from the relation

$$S_0 = 1 - \left[\frac{E_p}{4E_F}\right] + \frac{1}{3}\left[\frac{E_p}{4E_F}\right]^2 \tag{11}$$

The electronic polarizability, α_p can also be calculated by the Clausius–Mossotti equation:

$$\alpha = \frac{3M}{4\pi N_a \rho}\left[\frac{\varepsilon_\infty - 1}{\varepsilon_\infty + 2}\right] \tag{12}$$

where N_a is the Avogadro number. The calculated polarizability parameters for pristine and doped LAMD samples
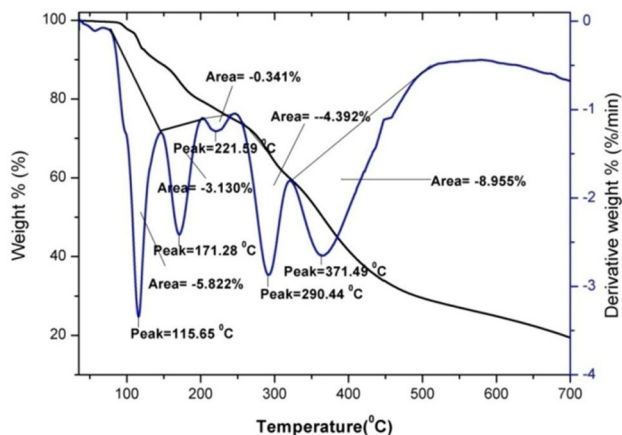
Fig. 14 TGA–DTG curve of pure LAMD

Fig. 15 TGA–DTG curve of 1 mol% MnCl$_2$ doped LAMD
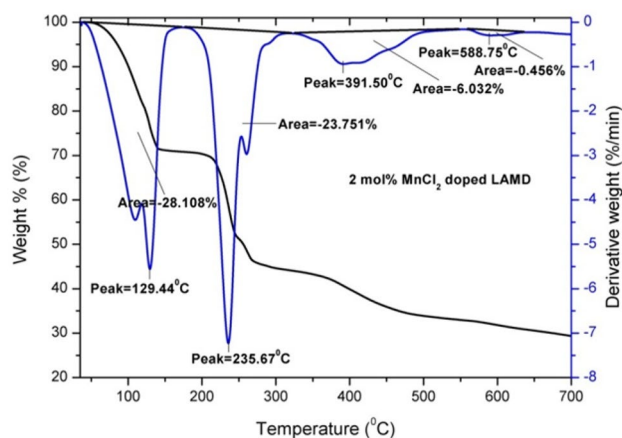
Fig. 16 TGA–DTG curve of 2 mol% MnCl$_2$ doped LAMD

Fig. 17 TGA–DTG curve of 3 mol% MnCl$_2$ doped LAMD

Table 6 Dissociation temperature and weight loss percentages from DTG

Samples	DTG peak temperature (°C)	DTG peak area (weight in %)
Pure LAMD	115.65	− 5.822
	171.28	− 3.130
	221.59	− 0.341
	290.44	− 4.392
	371.41	− 8.955
1 mol% MnCl$_2$ doped LAMD	124.93	− 28.18
	236.59	− 25.044
	389.71	− 5.093
2 mol% MnCl$_2$ doped LAMD	129.44	− 28.108
	235.67	− 23.751
	391.50	− 6.032
	588.75	− 0.456
3 mol% MnCl$_2$ doped LAMD	105.18	− 26.922
	223.32	− 19.307
	396.08	− 6.539

are given in Table 5. It is apparent from Table 5 that polarizability increased with doping concentration. Vasudevan et al. [15] and Priya et al. [11] showed that the polarizability of the LAMD crystal is greater than that of the KDP.

4.7 Thermal analysis

The thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC) of pure and doped crystals are carried out using a STA 6000 Simultaneous Thermal analyser (PerkinElmer). These two simultaneous measurements are carried out in nitrogen atmosphere with the heating rate of 10 °C/min. The TGA and DTG curves are shown in Figs. 14 15, 16 and 17. The variation of the weight percentage starts

Fig. 18 DSC curves of pure and doped LAMD
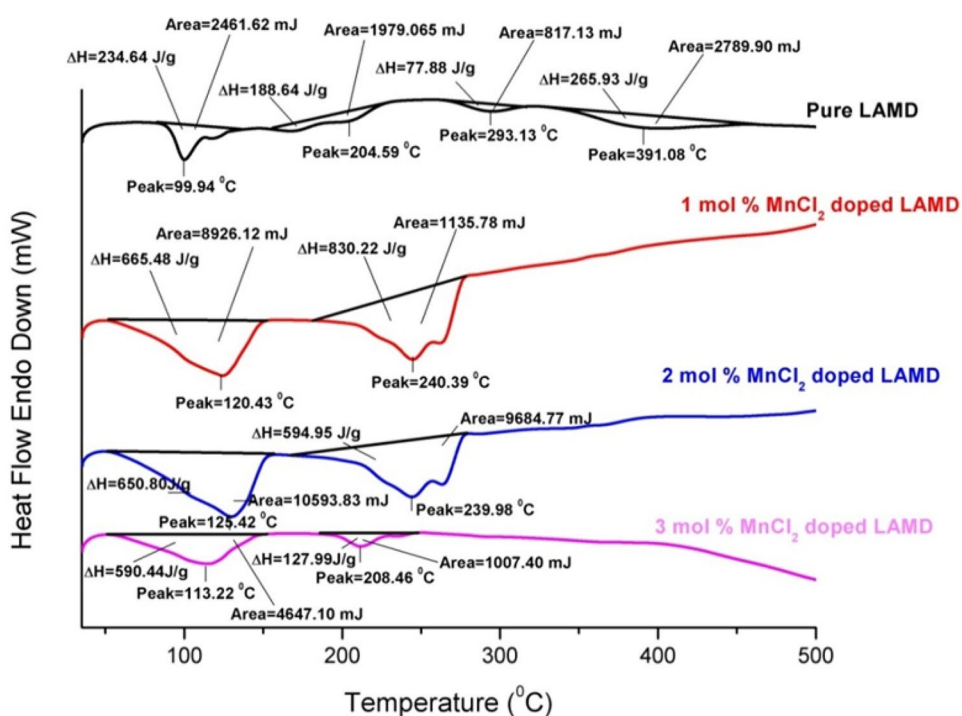
around 90 °C, which is due to the loss of water of crystallization. From the TGA–DTG plot of the pure LAMD, it can be observed that the dissociation of the sample is a four-step process but not clearly defined steps. From the TGA–DTG plots of the doped samples (Figs. 15, 16 and 17), it can be observed that the dissociation steps are clearly defined and steep in nature. The first two steps of the pure sample are merged into one in the doped samples. The temperature of dissociation and the weight loss in that temperature range is shown in Table 6. The DSC curves of pure and doped samples are also shown in Fig. 18. From the plots, it is clear that all the dissociation processes are endothermic. The first two endothermic peaks in the pure sample are fused into one in doped samples. The heat of fusion (ΔH) of each dissociation is indicated in corresponding peaks.

5 Conclusion

The low temperature solution growth technique is employed for the growth of pure and $MnCl_2$ doped L-arginine maleate dihydrate (LAMD) crystals. Pure and doped LAMD crystal belongs to triclinic crystal system with $P1$ space group. The LIBS spectra confirmed the incorporation of dopants in the parent crystal. The energy band gap of the pristine crystal is reduced from 3.90 to 3.76 eV. The Urbach energy is found to be increased. The polarizability calculations reveal that the polarizability of the material is increased with doping that enhances the nonlinear optical properties of the crystal.

This is also confirmed by measuring nonlinear optical coefficients β, of pure and doped crystals. The dielectric loss and ac conductivity also increase with doping concentration. The thermal dissociation character of the materials is studied using TG/DTG and DSC curves and the considerable changes are found due to $MnCl_2$ doping.

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UNDER WATER DANCE (AQUA DANCE) FOR HEALTH FITNESS

Mr. Jithin Thomas Abraham	Assistant Professor, Department of Physical Education, Henry Baker College Melukavu, Kerala

Abstract

Aqua dance aerobics is the performance of aerobic dance in fairly shallow water such as in a swimming pool. Water aerobics are just about perfect. Even though being in the pool seems very relaxing, it is still giving heart and muscles a great workout. Water exercise can even put in a better frame of mind. Water aerobics are not fast-paced heart-pounding workout. They are much slower than if you did them on land. The buoyancy factor provides support for the body, thereby reducing the likelihood of muscle, bone and joint injuries. Even though underwater moves use more energy and burn more calories. Dancing can also be enhancing positive mind set. It may provide benefits by reducing negative mood in terms of physical exhaustion. Therefore, water based exercise is one of the most potent alternative training methods for improving basic elements of their psychological, physical and physiological health.

Introduction

Aqua aerobic dance is the performance of aerobic dance in fairly shallow water such as in a pool. It is a type of resistance training. The water based aerobic dance is similar to land-based aerobic dance. The body is uplifted in water by process called buoyancy and since the viscosity or thickness of the water is greater than air, movement of the body through the water provides an increased level of resistance over land-based movements. The water creates a higher resistance than air and makes muscles work harder. Yet being in the water, the body only weighs a sixth of its mass and all movements become easier. So even though your muscles work harder you will not even notice it. The buoyancy factor provides support for the body, thereby reducing the likelihood of muscle, bone and joint injuries. Buoyancy is the ability of water to support a body's

weight. Because of less gravity, joints can easily be moved through the full range of motion without excess joint stress helping to improve flexibility. Water-based exercise classes began with an emphasis on the elderly that is no longer the case. Now the participants with varying levels and the full spectrum of ages are participating. The classes focus on aerobic endurance, resistance training, and creating an enjoyable atmosphere with music.

Aerobic Exercise

Aerobic exercise is any physical activity that makes you sweat, causes you to breathe harder, and gets your heart beating faster than at rest. It strengthens your heart and lungs and trains your cardiovascular system to manage and deliver oxygen more quickly and efficiently throughout your body. Aerobic exercise uses your large muscle groups, is rhythmic in nature, and can be maintained continuously for at least 10 minutes.

Plus points of Aerobic Exercise

- Improves your circulation and helps your body use oxygen better
- Increases energy
- Increases endurance, which means you can workout longer without getting tired
- Helps reduce the risk of developing heart disease
- Helps reduce the risk of developing diabetes
- Helps reduce body fat
- Helps you reach and maintain a healthy weight
- Helps reduce stress, tension, anxiety, and depression
- Improves sleep

Dance Aerobic

Dance aerobic involves any kind of dance put to music and can include everything from Zumba (a Latin-inspired dance aerobics) to hip-hop dancing. A typical dance class usually begins with a 5 to 10 minute warm-up, followed by a 20- to 30-minuteaerobic routine, and ends with a 5- to 10-minute cool down.

Benefits of Aqua Aerobics

Burns Calories

Aqua aerobics is a mix of strength and cardio workouts which is done in the face of water resistance. This ensures the body gets a full workout. Keeping in mind factors like cardio activity, weight, water temperature, volume and buoyancy, you can burn between 400 and 500 calories per hour of exercise.

Increases Muscle Strength

Because water flows in multiple directions, the resistance in the pool can range from four to 42 times greater than air. Therefore, the muscles get a rigid workout. According to a 2007 study, 12 weeks of regular aqua aerobics exercise gives significant gains in strength, flexibility and agility.

Builds Endurance

Water offers a natural resistance, unlike weights which require the body to pull and push against the weight plus gravity. Water needs the body to strain through the water and against it, building endurance.

Reduces Joint Pressure

Aqua aerobics relieve pressure placed on joints from normal wear and tear and arthritis. Hydrotherapy is recommended by doctors to those suffering from joint problems.

Increases Flexibility

Aqua aerobics requires movements in various directions while adjusting to the push and pull of water, hence the joints increase their range of motion. In the process, the body becomes more flexible.

Improves Mood

Aqua aerobic dance helps to fight depression, anxiety, stress etc.

Conclusion

A water based class can burn more calories than a comparable land-based class due to the increased resistance to movement while providing an increase in muscle strength and endurance. Both cardiovascular and strength training exercises may be part of an aqua aerobic dance program. Dancing may also be good for your mood. It has been shown to reduce depression, anxiety, and stress and boost self-esteem, body image, and overall sense of well-being.

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STATUS OF SPORTS GOODS RETAIL MARKET OF KERALA

JITHIN THOMAS ABRAHAM: Assistant Professor, Department of Physical Education, Henry Baker College Melukavu, Kerala

ABSTRACT

The purpose of the study was to analyses the status of sports goods retail market of Kerala. For the, study fifty one (N=51) sports goods retailers Kerala were selected as subjects for the study. The status of sports goods retail market of Kerala assessed through questionnaire. To examine the study frequency and percentage analysis was computed.

The study results based on the survey. I could find the positive trend of promotion of sports goods outlets such as comparison and competition. Significantly, the sellers are very much conscious about the stock of various items in their outlets especially the moving goods. Moreover, it is found that the location of the sports goods outlets place a key role in the sale. To be clear, the trade's persons depends on the qualities of the sports and the interest of the customer. Advertisement have a crucial role in the establishment of outlets in an area. Recently, retailers faced many problems, the first and foremost one was the updated tax policy by the government. It created reduction of the sale so the shop keepers forced to give maximum discount to attract customers. More sports participation creates more opportunities in business. It encourages the people to launch new outlets.

INTRODUCTION

Management is what managers do. But that simple statement doesn't tell us much. Retailers are a key component in a supply chain that links manufacturer to consumers. Retailers hire and promote people with wide range of skills and interests. It has been said that sport today is too much of a game to be a business and too much of a business to be a game. Managing sport organizations at the start of the twenty first century involves the application of techniques and strategies evident in the majority of modern business. So it must need to develop an understanding of the special features of sport and its allied industries that operate in the public.

METHODOLOGY

The investigator selected fifty one (N = 51) popular sports goods retailers from the different district of Kerala. For the data collection, questionnaire method is used. Scholar selected survey method and visited sports goods retailers to collect the data personally. Investigator give the assurance to the retailers that, the data would be used only for the research purpose. Frequency and percentage analysis was used to find out the status of sports goods retail market of Kerala.

ANALYSIS ON FINDINGS

Preference given by Retailers to sell Brands

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	INDIAN BRANDED GOODS	38	74.5	74.5	74.5
	NON - BRANDED GOODS	2	3.9	3.9	78.4
	IMPORTED GOODS	8	15.7	15.7	94.1
	LOCAL MANUFACTURED GOODS	3	5.9	5.9	100.0
	Total	51	100.0	100.0	

Interpretation:- From table above researcher analyzed that 15.7% retailers prefers to sell imported brand goods, 74.5% retailers preferred Indian branded goods of all Brands, 3.9% retailers prefers Non Branded sports goods and only 5.9% of sports goods retailers prefers Local manufactured sports goods to be kept for sell in their Outlets.

Companies Interest in solving consumers problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	35	68.6	68.6	68.6
	NO	16	31.4	31.4	100.0
	Total	51	100.0	100.0	

Interpretation:- Problem arises when the particular sports goods get defected due to which the consumer feels cheated. From table above researcher analyzed that 68.6% sports goods manufacturer's shows sincere interest in solving consumer's problems.

Incentives given to customers on bulk purchase

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CASH DISCOUNT	31	60.8	60.8	60.8
	COMPANIES SCHEME	13	25.5	25.5	86.3
	CREDIT FACILITIES	7	13.7	13.7	100.0
	Total	51	100.0	100.0	

Interpretation: - The retailers give various incentives to their customers in order to increase sales. From table above researcher analyzed that 60.8% sports goods retailers give Cash Discounts to their customers, while 13.7% retailers give credit facility on purchase, 25.5%

retailers pass Manufacturers Company scheme on that particular sports goods which consumer's desire and the retailers not provide various gifts to their customers on bulk purchase of sports goods.

Analyze reasons for the lost customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	45	88.2	88.2	88.2
	NO	6	11.8	11.8	100.0
	Total	51	100.0	100.0	

Interpretation: - The consumers of sports goods purchase the goods only when they feel necessity for those particular goods. Many times consumers prefer other outlets than the nearer ones. From table above the researcher analyzed that 88.2% sports goods retailers analyze the reasons for lost customer.

Encouragement for innovated sports goods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	47	92.2	92.2	92.2
	NO	4	7.8	7.8	100.0
	Total	51	100.0	100.0	

Interpretation: - The retailers often encourage their consumers to switch for newly innovated sports goods. The researcher from table above analyzed that 92.2% sports goods retailers encourage their customers to switch for newly innovated sports goods, while 7.8% retailers does not encourage their customers.

Net profit on sale of sports goods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	>20%	6	11.8	11.8	11.8
	20 - 15%	12	23.5	23.5	35.3
	10 - 15 %	20	39.2	39.2	74.5
	<10%	13	25.5	25.5	100.0
	Total	51	100.0	100.0	

Interpretation: Thus from table above researcher analyzed that 11.8% sports goods retailers feels that net profit on sports goods should be more than 20%, while 23.5% retailers feels that net profit on the sports goods should be between 15%-20%, 39.2% of the retailers are of the opinion that net profit should be between 10% - 15% and 25.5% of the retailers feels that net profit on the sports goods should be less than 10%.

Impact of Govt. Taxation Policy on prices of sports goods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	40	78.4	78.4	78.4
	NO	11	21.6	21.6	100.0
	Total	51	100.0	100.0	

Interpretation: - The sports goods retailers feel that there is a great impact of various taxes on prices of sports goods. From table above it has been analyzed that 78.4% sports goods retailers feels that various taxes on sports goods should be reduced so that the sales of sports goods may boost.

Impact of Geographic location on sales

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	43	84.3	84.3	84.3
	NO	8	15.7	15.7	100.0
	Total	51	100.0	100.0	

Interpretation: - From table above the researcher concludes that 84.3% retailers are of the opinion that the geographical location of the area is helpful in promoting sports activities in the area, due which the sales of sports goods is satisfactory.

Modes Retailers preferred for advertisements

	Frequency	Percent	Valid Percent	Cumulative Percent
LOCAL NEWS PAPER	7	13.7	13.7	13.7
BANNERS	11	21.6	21.6	35.3
SPONSORING VARIOUS TOURNAMENTS	26	51.0	51.0	86.3
ADVERTISING IN SPORTS MAGAZINES	5	9.8	9.8	96.1
ENDORSING SPORTS PERSONALITY IN YOUR AREA	2	3.9	3.9	100.0
Total	51	100.0	100.0	

Interpretation: - Due to highly competitive market of sports goods, sports goods retailers adopts various modes of advertisements in order to increase sales of their outlets. From Table No.A38 the researcher analyzed that 13.7% sports goods retailers prefers to advertise in local newspapers, 9.8% in sports magazines 3.9% endorsing sports personalities of the region in various games and 51.0% sports goods retailers sponsors various sports events in the area and 21.6% sports goods retailers of the region displays hoardings / banners of their firms.

Policies applied to increase sales

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	GIVING MAXIMUM CASH DISCOUNT TO CUSTOMER	43	84.3	84.3	84.3
	GIVING GIFTS ON EVERY PURCHASE	5	9.8	9.8	94.1
	SELLING GOODS ON CREDIT	3	5.9	5.9	100.0
	Total	51	100.0	100.0	

Interpretation: - In Kerala there is a highly competitive market of sports goods; the retailers apply various marketing policies in order to increase sales of their firms. From table above it has been analyzed that 84.3% retailers offer maximum cash discount to customers for improving the volume of sales, 5.9% retailers offer credit facility to consumers, while 9.8% retailers offer various gifts to customers for improving the volume of sales.

DISCUSSION ON FINDINGS

The study was conducted among the 51 individuals who are running their own business of sports goods in various districts in the state of Kerala, which is in the southern part of India. Interestingly, the majority of retailers engaged to this profession by choice. In fact, all the owners of the shops agreed that they had an active involvement in sports during their childhood. Based on the survey the trend has been progressing in very positive direction over the years. To be clear, the trade's person's purchase depends on the quality and durability of the sports goods and the interest of the customer. Hence, they prefer Indian brands rather than foreign brand because the consideration of environmental conditions as well as the platform of the playing conditions. The experts in the field of sports goods retail business claimed that the imported items are expensive due to the high-tech manufacturing process.

To embark on, some companies provide discount to the small-scale shopkeepers. Commonly the dealer has a special interest to sell some unique products because of the promotion of product. The study also helped me to explore the importance of sponsorship events, which conducts by these shopkeepers to keep inform their presence in the market. Recently, retailers faced many problems, the first and foremost one was the updated tax policy by the government. It created a mammoth reduction in the sales. Since the declined trading the shopkeeper was forced to give maximum discount to attract the customers. Apart from that the inability to handover the requested item on time to the customers makes a sense of bad impact to the outlets. Though the mismanagement of time by the wholesaler is the actual reason it gives a demerit to the shops.

From the survey I realized that there are plenty of matters influences the business in the market of sports goods. Some factors like price, reliability of advertisements, promotion

through the social media, brand name, customers satisfaction, discounts, flexible payment facility, quality of goods, style of packaging, outlet location, display of goods etc. are the factors which mostly affected. It is anticipated that the clients have the information about the product, which they are going to buy. They usually come up with basic idea about the targeted item. So no one can deceive them easily. There would a requisition for the salesman with convincing capacity. The employer interested to appoint the candidate with a background of physical education because they can manage this situation well. Undeniably, the healthy youngsters are the envoys of development in the realm of every trade. It is fervently hoped that every individuals would actively participate in sports as a routine of their daily life to be a part of a strong generation. The wider involvement in the games by the people and the business of physical recreation manufactured items are directly proportional. More participation creates more opportunity of trade. It encourages the people to launch new outlets

CONCLUSIONS

From the analysis it is evident that the retailers have sizeable profit from this trade. And the trend has been progressing in very positive direction over the years. To be clear, the trade's person's purchase depends on the quality of the sports goods and the interest of the customer. The advertisements have a crucial role in the establishment of outlets in an area.

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FLUID INTAKE DURING WORKOUTS BY THE MEN TRAINEES OF SELECTED FITNESS CENTERS IN KANNUR

JITHIN THOMAS ABRAHAM: Assistant Professor, Department of Physical Education, Henry Baker College Melukavu, Kerala

Abstract

The purpose of the study was to analyses 'fluid intake during workouts by the men trainees of selected fitness centers in Kannur' For the, study three hundred (N=300) trainees were selected as participants for the study. 'fluid intake during workouts by the men trainees of selected fitness centers in Kannur' assessed through questionnaire. To examine the study percentage analysis was computed. The study results based on the survey. The study provides an insight in the lack of knowledge about the importance of consuming frequent bouts of water during training among the trainees and the inability of the trainers or supervisors in educating the trainees about the significance of fluid intake. This may be due to the lack of scientific knowledge about all the training aspects on the part of trainers and supervisors. There are chances that serious health deterioration may happen if prolonged deprivation of fluid intake during training prevails. There should be some mechanism which monitors the fluid intake of trainees as well as educate them about the necessity. It should be made mandatory in fitness centers to display a board which signifies the need and importance of fluid intake.

Introduction

Water is essential to maintain blood volume, regulate body temperature and allow muscle contractions to take place. During exercise, the main way the body maintains optimal body temperature is by sweating. Heat is removed from the body when beads of sweat on the skin evaporate, resulting in a loss of body fluid. Sweat production, and therefore fluid loss, increases with a rise in ambient temperature and humidity, as well as with an increase in exercise intensity.

Methodology

The methodology pertaining to the study entitled 'fluid intake during workouts by the men trainees of selected fitness centers in Kannur'. The study was done among three hundred men. The participants were selected from the fitness centers in Kannur district. Fifteen fitness

centers were selected for the study. The investigator went to the fitness centers and collected the data's from the trainees. Investigator met the trainers of the fitness centers and they allowed the permission to move on the participants, the data's are collected through direct interview.

Result and Discussions

Table No. 1 - Workout timing of participants

Morning	Evening	Both	In-Between
42	52	6	Nil

Interpretation: Figure shows, among 300 participants 42 percent workout in the morning section and 52 percent workout in the evening section and the rest 6 percent workout in both morning and evening sections of a day.

Table No. 2 - Purpose of the workouts

Strength	Fitness	fatloss	Bodybuilding
35	25	15	25

Interpretation: Thus from table above researcher analyzed that 35 percent trainees workout for strength, 25 percent for fitness, 15 percent for fat loss and 25 for body building.

Table No. 3 - Trainees consuming fluid during workout

Yes	NO
88	12

Interpretation: Among 300 participants 88 percent of the subjects take any fluids during their workouts and 12 percent of the participants didn't take any fluids during their workouts.

Table No. 4 - Trainees awareness of dehydration process

Yes	No
37	63

Interpretation: only 37 percent of participants aware about the dehydration process and 63 percent didn't know about the process of dehydration.

Table No. 5 - Information provided by trainers about dehydration

Yes	No
26	74

Interpretation: Thus from table above researcher analyzed that 26 percent replied that trainers inform them about the process dehydration and 74 percent replied that trainers did not inform them about the dehydration process.

Table No. 6 - Feeling discomfort without fluid intake

Yes	No
83	17

Interpretation: the 83 percent of trainees feel discomfort during their workout without consuming water and 17 percent that they feel no discomforts during their workout without consuming water.

Table No. 7 - Fluid consumption intervals

In B/W Each Set	In B/W Each Repetition	Completion of WORKOUT	As their wish	Twice during the workout	Once during the entire workout
73	16	5	3	2	1

Interpretation: From table above the researcher concludes that 73 percent of the participants intake water in between each set, 16 percent intake in between each repetition, 5 percent intake during the completion of workout, 3 percent intake water as their wish, 2 percent intake twice during the workout and 1 percent intake water once during the entire workout.

Table No. 8 - Feeling energetic after fluid intake

Yes	No
69	31

Interpretation: 69 percentage of participants replied that they feel energitic after fluid consumption and 31 percent replied that they don't feel energitic after the consumption of fluid'

Table No. 9 - Sweating more after fluid intake

Yes	No
78	22

Interpretation: Among 300 participants 78 percent of participants replied that they sweat more when they consume more fluids and 22 percent replied that they don't sweat more when take more fluids

Table No. 10 - Workout more after the fluid intake

Yes	No
75	25

Interpretation: From the table above 75 percent of participant replied that they could workout more when taking water during workouts and 25 percent replied that they couldn't workout more when taking water during their workouts.

Summary and Conclusions

The study was conducted among the 300 individuals. The participants were selected from the fifteen fitness centres of Kannur district with no age limit. The result obtained from the study were consolidated and conclusion drawn from the study are summarized below.

In workouts dehydration is an important thing but only thirty seven percent from participants are aware about the dehydration process. The awarness about dehydration among the common peoples are very much limited. Many trainees replied that the trainers did not inform them about the process of dehydration. From this we could say that the trainers in the fitness centers of Kannur district are not professionally trained. Water is an inevitable component during workouts. More people replied that they feel discomfort during their workouts without consuming water, it is clear that consumption of water during wrkout is not avoidable. The dehydration during exercise can be avoided by intake of fluid during workouts. The athletes

should drink enough fluid to maintain fluid balance throuhout the exercise. The amount of fluid an individual can tolerate during exercise varies from one person to another.

In most sports, the body starts activity with normal total body water. As activity progesses over an extended period of time, dehydration can occur. The impact of volume depletion can influence the body in multiple ways. Muscle cramps can develop. Heat exhaustion occurs as the body losses its ability to cool itself. Rhabdomyolysis (breakdown of muscle) and exercise associated hyponatremia (loss of sodium) can develop. These processes all result in decreased exercise performance. From the study it can be concluded that consumption of water during workout is not avoidable the process of dehydration can be avoided by intake of water during your workouts.

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Indoor Court Marking Innovations

Jithin Thomas Abraham
Assistant Professor,
Department of Physical Education,
Henry Baker College Melukavu, Kerala

Abstract: The world of sport is continually changing over the years, and the use of technology is just one of those areas that have made an impact on many sports in the modern day. Technological development is rapidly changing almost every facet of the sports industry from the way sports are played and the facilities and equipments players use. Multi sports bring a whole new meaning to dynamic coaching. Coaches can use the customizable lines for enhanced training purposes as they have the ability to change the scenario at hand via the push of a button for the indoor court markings, a new type of glass surface that utilizes programmable lighting to create lines for indoor sports playing ground, with this system can be used for illuminating different courts at the touch of a switch, adapting to sports such as badminton, basketball, indoor soccer or hockey and handball or volleyball. Using a series modification with ceramic treatments to reach levels of elasticity and friction similar to traditional indoor courts, the surface technology provides enough bounce to make sure a ball responds to the same way as it would on a wooden floor. Combined with sensor technologies, digital markings can also provide reference to where a player's foot stepped out of bounds, or where a ball landed. We live in an age where sporting facilities are becoming ever more modern and state of the art, so the sports floor should be ready for the innovations.

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Introduction

The sports industry has always been a front runner in innovation. The world of sport is continually changing over the years. Multisport floor comes into play; the floor is the product of years of innovation and involvement within the sports industry. What has came out the other side is an astonishing piece of architectural genius which benefits the sportsperson, regardless of age or skill. The stunning LED lines housed beneath the sleek, colored glass on top could also double-up as a nice piece of modern artwork depending on your outlook. A stark contrast to the traditional, painted sports lines. We live in an age where sporting facilities are becoming ever more modern and state-of-the-art and the use of technology is just one of those areas that has made an impact on many sports in the modern day. Technological development is rapidly changing almost every facet of the sports industry – from the way sports are played and the equipment players use, to the way sports are governed, and, of course, the ways that we, spectators, watch and enjoy the on-field action.

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Elasticity and floor surface

Glass floor is more elastic than most wooden floors, elasticity and absorption are consistent across the entire area. Usually, glass reflects any source of light and has a slippery surface. But special treatment of the surface enables to achieve a very low level of light reflection. The floor surface does not reveal any visible reflections which means players are neither distracted nor blinded by glare. In fact, the surface looks very homogeneous and neutral. Non-slip properties are ensured by integrated ceramic dots, the number and size of which have been adapted so that the non-slip properties comply with those of traditional sports floors. The surface developed just the right level of slip resistance but prevents the risk of injury when a player dives for the ball or jumps.

Durability

The Glass Floor has an expected lifetime of 70 years. The materials used are glass, ceramic and aluminum which are known for their resilience and longevity. The main advantages however lie in the glass surface whose matt surface means that it does not show scratches or other signs of use, and the ceramic dots which withstand any kind of abrasion. The LEDs have a minimum life expectancy of 50,000 hours. Moreover, a floor with these properties allows one to use it for a variety of events which would be unthinkable of doing on a standard sports floor. It is possible to arrange non-sporting events, and access the floor with scaffolding or other heavy equipment.

Multi functionality

A professional set of marking lines for every sport is available with a touch on the control panel. Portable flooring for individual sports is no longer required. When the lines are turned off, the unique surface allows for any venue to be used as an expo space, entertainment venue, dance floor or for many other purposes.

Reasons for the Glass Floor

- Glass and aluminum do not age, so the Glass Floor with a "durability" of over 70 years is extremely durable and is an integral part of the sports hall.
- Due to its special surface, there is no damage or permanent soiling on the Glass Floor when using street shoes.
- No skin burns by slipping or falling down as with plastic coverings or wood lacquer.
- Unique elasticity, which excites all athlete.
- The clear LED field lines for different sports can be switched on and off individually. This avoids "line chaos" as with conventional trays.
- Insensitive to moisture and heat.
- The glass plates can be easily removed and reused at any time.
- Perfect sliding friction due to burnt-on ceramic points, which can be adapted to customer requirements by adapting size and density.
- The patented etching of the glass prevents mirroring in the surface.
- Unlimited advertising possibilities with LED video surfaces or color-printed and illuminated surfaces such as club or company logos.
- As a full-LED video floor, the ASB Glass floor offers an absolutely extraordinary visual experience.

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- The LED lines are clearly visible to players and referees in all lighting and all lighting conditions – even in strong sunlight.
- Easy cleaning and maintenance of the floor no specialist required.
- The surface cannot be damaged by sharp or hard objects.
- The illuminated lines creates a better sense of space for the playing field.
- The clarity of the lines makes it easier for referees to recognize whether a ball was out or not.
- A longer closing of the sports center for maintenance and maintenance work (as with wooden floors) is not necessary.
- Because of its long shelf life, the glass floor is a long-term investment and can be expanded from a hall and re-installed at another sports facility.

Conclusion

These innovations are great advantage to the sportsperson. Not only do they experience a better quality playing surface than the common wooden floor. But the quality of coaching and training they receive is also improved, the Multisport brings a whole new meaning to 'dynamic coaching'. Coaches can use the customizable lines for enhanced training purposes as they have the ability to change the scenario at hand via the 'push of a button' (touch screen).

Creativity has no limits and in the sports industry, innovation is constant, whether it is to improve the performance of athletes themselves or the fan experience. The sports industry is continuously moving; that is why it is an interesting business for entrepreneurs and innovators. One should definitely highlight one new trend in this sector, which is the use of technology in sport. They must always insist on high value creation through quality and intelligent design, thus having utilized modern technology to aid design in creating the innovative sports floor of the future.

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Relationship of Selected Psychological and Physical Performance Variables to Playing Ability of Women Ball Badminton Players

Mr. Jithin Thomas Abraham

Geemon M.G

Assistant Professor in Physical Education, Henry Baker College Melukavu, Kerala
Research Scholar, School of Physical Education and Sports Sciences, Kannur University, Mangattuparamba Campus P.O, Kannur, Kerala-670567

Abstract—The purpose of the study was to find out the relationship of selected psychological and physical performance variables to playing ability of women Ball badminton players. Purposive sampling design was used in this study. For this purpose forty (N=40) university level women Ball badminton players at the age of 18 to 23 years were selected from Kerala. The psychological variables selected for the study were anxiety, aggression and concentration. The anxiety and aggression of the players were measured by using standardized questionnaire that sports competitive anxiety test and aggression test and concentration measured by using concentration grid. The physical performance variables selected for the study were agility, reaction time, flexibility, speed of movement, hand power, back power and leg power. agility was assessed by shuttle relay, reaction time was assessed by nelson hand reaction time test, flexibility was assessed by sit and reach test, strength/power were assessed by using hand grip dynamometer, back strength dynamometer and leg standing dynamometer. The data were statistically analyzed by Pearson product movement correlation was used to compute correlation between psychological and physical performance variables to playing ability of women Ball badminton players. The findings indicated that the correlation coefficient of anxiety and playing ability (-0.06), aggression and playing ability (0.21) were found not to be significant at 0.05 level of confidence. But in the case of concentration and playing ability (0.37) was found to be significant. The findings indicated that the correlation coefficient of agility and playing ability (0.06), reaction time and playing ability (-0.23), flexibility and playing ability (0.08), speed of movement and playing ability (-0.20), hand power and playing ability (-0.04), back power and playing ability (-0.09) and leg power and playing ability (0.24) were found to be not significant at 0.05 level of confidence.

Relationship of psychology to playing ability and Relationship of physical performance to playing ability

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I. INTRODUCTION

Ball badminton is a fast-paced game; it demands skill, quick reflexes, good judgment, agility, and the ability to control the ball with one's wrist. The modern Ball badminton game needs High degree of accuracy, Reaction, Strength, Flexibility and Reflexes to perform powerful smashes, Fast rallies, Strokes and Shut- at-net.Psychological factors play an important role on the playing ability and performance of the athletes or players. Physical performance directly influences the playing ability of the athlete.

II. METHODOLOGY

A total of forty (N=40) women Ball badminton players in the range 18-23 years were selected as the subjects for the study. All of them have represented university Ball badminton team from Kerala state. The psychological variables and physical performance variables were selected by reviewing and studying related literature in detail and playing ability assessment was through experienced experts. A feasible analysis of as to which of the important variables could be taken for the investigation was made in consultation with supervisor and the experts keeping in mind the availability of the equipment's acceptability of the subjects and the suitable time that would be developed for test as well as to keep the entire study integrated. For the purpose of the study the following variables: Anxiety questionnaire: - Sports Competitive anxiety test (Martens, Vealey. Burton), Aggression questionnaire: - Aggression test Tiware and Chauhan, Concentration grid test:-Robert s Weinberg and Physical performance variables: Agility: - Shuttle relay, Reaction Time: - Drop test. Nelson hand reaction time test, Flexibility: - Sit and reach test, Strength: - (Hand grip dynamometer, back strength dynamometer, leg standing dynamometer.), Speed of movement: - Nelson's speed of movement test the descriptive statistics was computed to understand the nature of spread of data. Pearson Product Moment Correlation was calculated to find out the relationship of selected variables to playing ability

Analysis of Data and discussion on results
Relationship of selected psychological variables to the playing ability of women Ball badminton players

Psychological variables	Co effi. of Correlation	Sig Level
Anxiety	-0.06	0.74
Aggression	0.21	0.20
Concentration	0.37*	0.02

*Correlation is significant at the 0.05 level and table value (df 38) is 0.31

Relationship of selected physical performance variables to the playing ability of women Ball badminton players

Physical performance variables	Co effi. of Correlation	Sig Level
Agility	0.06	0.72
Reaction time	-0.23	0.15
Flexibility	0.08	0.62
Speed of movement	-0.20	0.22
Hand strength	-0.04	0.81
Lower back strength	-0.09	0.59
Leg strength	0.24	0.14

*Correlation is significant at the 0.05 level and table value (df 38) is 0.31

III. DISCUSSION AND FINDINGS

The study on Relationship of selected psychological and physical performance variables to playing ability has brought to light few findings and observations. The purpose of the study was to find out the Relationship of selected psychological and physical performance variables to playing ability of women Ball badminton players.

IV. PSYCHOLOGICAL VARIABLES

The Psychological variables selected for the study were anxiety, aggression and concentration. The result showed that only concentration has significant relationship on playing ability of women Ball badminton Players. The result implies that concentration is an important psychological qualities needed for in Ball badminton.

Physical performance variables

The physical performance variables selected for the study were (agility, reaction time, flexibility, speed of movement, hand strength, lower back strength and leg strength). On the basis of the statistical analysis it is showed that there wouldn't exist any significant difference in physical performance on playing ability of women Ball badminton players. So the role of physical performance are not much relevant in Ball badminton at certain extent.

Concentration is one of the major factor needed for playing Ball badminton. Ball badminton is a fast paced game and as a Ball badminton player without proper concentration, this game cannot be played. The study relationship of selected psychological and physical performance variables to playing ability of women Ball badminton players found that there was significant relationship between psychological variable concentration to playing ability of Ball badminton players. The study also found that there was no significant relationship between psychological variables namely anxiety and aggression. It may because of women are less aggressive as compared to men and the game is not a body contact game. Experience of the players played an important role in the anxiety level. The subjects selected for the study had more than eight years of experience. This Ball badminton players and competition may be the reason for non-significant difference in anxiety of women Ball badminton players.

The study also found that there was no significant relationship between the selected physical performance variables (agility, reaction time, flexibility, speed of movement, hand strength, lower back strength and leg strength) and playing ability of women Ball badminton players. As compared to any other major games such as football, hockey, volleyball basketball the physical performance of Ball badminton are not that important. Ball badminton is a team game were players playing normally in stationary position. There is lack of movement in the position during the game. During the practice sessions also the players were doing standing practices such as wall practice and service practices, shutting practices, smash practice and floating. The result of the study indicates that the selected physical performance qualities have no co-relation with the playing ability in fact all this qualities are contributing factor in the Ball badminton consider nature of the game reaction time is needed to react fast observing the opponents action and same way speed of movement also. Agility and flexibility is required to move freely to different direction and range.

The important factor that can be noted from the results of the study that the physical fitness level of Kerala women Ball badminton players are very poor. If they improve this qualities they may be able to perform better in the game an in competition tournaments are held only at national Ball badminton is as compare to other game. Hence players may not put much effort on improving performance. Hence it is important to include fitness training as part of the total training program of Ball badminton players.

Summary, Conclusions and Recommendations
Summary

The present study was under taken to determine the relationship of selected psychological and physical performance variables to playing ability of women Ball badminton players. Purposive sampling design was

used in this study. For this purpose forty (N=40) university level women Ball badminton players at the age of 18 to 23 years were selected from Kerala.

Ball badminton is a fast-paced game; it demands skill, quick reflexes, good judgment, agility, and the ability to control the ball with one's wrist. Games are usually played outdoors during the day. All-India tournaments are conducted regularly using floodlights in Tamil Nadu, Pondicherry, Andhra, and Karnataka.

Psychological factors play an important role on the playing ability and performance of the athletes or players. Sports are a Psycho-Social activity, the psychology plays an important role in the game of Ball Badminton. An adequate amount of aggression is critical for enhancing performance and negative aggression effects inversely. Like physical activities, psychological factors were also taken place in playing ability and also in the performance.

Physical Performance was developed with a passion for helping people learn how to exercise properly and how their bodies truly function. Our interest is in encouraging our clients to have the best conditioning programs to fit into a lifestyle that will not only help them to be healthier and more physically fit, but also happier overall.

The psychological variables selected for the study were anxiety, aggression and concentration. The anxiety and aggression of the players were measured by using standardized questionnaire and concentration measured by using concentration grid.

The physical performance variables selected for the study were agility, reaction time, flexibility, speed of movement, hand strength, lower back strength and leg strength. agility was assessed by shuttle relay, reaction time was assessed by nelson hand reaction time test, flexibility was assessed by sit and reach test, strength were assessed by using hand grip dynamometer, back strength dynamometer and leg standing dynamometer.

Pearson product movement correlation was used to compute correlation between psychological and physical performance variables to playing ability of women Ball badminton players.

The findings indicated that the correlation coefficient of anxiety and playing ability (-0.06), aggression and playing ability (0.21) were found not significant at 0.05 level of confidence. But in the case of concentration and playing ability (0.37) was found significant.

The findings indicated that the correlation coefficient of agility and playing ability (0.06), reaction time and playing ability (-0.23), flexibility and playing ability (0.08), speed of movement and playing ability (-0.20), hand strength and playing ability (-0.04), lower back strength and playing ability (-0.09) and leg strength and playing ability (0.24) were found not significant at 0.05 level of confidence.

V. CONCLUSION

The results of the present study were concluded that there was a positive relationship between concentration and playing ability of Ball badminton women players of Kerala, whereas no relationship between psychological variables namely anxiety and aggression with playing ability among women Ball badminton players.

The study revealed that there was no correlation with physical performance variables namely agility, reaction time, flexibility, strength and speed of movement to playing ability of women Ball badminton players.

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VI. RECOMMENDATIONS

❖ Create awareness among women Ball badminton players and coaches about the importance of physical Fitness.

❖ Coaches must give considerations for the improvement of physical fitness of women Ball badminton players.

❖ Coaches should to add more training programs to enhance the physical Fitness of women Ball badminton players.

❖ Concentration of the players is to be improved for better performance.

✜ Similar study may be conducted among national level players.

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A Canonical Correlation Approach to Measure Strength of Interrelationship between Causes and Psychological Effect of Job Stress among Bank Employees in Kerala

Dr. Gangadathan Nair D

Associate Professor and Head, PG Department of Commerce, SVR NSS College, Vazhoor, Kerala- 686 505, S.India

Dr. Gireesh Kumar G S

Principal, Henry Baker College, Melukavu, Kottayam (Dist), Kerala-*686652*, S.India

Email: gireeshkartha@gmail.com

Abstract

Job Stress has become a pervasive problem at workplace. Myriad factors are responsible for the extent, causes and effects of stress which varies across industries. The proposed study was conducted among bank employees in Kerala covering public sector banks, old private sector banks and new generation banks. Analysis of extensive survey data collected from respondent employees identified 13 dimensions of causes job stress and 3 dimensions of psychological effect of stress on individuals which are Professional Anxiety, Social Isolation and Professional Dissatisfaction. Canonical correlation analysis is attempted to study the strength of interrelationship between sources and psychological effects of job stress. Study established the hypothesized interrelationship between stress factors and psychological effects of stress.

Keywords: Job Stress, Psychological effect, Work-home interface, Professional Anxiety, Social Isolation, Professional Dissatisfaction

Introduction

Occupational stress is a serious and enduring problem in the workplace. The last few decades have brought about dramatic changes in the nature of work in organizations. The introduction of new technology, particularly the use of computers, in the workplace, coupled with huge shift towards globalization and privatization with its inherent features of mergers, acquisition, strategic alliances

and downsizing, restructured the functioning of industries. In order to compete successfully in the increasingly competitive global market, many organizations started to depend on subcontracting and outsourcing which undermine the requirements of permanent employees.

As a result of these changes in the work environment, significant changes have been noted in the conditions of work and employment. The demands for skilled or multi-skilled employees have increased in tandem with the growth of information technology. Employees are being asked to perform multiple tasks and are forced to carry work home. Jobs have become less stable and secure. The number of hours worked per week continues to increase. All these changes in the work atmosphere, along with organizational changes, increased the occupational stress and related disorders among the employees.

Stress is an experience that disrupts a person's emotional and physical state, such as giving too much work that causes someone to become overtired or get into arguments with co-workers that results in anger. Stress is an integral part of the work life and in fact a great deal of a person's stress comes from work.

Whenever an individual feel that the demand from the job is beyond his/her capacity, he/she is said to be under stress. Stress leads to strain. Stress is felt at the psychological level leading to strain which is felt at the physical level. Irrespective of the professional status, position in the organization or strata of the society to which they belong, people experience stress and strain.Stress could be a stimulating experience as long as it is within a controllable limit. When it goes beyond this limit, stress becomes distress, which is difficult to manage. At this stage employees feel helpless and hopeless and their work will become dull and everything will go wrong. This situation leads to reducing his/her efficiency and effectiveness in performing the role assigned to him/her in the workplace, society and family.

There are two types of stress, namely positive (Eustress) and negative (Distress). Positive stress offers potential gain leading to better performance, whereas negative stress creates deep dejection, despondency and depression. One's effectiveness may rise up to a particular level of stress, but beyond that level, it invariably drops. In the work environment, when people feel unable to exert any control or influence over the demand placed upon them, a sort of tension is created that may result in stress.

Work stress is perceived and interpreted differently by individuals; and their capacity to cope with it and respond to it also differs significantly. Situations that may impose stress on one individual may not be stressful to others. Individual characteristics such as personality traits and coping style can influence how a person responds to work stress. Although these characteristics can be partly responsible for how people respond to stress, working conditions such as workload, demands and pressure, conflicting expectations, or fear of lay-offs or being fired at can influence the amount of stress that one feels. Individuals with certain personality characteristics, such as Type A personality traits or people prone to depression, may respond more often and more intensely to work-related stress. Work stress can also result from an imbalance between a person's efforts and the personal rewards he or she receives from work, for example, workers who take on responsibilities above and beyond their normal workload but who don't receive the promotion they feel they deserve, may be prone to stress.

The recognized causes of stress are numerous and these include heavy workload, unpleasant work practices, work pressure, management techniques and approaches and work environment. Stress can also be created in a situation where there are no clear job descriptions or career prospects. Lack of support from superiors and non-co-operation of subordinates also results in stress development. Heavy responsibility without sufficient authority and decision-making power, time deadlines to finish the work, inadequate time to attain the target, etc., normally enhance the stress of an individual. Lack of participation in decision-making, lack of recognition or reward for better performance, absence of grievance redress mechanism, etc., are the possible causes of stress. In short, stressors can be physical, emotional, internally or externally generated.

Occupational stress is a major problem in many industries. Though there may be some benefit from small amounts of stress such as helping one to remain productive and challenged at work, prolonged stress can have debilitating consequences. Despite work posing an exciting challenge for people, it can significantly contribute to health problems that include both physical and psychological symptoms. Although work stress is not a disease, it has some negative health outcomes. Occupational stress can lead to health problems, including the onset of new health concerns such as cardiovascular disease or it can exacerbate existing conditions such as asthma, irritable bowel syndrome, or high blood pressure. Mood and sleep disturbances, headaches, fatigue and gastro-intestinal problems can also be associated with job stress. Depression and anxiety too can be linked to prolonged job stress.

All these health concerns can lead to increased absenteeism, decreased work performance and increased health insurance expenditures. Most concerning is the relationship between work stress and behavioral problems such as anger that can lead to violence in and out of the workplace. Work stress can also contribute to alcohol or other drug abuse, whereby people use alcohol and other drugs to regulate their emotions and cope with difficult and stressful work situations. Stress can deteriorate social and family relationship and eventually burn one out. The corporate world, therefore, needs to recognize stress as a problem and take necessary steps to act upon it. Stress can cause poor work performance and lower employee morale. These factors, in turn, increase employee turnover rate and lessen the quality of life.

Although a degree of stress may clearly be beneficial in providing stimulation and creating energy for better productivity and efficiency, its prolonged presence gives way to physical and mental reactions, collectively known as 'stress reactions'.The majority of stress researchers have concluded that stress gives rise to negative emotional experiences causing significant deterioration in the individual's adjustment, behavioral effectiveness, and health.

Excessive stress is, therefore, destructive, leading to a deterioration in performance (Cox.1993) as well as job dissatisfaction, accidents, unsafe working practices and high absenteeism (Cooper 1986); Smith and Sulsky, 1995). It is also associated with mood changes causing feeling of tension, anxiety, fatigue and depression (Cox and Ferguson, 1991; Stone etal., 1993). Studies have demonstrated the relationship between stress and cold(Jones and Bright,2001). Certainly, stress is depressing, demoralizing and de-motivating. Affected individuals often display decreased energy

associated with an inability to keep up with the pace of work.They often perceive that great personal expenditure is required at work for very little personal gain or reward(Farrington, 1997). Self-esteem may significantly decrease, accompanied by feeling of both failure and hopelessness. The personal cost of work-related stress is, therefore, high and may incorporate significant grief and suffering and, at times, premature death (Levi, 1996); it may significantly detract from general quality of life and well-being (EASHW, 2000). Such effects, in turn, markedly influence the way individuals feel, think and behave, resulting in cynicism, negativism and self-depletion; these are often worsened by the fact that few people are prepared to admit suffering from stress or seek help from it.

Most researchers argue that the consequences of stress can be classified into three major types: Psychological, Physical and Behavioral (Brief, Schuler and Van Sell, 1981; Cooper and Marshal, 1976;Ivancevich and Matterson, 1980). It is possible that the reaction to the stressor, generally, is psychological first and then physiological and/or behavioural. Someone who perceives a great deal of work overload might feel anxious (psychological strain), and the anxiety might then cause one to lose sleep (physical strain) by thinking about the overload. When one loses sleep for an extended period of time, the individual might resort to taking extra sleeping pills (behavioural strain). Anxieties, loss of sleep and taking sleeping pills have an effect on one's overall performance.

Review of Literature

"Organizational climate, role stress and locus of control in job involvement among bank personnel", is a study conducted by **Kedarnath(1988)** among 500 bank employees to assess role stresses, motivational climate, locus of control and job involvement.   The findings of this study revealed that those who experienced high role stresses showed less job involvement. In other words, high and low scoring groups on role stress variables differed significantly with regard to job involvement.

Umasekaran (1989) in a study titled, "Paths to the job satisfaction of bank employees", investigated casual connections among job characteristics, sense of competence (SOC), job involvement (JI) and job satisfaction (JS) using 267 bank employees. The study found that work ethics had significance to both job involvement and sense of competence, and increasing confidence in job competence and skill variety had direct path to job satisfaction. Stress had a direct, negative path to job satisfaction in addition to its negative influence on sense of competence. The data indicates that making work more

interesting, reducing stress and facilitating success experience would progressively increase employees' sense of competence, which would result in increased job satisfaction.

In the study "Occupational stress: field dependence-independence and job level in banking organizations", conducted by **Herode, R.D and Palnitkar. A. (1987)** a sample of 100 officers and 100 clerks was used.. The analysis revealed that field dependence-independence had a positive and significant association with Occupational Stress and that it was normally distributed among middle and lower level managers. The study also contended that Occupational Stress was significantly higher among officers than among clerks. Field independent officers were found to experience more occupational stress than field- dependent clerks, whereas field-independent clerks experienced more occupational stress as compared to field-dependent officers.

Chaudhary, A (1990) in a study examined the relationship between role stress and job satisfaction among bank officers. The main findings of the study was that overall indices of role stress and job satisfaction were found to be negatively correlated in the higher as well as the lower age groups of bank officers.

Rajeswari, T.R (1992) in her research work "Employees' stress: A study with reference to bank employees", found structured rigidity and poor physical working condition to be the sources of stress. This study was conducted among 34 officers and 79 clerks from five nationalised banks.

A noteworthy study related to bank professionals was conducted by **Pattanayak, B and Mishra, P.K. (1997)** in their work "Life in Organizations." The main objective was to explore specifically the prevalence and determinants of organizational climate, job stress and job strain among the employees in the service sectors.This study revealed that significant differences were experienced between younger and older employees on dimensions of experience of inequity, job difficulty and inadequacy of role authority. Job strain due to latent hostility, depression and physical strain was found to be uniformly distributed in both banking and insurance sectors. Further, younger age employees scored higher on job strain dimensions as compared to older age employees.

Chand and Sethi(1997) conducted a study titled "Organizational factors in the development of work stress" to examine the organizational factors as predictors of job- related strain. As many as 150 junior management scale-1(JMS-1) officers working in various banking institutions in the State of Himachal Pradesh were taken as sample. Co-efficient of correlation and stepwise

Multiple regression analysis were used to analyze the data. The study found significant positive relationships between job-related strain and role overload, role conflict and strenuous working conditions. The relationships of other organizational variables with job related strain were also in the expected direction, though not significant.

In the study "Locus of control as determinant of organizational role stress",**Ashwinkumar Malik and MadhulikaSabharwal(1999)** examined the relationship between role stress and locus of control in bank employees.The findings partially confirmed that those with an internal locus of control experienced less stress than those with an external locus of control.

Karen, Keelay and Mark Harcourt (2001)made a study titled "Occupational stress: A study of the New Zealand Reserve Bank". This study utilizedKarasek's job strain model to predict a variety of potential responses to prolonged stress at the New Zealand Reserve Bank and found that some stress symptoms decline as skill discretion and decision authority increased, even if work demands were light. They also found that some stress symptoms declined as work demands decreased, even if authority and skill levels were high.

Plair Chand(2006), in his study, "Psychological factors in the development of work stress", investigated the psychological factors, such as life event stress, psychosomatic illness, anxiety, depression, alienation, control coping, escape coping and symptoms management coping as predictors of job related strain among junior management scale-1 officers in banks. Samples of 150 junior management scale-1 officers were selected from a variety of nationalized banking institutions in the State of Himachal Pradesh through purposive and incidental sampling. JMS-1 officers engaged in different functional areas like branch administration, general banking, saving, lending, auditing, accounting, rural development, agriculture, etc., were selected as respondents. Co-efficient correlation and step-wise multiple regression analysis were used to analyse the data. This research found that job-related strain is positively related with psychosomatic illness, anxiety, depression, alienation, and escape coping, and negatively related with life events stress, control coping and symptom management coping. Anxiety and alienation were found to be the clearest and most significant predictors of job-related strain.

Keniston (1965), in his study, "The uncommitted: alienated youth in American Society", has explained that alienated individuals often appear to be angry and depressive. In the early stage of

burnout, individuals experience perceptual feelings of anger. When a calm, accepting and easy-going individual begins to burnout, he becomes chronically angry. His anger often becomes more focused if the work stress of the individual is unabated, the study concluded.

The findings of the study, "Reactions to a study of Bureaucracy and Alienation" done by **Anderson, B. O. (1971),** emphasized that when an individual perceives to have lost his/her self and is constrained to act according to the forces external to him/her, he/she feels alienated. Alienation is no longer confined to individual worker; all sections of person experience alienation under the condition just cited.

Freudenberger (1977) has examined the effect of stress in his study on "Burnout: The occupational hazard of the child care worker". He has concluded in his study that the stress experienced by a child-care worker increases fatigue and turns the individual cynical and left with burnout.

If the individual experiences job stress for any period of time, he or she is likely; to become demoralized and he or she is ineffective in problem solving, according to **Lazarus andLaunier (1978),** in their study on stress-related transactions between person and environment.

The findings of the study, "Burned-out Cops and their families" made by **Maslach, C.and Jackson, S.E.(1979)** pointed out that burnout people lose Interest in their job and developed intentions to leave their job.**Cherniss (1980)** in his study, "Staff Burnout: Job stress in the Human Services", argues that psychological stress is more disruptive than motivating the workers if the job stress reaches high levels. The disruptive nature of the stress depends on the complexity of the task.

Singh, A.P and Singh, H.C. (1984), in their study, "Occupational stress, security-insecurity and job involvement of first level industrial supervisors", investigated the influence of occupational stress and security-insecurity on job involvement of first level industrial supervisors. The findings showed significant positive relationship between occupational stress and job involvement.The study conducted by **Whitehead, J.T.(1987)** on "Probation Officer job burnout: A test of Two Theories" revealed that stress and burnout are not synonymous; rather, excessive and prolonged levels of job stress produce strain and result in burnout on the part of the individual if the coping mechanism adopted by the individual is improper.

"Stress in Managers and professionals in Indian organizations", a research work of **Ashok, K.Sahni (1998),** revealed that low-stressed group compared with the high- stressed group tended to be significantly higher in respect of their job commitment, self- esteem, satisfaction and good human relations. According to the researchers, they were more flexible in their attitudes and values and experienced lesser conflict with their superiors.**M.Morean etal.(2004),** in their study "Occupational stress and incidence of sick leave in the Belgian workforce: the Belstress study", show that perceived high strain at work, especially combined with low social support was predictive of sick leave in both sexes of a large cohort of the Belgian workforce.

According to **A.K. Srivastava's(2005)** study, "Effect of Cognitive Appraisal on the Relationship of Job Stress and Job-related Health Outcomes", noted that cognitive apprasials markedly modified the relationship of job stress and consequent strains.**S.N. Modu and S.E.Poodhun (2006),** in their work "Stress symptoms and substance use among Police officials in the Central Regions of Limpopo Province, South Africa", investigated the sources of job stress, the effect of this stress in their personal and interpersonal spheres, and the mechanism used by police officials to cope with high levels of stress. The stress was found to affect them mentally and physically. It also affected their interpersonal relationships.

In the study "Occupational stress and Burnout among Women Police", conducted by **Mandeep Kaur and Sharanjithkaur (2007),** the results indicated positive correlation between occupational stress and burnout. **RashmiShahu, S.V. Gole (2008),** in his study "Effect of job stress and job satisfaction on performance: An empirical study", examined the relationship between job stress, job satisfaction and performance among 100 managers of private manufacturing firms. The finding suggested that higher stress levels were related to lower performance whereas higher job satisfaction indicated higher performance.

"Oganisational Role stress and job satisfaction among male and female vocational teachers", a study by **Vaishali Gupta andKiranSahu (2009)**analysed the relationship between organizational role stress and job satisfaction among 200 vocational teachers (100 male and 100 females) from private sectors of Moradabad district. The results indicated that there was a significant gender difference regarding job satisfaction. Organisational role stress and job satisfaction were significantly and negatively correlated and this relationship was found significant for males as well as for females.

Research Problem

Ever since the introduction of deregulation of the banking sector in India in the early 90s, there has been a paradigm shift in the focus of banks from social objectives to sound business objectives. Accordingly, there has been an increased thrust on profitability and productivity of all banks, including the public sector banks. Competition in the industry became intense with the emergence of new generation private sector banks and also with the enhanced dynamism of the foreign banks. The new generation banks and foreign banks, with their advanced technological base and highly skilled manpower, have been relatively at a competitive advantage over their two counterparts, viz., Public sector banks and old private sector banks, In order to withstand the competitive pressure and also to enhance productivity and customer service, banks have to invest heavily in technology and also go for highly skilled manpower or to train their existing staff suitably. In short, for the banking system as a whole, adoption of advanced technology has become an imperative to ensure better productivity and enhanced customer service.

The highly competitive work environment in the banking sector demands updated skill and knowledge from the managers and other employees in the banks, which are essential to fulfil the ever-increasing aspirations of the high-demanding customers. Coupled with this, the uncertainties and ambiguity associated with the finance sector around the globe multiplied the stress level of bank employees. A sound theoretical base in banking operation as well as practical experience acquired from the job is now not sufficient for them to tackle the various work-related issues confronted by them. Moreover, banks are not able to provide adequate training and back up support to enhance their competency.

The abovesaid transformation in the banking sector has affected the social, economic and psychological domains of bank employees and their relations. They have to cope with the enhanced work pressure, which leads to more of mental stress and physical strain. In the light of these grounds, it is imperative to study the work-related stress faced by bank employees, the stressors and their effect, and strategies to combat such stress. Therefore, the present study addresses the following intricate questions: What causes occupational stress in banks? What are the baneful effects of occupational stress on employees? What are the psychological reactions to stress?

Research Goal

The main aim of the study is to identify the occupational stressors of bank employees. With this aim the following specific objectives are formulated:

1. To study the sources of occupational stress and to analyze the influencing factors.

2. To identify the stressors that discriminate employees of different sectors of banks.

3. To study the psychological effects of job stress on bank employees and to identify the influencing factors.

4. To study the relationship between sources and effects of job stress.

Research Hypotheses

The study attempts to test the following Hypothesis:

Ho: There is no dependence between sources and psychological effects of job stress confronted by Bank Employees

H1: There is dependence between sources and psychological effects of job stress confronted by Bank Employees

Materials and Methods

In pursuance of the stated objectives and hypotheses, the following methodology was adopted for conducting the present study. The descriptive research design is applied for the study. Both primary and secondary data have been used, but the study mainly consumed primary data collected from the field source. In the first exploratory stage of this study, survey of literature was undertaken to familiarize the researcher with the various aspects of the study, to design appropriate methodology and to formulate a conceptual framework for the study. An honest effort was made to collect a large volume of secondary data from different available sources such as books, journals, Research articles, working papers, published and unpublished PhD theses etc. from the libraries of ICSSR-New Delhi, Banaras Hindu University, JamiaMilia University, Indian Institute of Banking and Finance- Mumbai, IIM- Kozhikodu, CUSAT, Univeristy of Kerala, IMK- Kerala, CDS-Thiruvananthapuram, and M.G. University- Kottayam. Relevant data from the official website of the Reserve Bank of India and SLBC were accessed. The researcher also conducted unstructured personal interview with many of the officials in connection with this particular sector. The scope of World Wide Web for collecting data has been exploited well.

Data Analysis and Interpretation

Sample Profile

Data were collected from 462 respondents spread across three regions and three sectors to assess the level of stress, causes of stress, effects of job stress and coping strategies. The relevant details about the sample population on the basis of demographic and job-related factors are exhibited in the succeeding paragraphs.

Table 1: Distribution of Respondents

Gender	Type of banks			Total
	PSB	**OPSB**	**NGB**	
Male	148 (58.3)	77 (58.3)	54(71.1)	279 (60.4)
Female	106 (41.7)	55(41.7)	22(22.9)	183 (39.6)
Total	**254 (100)**	**132 (100)**	**76 (100)**	**462 (100)**
Age: 30 & Below	34(13.4)	37(28.0)	38(50)	109(23.6)
31-40	31(12.2)	18(13.6)	29(38.2)	78(16.9)
41-50	80(31.5)	40(30.3)	7(9.2)	127(27.5)
51 & Above	109(42.9)	37(28.0)	2(2.6)	148(32.0)
Total	**254(100)**	**132(100)**	**76(100)**	**462(100)**
Education: School Level	10(3.9)	1(0.8)	0(0)	11(2.4)
Graduate	156(61.4)	80(60.6)	34(44.7)	270(58.4)
Post Graduate	88(34.6)	51(38.6)	42(55.3)	181(39.2)
Total	**254(100)**	**132(100)**	**76(100)**	**462(100)**
Income (Rs.): < 15000	24(9.4)	22(16.7)	11(14.5)	57(12.3)
15001-30000	53(20.9)	38(28.8)	33(43.4)	124(26.8)
30001-50000	144(56.7)	59(44.7)	26(34.2)	229(49.6)
➤ 50000	33(13)	13(9.8)	6(7.9)	52(11.9)
Total	**254(100)**	**132(100)**	**76(100)**	**462(100)**
Experience (Yrs):				
< 5	40(15.9)	39(29.5)	38(50)	11725.3)
6-10	16(6.3)	11(8.3)	20(26.3)	4710.2)
11-15	17(6.7)	10(7.6)	10(13.2)	37(8.0)
16-20	19(7.5)	9(6.8)	2(2.6)	30(6.5)
➤ 20	162(63.8)	63(47.7)	6(7.9)	231(50.0)

| Total | 254(100) | 132(100) | 76(100) | 462(100) |

Exploratory factors extraction model

Table presents the results of factors' extraction on the basis of the Eigen Values greater than 1 criterion, which resulted in identification of thirteen factors which together would explain the variance of 57 per cent.

Table: Table 2: Total Variance Explained

Components	Initial Eigen Value			Extraction sums of Squared Loadings			Rotation Sums of Squared Loadings.		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.709	20.657	20.657	9.709	20.657	20.657	4.028	8.570	8.570
2	2.699	5.742	26.400	2.699	5.742	26.400	3.230	6.873	15.443
3	1.828	3.890	30.290	1.828	3.890	30.290	2.595	5.521	20.964
4	1.704	3.625	33.915	1.704	3.625	33.915	2.442	5.197	26.161
5	1.492	3.174	37.089	1.492	3.174	37.089	1.953	4.155	30.316
6	1.383	2.942	40.031	1.383	2.942	40.031	1.858	3.954	34.270
7	1.273	2.707	42.739	1.273	2.707	42.739	1.786	3.800	38.070
8	1.233	2.623	45.362	1.233	2.623	45.362	1.616	3.438	41.507
9	1.191	2.533	47.896	1.191	2.533	47.896	1.602	3.408	44.915
10	1.111	2.364	50.260	1.111	2.364	50.260	1.488	3.166	48.081
11	1.084	2.307	52.567	1.084	2.307	52.567	1.448	3.081	51.162
12	1.047	2.227	54.794	1.047	2.227	54.794	1.419	3.019	54.181
13	1.037	2.207	57.001	1.037	2.207	57.001	1.325	2.820	57.001

KMO and Bartlett's Test of Sphericity

The results of KMO and Bartlettt's Test of Sphericity are presented in Table 5.3, which shows that the value of Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy value was 0.886 and the Bartlett's Test of Sphericity was significant at one per cent level of significance(P<.001), which revealed the appropriateness of the sample data for conducting factor analysis.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.886
Bartlett's Test of Sphericity	Approx. Chi-Square	5133.466
	df	1081
	Sig.	.000

Table 4: Creation of Factors (Causes of Stress)

Sl.No	Factor	Factor Code	Number of Measures
1	Work –home Interface	F1	11
2	Leadership support	F2	8
3	Work Pressure	F3	8
4	Group Cohesiveness	F4	4
5	Customer Relationships	F5	3
6	Career Growth	F6	6
7	Compensation	F7	2
8	Job Autonomy	F8	3
9	Customer Services	F9	2
10	Lack of Encouragement	F10	2
11	Lack of Professionalism In Management	F11	3
12	Staff Shortage	F12	2
13	Externalities	F13	2
	Total number of Measures		47
	Overall Reliability		**.912**

Psychological Effect of Stress

This part of the research study was done to identify the psychological effect of occupational stress among the bank employees in Kerala. Based on the various theories and models in the field of occupational stress research, and in consultation with experts in the field of academic research and industry, 24 statements were developed for assessing the various psychological effects of occupational stress in the field of banking industry. In order to test the internal consistency of the scale and to reduce the number of statements to a manageable size, a pilot study was conducted. Responses were obtained from 56 employees in the banking sector through interview scheduling. A five-point Likerts scale was used to measure the agreement with the statements. Reliability

analysis was done to ensure the reliability of the instrument and those items with item-to-total correlation below 0.3 and Cronbach's alpha below 0.7 were deleted resulting in a 15-item scale to measure the psychological effect of occupational stress.

Fifteen statements are considered to measure the psychological effect of occupational stress which has an overall Cronbach's alpha of 0.848 which is well above the accepted norms of 0.70 (Nunnally, J.C, 1978). Hence the variable identified and included in the instrument are reliable and relevant.

Exploratory Factor Analysis (EFA) was carried out on 15 measures to validate construct which will help to analyse the employees' responses and to evaluate factors which exert influence over the magnitude of psychological effects of stress. The measures were subjected to Principal Component Analysis (PCA) under the restriction that the Eigen value of each construct should be more than 1. The various measures used to assess the psychological effects of stress, along with item code, mean and S.D are exhibited in the following Table.

Table 5: Psychological Effects of Stress-Variables

Sl.No	Item Code	Statements	Mean	S.D
1	PE 1	I am totally satisfied with my present job.	2.4784	1.04485
2	PE 2	If a friend seeks my opinion on joining a job like mine, I will strongly recommend it.	2.6190	1.10702
3	PE 3	I feel completely exhausted at the end of the day.	3.3723	1.04556
4	PE 4	I feel tired (even with adequate sleep) during the day.	2.9589	1.06840
5	PE 5	I worry if these mounting pressures persist for long, it will significantly damage my efficiency to work hard.	3.2965	1.09264
6	PE 6	I feel frustrated in carrying out my responsibilities at work.	2.6732	.97434
7	PE 7	It is hard for me to feel calm and relaxed at work.	2.8550	1.05518
8	PE 8	I find it difficult to finish my work in the stipulated time.	2.8723	1.09174
9	PE 9	I often miss the get-together parties of my family and	3.6212	1.02751

		friends.		
10	PE 10	I feel that I can't serve the customers as expected.	2.6364	1.03193
11	PE 11	I have a lot of other interests (e.g. cultural, social, spiritual etc…) which remain neglected due to workload.	3.4654	1.09321
12	PE 12	I spend so long at work that my outside relationships are suffering.	3.4177	1.10056
13	PE 13	I always get a good night's sleep without worrying about my work.	3.2251	1.07686
14	PE 14	Since I am preoccupied with a hectic work schedule, I give only a little attention to my family.	3.0173	1.07006
15	PE 15	I feel emotionally drained from my work.	2.9026	1.00607

KMO and Bartlett's Test of Sphericity

The result of KMO and Bartlettt's Test of Sphericity are presented in Table 6.3, which show that the value of Kaiser-Meyer-Olkin (KMO) Measure of Sampling adequacy value is 0.991 and the Bartlett's Test of Sphericity is significant at one per cent level of significance($P<.001$), which reveal the appropriateness of the sample data for conducting factor analysis.

Table 6: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.911
Bartlett's Test of Sphericity	Approx. Chi-Square	2498.702
	df	105
	Sig.	.000

Exploratory factors extraction model

Table 7 presents the results of factors' extraction on the basis of the Eigen values greater than 1 criterion, which resulted in identification of three factors which together explain the variance of 56 per cent.

Table 7: Total Variance Explained

Components	Initial Eigen Value			Extraction sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	%of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.894	39.292	39.292	5.894	39.292	39.292	3.504	23.362	23.362
2	1.275	8.500	47.793	1.275	8.500	47.793	2.798	18.654	42.016
3	1.160	7.730	55.523	1.160	7.730	55.523	2.026	13.507	55.523

Extraction method: Principal component analysis
Source: Primary survey

Table 8: Creation of Factors (Effect of Stress)

Sl.No	Factor	Factor Code	Number of Measures
1	Professional Anxiety	E1	8
2	Social Isolation	E2	4
3	Professional Dissatisfaction	E3	3
	Total Measurers		15
	Overall Reliability		**.848**

Canonical Correlation Analysis

Canonical correlation analysis is a multivariate statistical model that facilitates the study of interrelationships among sets of multiple dependent variables and multiple independent variables. It measures the strength of the overall relationships between the linear composites (canonical variates) for the independent and dependent variables. In effect, it represents the bivariate correlation between the two canonical variates. While multiple regressions predict a single dependent variable from a set of multiple independent variables, canonical correlation simultaneously predicts multiple dependent variables from multiple independent variables. In situations with multiple dependent and independent variables, canonical correlation is the most appropriate and powerful multivariate technique. It has gained acceptance in many fields and

represents a useful tool for multivariate analysis, particularly as interest has spread to considering multiple dependent variables. Canonical correlation identifies the optimum structure or dimensionality of each variable set that maximizes the relationship between independent and dependent variable sets.

Sources of Job Stress and Psychological Effects

Here, a study on the association between 13 stress factors, causes of stress, identified with 3 psychological effects, is attempted and the results of the analysis are given below.

Table 9: Test of Canonical Dimension

Canonical Dimensions	Canonical correlation	F	Hypoth. DF	Error DF	Sig. of F
1	.82389	17.09585	39.00	1123.05	.000*
2	.34288	4.11556	24.00	760.00	.000*
3	.33535	4.38873	11.00	381.00	.000*

Source: Primary survey
* Significant at 5 per cent level.

Table 10: Standardized Canonical Coefficients (Dimensions)

Variables(stressors)	Dimensions		
	1	2	3
Work-home interface	.72915	-.75204	-.58993
Leadership support	.06785	.40864	-.55841
Work pressure	.20097	.20612	.80379
Group cohesiveness	.09051	.29147	-.25183
Customer relationship	.01070	.32995	.56776
Career growth	.02258	-.23503	.30898
Compensation	.03718	.04023	-.09854
Job autonomy	-.02221	.19983	.16639
Customer services	.09911	.43604	-.23954

Lack of encouragement	-.03153	.37963	.19246
Lack of professionalism in management	-.02611	.04227	-.15173
Staff shortage	-.06983	-.13755	.10801
Externalities	.08180	-.30382	-.12730

Source: Primary survey

Table 11: Standardized Canonical Coefficients for Covariates (Psychological Effects)

Covariate	1	2	3
Professional Anxiety.	**-.53369**	**-.64269**	**-.99786**
Social Isolation	**-.51556**	**.98887**	**.62940**
Professional Dissatisfaction	-.14923	**-.68257**	**.78499**

Tests of dimensionality for the canonical correlation analysis, as shown in Table 6.35, indicate that all the three canonical dimensions are statistically significant at the 5 per cent level. Dimension 1 has a canonical correlation of 0.82 between the sets of variables, while for dimension 2 the canonical correlation is much lower at 0.34. Also, the third canonical correlation is .34 (.335).

Table 6.36 presents the standardized canonical coefficients for the three dimensions across both sets of variables. The first canonical dimension is most strongly influenced by work-home interface (.73) and for the second dimension, by Work-home interface (-.75), Leadership support (.41) and Customer services (.44). The third dimension is dominated by Work pressure (.80), Work-home interface (-.58), Leadership support (-.56), and Customer relationship (.57). For the covariates (Table 6.37), the first dimension comprises Professional anxiety (-.53) and Social isolation (-.51). For the second and third dimension all the three variables are important with Social isolation (.98) dominating the second dimension and Professional anxiety (-1.0) dominating the third dimension.

From the results of the study, it can be summarized that the first canonical correlation of 0.82 indicates that there is a strong association between the independent variable, Work-home

interface with the dependent variables, Professional anxiety and Social isolation. The second canonical correlation of 0.34 indicates that there is interrelationship between stress factors such as Work-home interface, Leadership support and Customer service and psychological effects. The third dimension also shows canonical correlation of .34, which also reflects an overall relationship between the canonical variates for the independent and dependent variables. So, stress due to extensive Work pressure from all directions including domestic pressure on employees' results in all the three psychological outcomes of job stress.

Since there is significant relationship between causes of stress such as Work-home interface, Leadership support, Work pressure, Customer relationship and Customer services, and psychological effect of stress such as Professional anxiety, Social isolation and Professional dissatisfaction, the null hypothesis is rejected and it is established that there is interrelationship between sources and effects of job stress.

Conclusion

Canonical correlation analysis is done to measure the strength of interrelationship between sources and psychological effects of job stress. Tests of dimensionality indicate that all the three canonical dimensions are statistically significant at 5 per cent level. Strength of interrelationship between sources of job stress and physical effects is also measured through canonical correlation, which shows that only two canonical dimensions are statistically significant at 5 per cent level. It is concluded from the analysis that the hypothesized relationship between stress factors and physical and psychological effects of stress is statistically significant.

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RESPONSIBLE TOURISM IN KERALA: A STUDY ON TOURIST SATISFACTION AND REVISIT INTENTION

Parvathy Mohan
Research Scholar, MG University, Kottayam (Kerala)
Email: parvathymohanan@gmail.com

Dr. Gireesh Kumar G S
Principal, Henry Baker College, Melukavu, Kottyam (Kerala)
Email: gireeshkartha@gmail.com

Abstract

The study focused on the Responsible Tourism service satisfaction of tourists in a popular RT destination of Kerala, Kovalam. Non- probability sampling technique was adopted to collect data from a sample of 103 respondents in the selected destination. The analysis of data revealed the presence of two factors that are dependent on Overall Tourist Satisfaction (OTS) and they are Behavioral Traits (BT) and Contentment (C) in association with the destination. Also this Overall Tourist Satisfaction (OTS) influences the intention of tourists to visit the destination again, ie, their Revisit Intention (RI). Thus we got a clear relationship between Behavioral Traits, Contentment, Tourist Satisfaction and their Revisit Intention.

Key words

Responsible Tourism (RT), Behavioral Traits (BT), Overall Tourist Satisfaction (OTS), Contentment (C), Revisit Intention (RI).

Introduction

Responsible Tourism became one of the established areas of tourism research and practice. Even though this concept overlaps significantly with concepts of sustainable tourism, ethical tourism, integrated tourism and pro-poor tourism, the label of RT is by far the most favored industry term. Responsible Tourism got its prominence in the year 2002, in the World Summit on Sustainable Development in Cape Town in South Africa.

Responsible Tourism can be called as a tourism management strategy where the tourism sector and the tourists take responsibility to protect and conserve the natural environment and local cultures and also contribute to the local economies by providing better

quality of life for local people (RT requirements-SANS 1162:2011). Thus RT destinations shall equip itself with such facilities that can provide quality travel experiences to the tourists, thereby promotes the conservation of natural environment and offer opportunities and benefits for local people. Hence Responsible Tourism is all about "using tourism to make better places for people to live in and better places for people to visit, in that order" (Nair, 2018).

Harun, Chiciudean, Sirwan, Arion and Muresan (2018) and Ganapala and Pradeep Karunathilaka (2016) studied about attitudes and perception of local community towards sustainable tourism development in certain RT destinations. Morrison- Saunders, Hughes, Pope, Douglas and Wessels (2019) studied about the visitors expectations for RT initiatives in tourism destinations. Also RT development in Small Island communities are studied by Vikneswaran Nair (2018) .The challenges of RT is studied and analysed by a stakeholder approach by Tichaawa and Samhere (2015) and Ottlie Geiger (2017). Responsible Tourism and quality of life of host community is studied by Nkemngu (2015) and Pavlic, Portolan and Puh (2015). Resident perception of RT in China is studied by Gong and Knight (2018). Jobi and Satheesh (2016) focused on Responsible Tourism activities of local communities in Kumarakom Grama Panchayath in Kottayam in Kerala.

Research Problem

Tourism is now becoming an inevitable opportunity to bridge the gap between the socio- cultural, economic and environmental plethora of domestic and foreign tourists. As the expectations of the tourists and tourism stakeholders are alarmingly increasing in the present era, a responsible behavior in tourism becomes the order of the day. Here lies the relevance of Responsible Tourism, which gives maximum benefits to the host community by minimal exploitation of the environment. The tourists, as well as the tour operators, hoteliers, government and the host community do their respective roles so as to keep the responsible objectives of Responsible Tourism intact. The Responsible Tourism Mission in Kerala gives the tourists unique experiences by way of RT packages, which varies from one RT destination to another. The uniqueness of these packages always enthralls the tourists that they develop an inner urge to come back again to the destination. Here an attempt is made to identify the relationship between tourist satisfaction and their revisit intentions. Hence the

problem is stated as "**Responsible Tourism in Kerala: A study on Tourist Satisfaction and Revisit Intention".**

Research Objectives

The study is focused on following specific objectives:

1. To identify various dimensions of Overall tourist satisfaction and its interrelationship with extent of tourist satisfaction.
2. To identify nature and extent of interrelationship between overall tourist satisfaction and Revisit intention.

Hypotheses of the study

The following hypotheses are tested in the study:

H1: There is no relation between various dimensions of Tourist satisfaction and the extent of satisfaction.

H2: Revisit Intention is independent of Overall Tourist Satisfaction in Responsible Tourism.

Method

Responsible Tourism strives to create cohesion between the host community perspectives and the tourist expectations. RT authorities are very keen in selling unique experiences to the tourists visiting a destination. The study was conducted in Kovalam in Thiruvananthapuram district in Kerala. Kovalam is a beach destination which attracts both domestic and foreign tourists. The period of the study ranged from July to September 2019. A mixed methodology is adopted by using both quantitative as well as qualitative data. A pre-structured interview schedule is used to collect data from the respondents. About 250 respondents are approached and only 107 are capable for analysis. Some respondents gave partly filled questionnaires, some behaved in an odd manner and some are not even ready to answer the questions. Such responses are rejected and 107 full-fledged questionnaires are selected for final analysis. The assistance of language translators are also sought for the collection of data from foreigners.

Convenience sampling technique is used to collect the data from respondents. The data so collected are tested for reliability and validity and the value was 0.72, which was reliable enough in Pre- testing as per the standard reliability norms. The collected data are codified, classified, tabulated and analysed in a systematic manner. The responses of tourists are measured based on a five point Likert scale. Exploratory Factor Analysis (EFA) and Multiple Regression Analysis are the main analysis tools used in the study.

Analysis

1. **Sample Profile**
2. **Tourist Satisfaction**

The extent of satisfaction enjoyed by the tourists upon the Responsible Tourism initiatives is very important in determining the success of RT policy in a destination. Here Tourist Satisfaction has been measured on a five point Likert scale by using 19 statements related to the satisfaction level of tourists. The mean and standard deviation are depicted below:

Table 2.1: Tourist Satisfaction (TS)

Sl. No	Variables	N	Mean	SD
1.	Tourism personnel accommodates language preferences of tourists	107	4.19	.870
2.	The service employee has good language skills	107	4.16	.803
3.	The service employee uses positive language	107	4.25	.674
4.	Voice of tourism personnel is clear to understand	107	4.12	.749
5.	Listens carefully to what the tourist says	107	4.15	.750
6.	Converses at a proper speed	107	4.12	.696
7.	The propriety of service personnel is well and good	107	4.17	.693
8.	Tourism employee is friendly and respectful	107	4.21	.697
9.	Tourism employee is willing to help tourists	107	4.21	.669
10.	Tourism employee behaves gracefully	107	4.20	.679
11.	The tourism personnel knows the job very well	107	4.21	.697
12.	He/ She is able to answer tourists' questions quickly	107	4.18	.750
13.	Tourism employee understands that the tourists rely on them to meet the	107	4.16	.702
14.	needs	107	4.15	.775
15.	The tourism personnel possesses the expertise to analyse tourists' problems	107	4.14	.745

16.	Cost of the tourist spot/ tourism service is reasonable and worthy	107	4.13	.741
17.	The service experience is well organized and problem free	107	4.07	.696
18.	The service made the trip a richer experience for the tourists	107	4.15	.670
19.	The quality of tourism service has been extensively good and appealing	107	4.22	.634
	My feeling towards the tourism service here is positive			

Source: Primary data, N= No. of respondents, S.D= Standard Deviation

Table 2.1 shows that the third and nineteenth statements have maximum means followed by eighth, ninth, eleventh and tenth statements. Also the SD is least with respect to the nineteenth statement followed by ninth, eighteenth and third statements. From the table it is clear that the tourists are satisfied with the overall tourism service of the destination, the positive language of the tourism personnel, the helpful mentality, grateful behavior and the respectful nature of the personnel. The table also points out that the tourists have a positive feeling towards the tourism services in the destination.

3. Reliability Analysis

The analysis tool is pretested for ascertaining the reliability and validity. The pretested result is depicted below:

Table 3.1:   **Reliability Table**

Cronbach's Alpha	No. of items
0.978	19

From table 3.1, it's clear that the nineteen statements have sufficient reliability to do further analysis as the Cronbath's Alpha is 0.978 which is greater than the standard Alpha value of 0.70 (Nunnaly in 1978).

4. Exploratory Factor Analysis (EFA)

After attaining sufficient reliability, a detailed analysis of the nineteen statements is conducted with the help of EFA. The results are shown below:

Table 4.1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.901
Bartlett's Test of Sphericity	Approx. Chi-Square	3130.978

Degrees of Freedom	171
Sig.	.000

According to Kaiser, a measure greater than 0.9 is marvelous, greater than 0.80 is meritorious, greater than 0.7 is middling, greater than 0.6 is mediocre, greater than 0.50 is miserable and less than 0.5 is unacceptable (Darren and Paul, 2011, p.256). Here the measure is 0.901 which is marvelous that the sample is adequate to do factor analysis. A significance value of less than 0.05 indicates that the data do not produce an identity matrix. Table 4.1 shows a significance value of 0.000 which is less than 0.5 and thus the distributions are approximately multivariate, normal and acceptable for factor analysis.

Table 4.2: communalities

Variable code	Initial	Extraction
TS 1	1.000	.625
TS 2	1.000	.655
TS 3	1.000	.837
TS 4	1.000	.853
TS 5	1.000	.855
TS 6	1.000	.844
TS 7	1.000	.833
TS 8	1.000	.862
TS 9	1.000	.853
TS 10	1.000	.860
TS 11	1.000	.845
TS 12	1.000	.811
TS 13	1.000	.798
TS 14	1.000	.814
TS 15	1.000	.762
TS 16	1.000	.785
TS 17	1.000	.834
TS 18	1.000	.815
TS 19	1.000	.550

Source: Principal Component Analysis

Table 4.3: Total Variance Explained- Factors influencing Tourist Satisfaction

Component	Initial Eigen Values			Rotation Sum of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	13.680	71.999	71.999	7.981	42.006	42.006
2.	1.412	7.433	79.432	7.111	37.426	79.432

Extraction Method: Principal Component Analysis

From table 4.3, two factors with Eigen values more than one are extracted. Eigen Value respresents the amount of variance accounted by a factor and the Kaiser Rule is to drop all components with Eigen values less than one.

Table 4.4: Rotated Component Matrix

Item code	Components	
	1	2
TS 4	.861	
TS 5	.853	
TS 8	.840	
TS 6	.834	
TS 9	.827	
TS 7	.826	
TS 3	.814	
TS 10	.803	
TS 1	.517	
TS 2	.675	
TS 18		.862
TS 17		.858
TS 14		.789
TS 16		.752
TS 12		.743
TS 15		.734
TS 11		.733

TS 13		.723
TS 19		.696

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalisation

Table 4.4 shows the rotated factor matrix gives the loadings of each measure on each of the extracted factors. Accordingly the factors are **Behavioual Traits (BT)[from TS4 to TS2] and Contentment(C) [from TS 18 to TS 19].**

Table 4.5: Reliability table of Components

Components	No. of Items	Cronbach's Alpha
Behavioual Traits (BT)	10	.970
Contentment (C)	9	.963

Table 4.5 depicts the internal consistency of the components, which is measured by using Cronbach's Alpha. As the Alpha values are more than the threshold of 0.7 suggested by Nunnaly in 1978, the scale has internal consistency and reliability.

5. Regression Analysis- I

Regression Analysis is used to reveal how different factors affect the Overall Tourist Satisfaction of Tourists. Regression explains the variation in one dependent variable caused due to the variations in one or more independent variables. If multiple independent variables are used to explain the variation in a dependent variable, it is called multiple regression model, the output of which will be used for testing the hypotheses.

Correlation

Correlation is a statistical tool to identify the degree to which one variable is linearly related to another [Levin and Rubin (2007)]. Here correlation analysis is done to identify the relationship between Behavioral Traits (BT) and Contentment (C) to Overall Tourist Satisfaction (OTS). Table 5.1 shows that the correlation is significant at 5% level of significance. Also there exists positive correlation between BT, C and OTS.

Table 5.1: Correlation Analysis

	OTS	BT	C
OTS	1.000	.275	.266
BT Total	.275	1.000	.833
C Total	.266	.833	1.000
Sig. OTS	-	.002	.003
BT Total	.002	-	.000
C Total	.003	.000	-

- At 5% level of significance

Table 5.2: Model Summary of Regression Analysis

Model	R	R square	Adjusted R square	Std. Error of the estimate	Durbin-Watson
1	0.283	0.080	0.062	2.07878	1.661

a. Predictors: (Constant), F2: Contentment TOTAL, F1: Behavioral Traits TOTAL

b. Dependent Variable: Overall Tourist Satisfaction

R square and Adjusted R square must be a value close to each other. As per Table 5.2, the value is somewhat closer and it's a good practice to follow adjusted R square value for interpretation as it explicitly takes in to account the number of variables included in the model (Gujarati in 2006). From the table, it's clear that 6.2 percent of the variations in Overall Tourist Satisfaction of Tourists are caused by Behavioual Traits and Contentment of the Tourist personnel.

Table 5.3: ANOVA Table showing the Regression Model Fit

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.051	2	19.525	4.518	0.013
	Residual	449.416	104	4.321		
	Total	488.467	106			

- Significance at 5% level

a. Dependent Variable: Overall Tourist Satisfaction (OTS)

b. Predictors: (Constant), F2: Contentment (C) TOTAL, F1: Behavioral Traits (BT) TOTAL

Table 5.3 shows that the model is statistically significant at 5% level of significance as the sig. value is less than .05.

Table 5.4: Coefficients- Significance of BT and C on OTS

Model	Dimensions	Beta	t	Sig.	Tolerance	VIF
1	(Constant)		8.892	.000		
	F1 BT Total	0.174	1.027	.307	.307	3.262
	F2 C Total	0.120	.709	.480	.307	.262

- Significance at 5% level
  a. Dependent Variable: OTS

The Beta coefficient gives a measure of the contribution of each variable to the model. Higher the Beta value, greater is the effect of independent variable on dependent variable. Table 5.4 shows factor one, BT has highest influence on Overall Tourist Satisfaction of Tourists as it has higher Beta value compared to factor two.

Testing of Hypothesis I

From the above analysis it's clear that; there exists significant relationship between various components of tourist satisfaction and the extent of satisfaction enjoyed by the tourists. Hence the null hypothesis is rejected and the alternate one is accepted.

6. **Regression Analysis- II**

Here Regression analysis is done to establish the relationship between Overall Tourist Satisfaction (OTS) and Revisit Intention (RI) of Tourists. RI is the dependent variable which is dependent on the independent variable OTS.

Correlation

A Correlation is first established between OTS and RVI. The details of which can be seen in Table 6.1

Table 6.1: Correlation Analysis

	RI	OTS
RI Total	1.000	.754
OTS	.754	1.000
Sig. RI Total	-	.000
OTS	.000	-

- At 5% level of significance

Table 6.1 clearly states that positive correlation is existing between RI and OTS of Tourists.

Table 6.2: Model Summary of Regression Analysis

Model	R	R square	Adjusted R square	Std. Error of the estimate	Durbin-Watson
1	0.754	0.568	0.564	1.86182	1.464

a. Predictors: (Constant): OTS

b. Dependent Variable: RI

R square and Adjusted R square must be a value close to each other. As per Table 6.2, the value is somewhat closer and it's a good practice to follow adjusted R square value for interpretation; as it explicitly takes in to account the number of variables included in the model (Gujarati in 2006). From the table, it's clear that 56.4 percent of the variation in Revisit Intention (RI) is caused by Overall Tourist Satisfaction (OTS) of the tourists.

Table 6.3: ANOVA Table showing the Regression Model Fit

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	478.703	1	478.703	138.099	0.000
	Residual	363.969	105	3.466		
	Total	842.673	106			

a. Dependent Variable: RI TOTAL

b. Predictors: (Constant), OTS

Table 6.3 shows that the model is significant as the sig. value is lower than .05 at 5% level of significance.

Table 6.4: Coefficients- Significance of OTS on RI

Model	Dimensions	Beta	t	Sig.	Tolerance	VIF

| 1 | (Constant) | | -.088 | .930 | | |
| | OTS | .754 | 11.752 | .000 | 1.000 | 1.000 |

a. Dependent Variable: RI; Significance at 5% level.

The Beta coefficient gives a measure of the contribution of each variable to the model. Higher the Beta value, greater is the effect of independent variable on dependent variable. Table 6.4 shows that even 1% variation in OTS will lead to 75.4% of variation in RVI of Tourists. Hence the model validated. Thus the statistically validated model is given in Fig: 1

Fig: 1

Statistically Validated Model
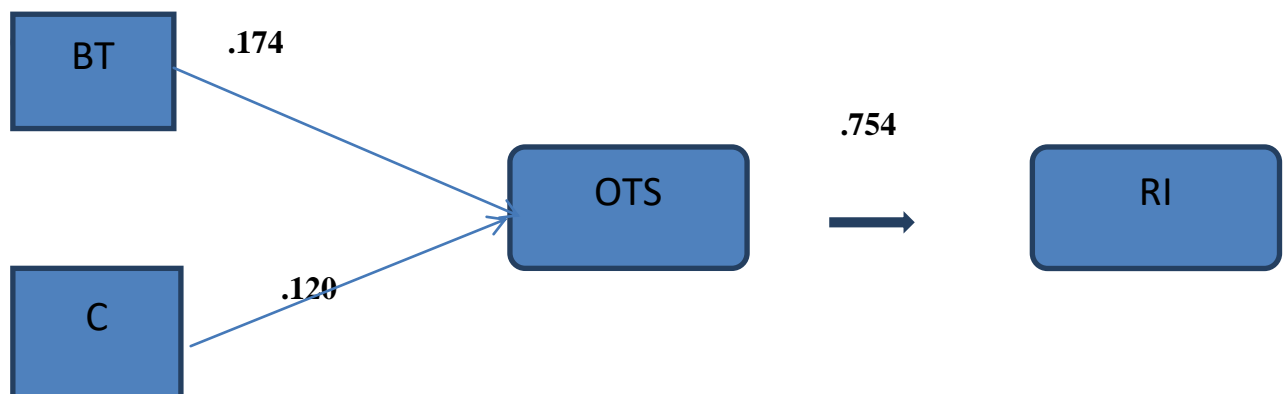
Testing of Hypothesis II

The analysis pointed out that the Revisit Intention of Tourists is greatly dependent on the Overall Satisfaction enjoyed by the tourists in a destination. Hence there exists strong relationship between OTS and RI of Tourists. Thus the null hypothesis is rejected and the alternate one is accepted.

Conclusion

Responsible Tourism is that form of tourism which clearly associates its connections withvaried aspects like ethics, social responsibility, sustainable development and sustainabletourism. All these aspects offers multiple research options to the general public (State &Bulin, 2016) . Also previous research works states that the perception of tourists on thenegative effects of tourism can positively affect their perceptions of responsibility,

which isvital for the promotion of responsible behaviors' (Gao, Huang, & Zhang, 2017) . The keyfactors that affect the motivation of tourists to become loyal to a particular ResponsibleTourism destination includes their destination perceptions and brand consciousness of theirRT operators. The attitudinal and behavioral loyalty of tourists are greatly dependent onvarious other factors which are discussed in this article. The study shows that BehavioralTraits and Contentment are the factors which affects the tourists in positively molding theirbehavior towards Responsible Tourism in Kovalam. The ultimate result of these factors isthe enhancement of the Overall Tourism Satisfaction enjoyed by the tourists. Once thetourists are satisfied, they will have an inner urge to come back again to visit the same RTdestination. Thus, Overall Tourist Satisfaction will lead to Revisit Intention. Hence, Responsible Tourism in Kovalam, which is studied among 107 tourists is a revitalizingexperience to create an awareness that tourists are eagerly waiting to visit the destinationagain as they are contended of the RT packages offered.

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A Study on the effect of Loyalty Programme on Purchase Intention

Ajay Joseph*
G S Gireesh Kumar **

*(Assistant Professor, Bharata Mata College, Thrikkakara and Research Scholar Nirmala College Muvattupuzha)
**(Principal, Henry Baker College, Melukavumattam and Research Guide, Nirmala College Muvattupuzha)

Abstract

The purpose of the study is to determine the perceived benefits of loyalty programmes among customers and its effect on their purchase intentions. It also determines the influence of demographics on customer loyalty programme membership and its relationship between purchase intentions of customers. A descriptive analysis has been undertaken to determine the relationship between the selected variables. The paper has several practical implications for the stores/organizations who want to retain customers through effective loyalty programmes. By reviewing major recent literature, this study has developed an 8 dimensional model which has the potential to make new contributions particularly in the area of marketing. Regression Analysis and Correlation Analysis has been used to validate identified constructs for purchase intention. The study aids both the marketers and consumers as it helps the marketers to increase their sales by designing best loyalty programme, at the same time it helps the consumers to derive maximum benefit out of the loyalty programme offered to them. The findings of the study have managerial implications for the marketers as it helps them to locate their potential customers. The study also highlights the need for the marketers to create loyalty by rewarding their customers for their repatronage buying behaviour.

Keywords – Loyalty Programme, Purchase Intention, Repatronage buying behaviour

INTRODUCTION

In India, retail has become one of the biggest emerging sectors owing to economic growth, recent Government of India's initiatives and increasing FDI projects. Due to these changes retail environment in India is also evolving and modernizing. Another factor that has fuelled this shift is the changes in customers learning and preferences. Rapid changes and intense competition have resulted in countless choices and alternatives being made available in the business environment for the customers. In such a scenario, it becomes very important and an absolute necessity for the marketers to not let the customer to switch over to the products and services of competitors. Therefore, it is obvious for the companies today to run a rat race to woo the customers through a variety of relationship marketing strategies and tactics. One such strategy employed to make the customers stick to a particular product/brand/store is 'Customer Loyalty Programme'. Such loyalty programmes are a well known feature in developed markets wherein the retail sector

especially finds its extensive use globally. However, while referring to Indian context, such relationship marketing strategies is still in their early stage. The goal of a loyalty program is to establish a higher level of customer retention in profitable segments by providing more satisfaction and value to certain customers (Bolton, Kannan, and Bramlett 2000).. There is also scant research on which variables affect the relationship between the loyalty program and customer loyalty. Also, loyalty programs are often misunderstood and misapplied. When it comes to design and implementation, too many companies treat rewards as short-term promotional giveaways (O'Brien and Jones 1995). Many companies openly discuss all the benefits of loyalty programs, but in reality, their decision to launch a program is often motivated by fears of competitive parity (Dowling and Uncles 1997). Despite the prevalence of loyalty programs worldwide, little research has been done on the actual effectiveness of loyalty programs, and much of the attention is focused on packaged-goods markets (Bowman and Lele-Pingle 1997; Uncles and Laurent 1997)

there is relatively little empirical research concerning the mechanisms by which the loyalty program operates (for an exception, see Bolton et al. 2000).

Thus the overall purpose of this study is to identify factors affecting the customer loyalty and to identify its effect on purchase intention.

RESEARCH GAP AND STATEMENT OF THE PROBLEM

Though there are plenty of literatures showing the effect of loyalty programme on consumer's purchase intention, the studies that examine the effect of the factors influencing customer loyalty and to know the extent of satisfaction of customers regarding loyalty programme is hardly found in literature. Thus it is essential to identify the reasons behind the mass increase in the volume of sales as a result of the loyalty programme offered by the retailers and wholesalers. This study thus aims to fill the gap in literature and tests a model having hypothesized relationship of various factors influencing the purchase intention of consumers. The study mainly focuses on addressing the following research questions.

1. What are the factors influencing customer loyalty?
2. To know the extent of satisfaction of customers regarding loyalty programme?
3. To identify whether there is any relation between customer loyalty and purchase intention?

. SIGNIFICANCE AND NEED OF THE STUDY

Findings of the study might be useful for and important among students and academicians being input for doing similar nature of research in future. The research will give various factors that influence the purchase intention of consumers. Furthermore, the result of this study will provide guidance to the industry players who are looking to increase their sales revenue through offering the customers with loyalty programmes.

OBJECTIVES OF THE STUDY

The study "A Study on The Effect of Loyalty Programme on Purchase Intention" is carried out with the following objectives.

- To study the factors influencing customer loyalty.
- To measure the satisfaction of customers regarding the loyalty programme.
- To identify the relation between customer loyalty and purchase intention.

Hypothesized Model
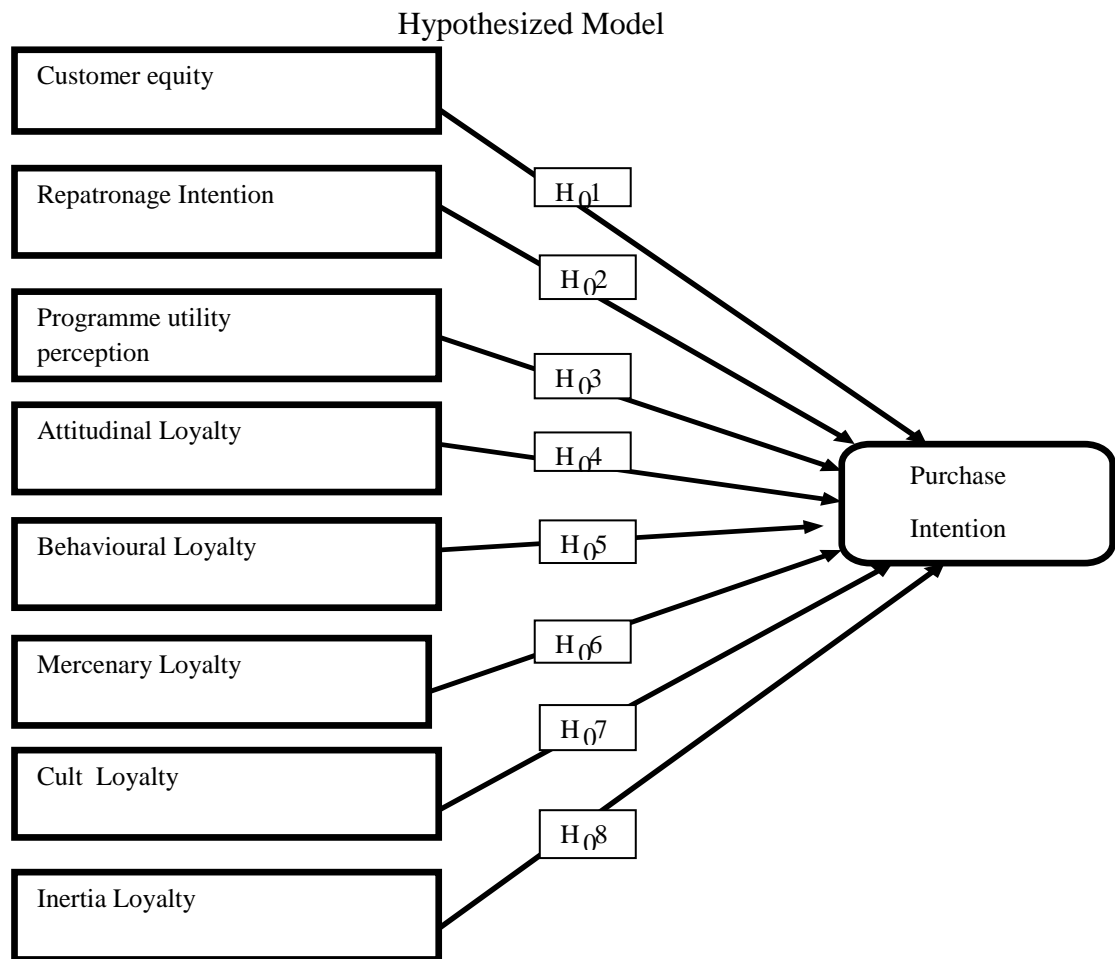
METHODOLOGY OF THE STUDY

The project "A Study on the Effect Of Loyalty Programme On Purchase Intention" is a study based on the information collected from both primary and secondary data. Google form questionnaires where send to 200 respondents, out of these only 140 responded back and after sorting the incomplete and incorrect questionnaire 115 forms where selected for conducting the research. Data was collected by purposive sampling method.

RESULTS AND DISCUSSION

Demographic profile

- Out of the total respondents 32.2% are male and67.8% are female
- 82.6% are below the age of 25,3.5% are age between 35-45 and 5.2% are between the age of 45-60.
- Out of the total respondents, 60.9% of respondents are Students, 22.6% are professionals, 2.6% and 3.5% are Homemaker and Unemployed.
- Out of the total respondents, 26.1% are have income between   10000-20000, 20.9% have between 20000-30000, 23.5% are have between 30000-40000 and 29.6% have income above 40000.
- Out of the total 115 respondents 1.7% are +12 and below, 47.8% of them are graduates and 50.4% of them are post graduates.

Reliability Analysis

A Reliability Test was carried out using Cronbach's Alpha, which measures the internal consistency of research constructs . The Alpha values for all the nine factors are above 0.70, the threshold suggested by Nunnally (1978). Thus it can be concluded that the scale has internal consistency and reliability.

Cronbach's Co-efficient Alpha CE,RI,PUP,ATL,BL,ML,CL,IL,PI

Sl. No	Factors (constructs)	Item Acronym	Number of items	Cronbach's alpha
1	Customer Equity	CE	3	.729
2	Repatronage Intention	RI	2	.761
3	Programme Utility Perception	PUP	2	.640
4	Attitudinal Loyalty	ATL	3	.713
5	Behavioural Loyalty	BL	2	.766
6	Mercenary Loyalty	ML	2	.723
7	Cult Loyalty	CL	2	.742
8	Inertia Loyalty	IL	3	.819
9	Purchase Intention	PI	3	.751

Customer Equity

Customer Equity is an indicator of how valuable business is in the market and in the minds of the customers. It represents the value that current and future potential customers will provide to a company during the entire lifespan of their relationship.

Measures of Customer Equity

Measures	Item Acronym	Mean	Mode	SD
When goods are on discount the stores get more customers	CE1	4.27	4	.765
Using loyalty programme stimulated me to focus my mind on brand/store	CE2	3.39	3	.924
Loyalty programme stimulate my interest to learn more about the brand	CE3	3.53	4	.976

Mean is highest for CE1(4.27) and lowest for CE2(3.39). Mean scores shows that most of the respondents believe that when goods are on discount the stores get more customers. SD is highest for CE3 (.976) and lowest for CE3(.765).Mode for CE1 and CE3 are 4 respectively. It is evident that the customers have high lifetime value towards Loyalty programme.

Repatronage Intention

A repeat purchase is the purchase by a consumer of a same-brand product as bought on a previous occasion. A repeat purchase is an indicator of a degree of customer loyalty to a brand.

Measures of Repatronage Intention

Measures	Item Acronym	Mean	Mode	SD
I often come for shopping to get more vouchers	RI1	3.17	3	1.059
I have won severally and this made me continue being a customer to save money	RI2	3.19	3	1.123

Mean is slightly higher for RI1 (3.19) and for PR2 it is 3.17. Mode is 3 for RI1 and RI2, which means most of the respondents neutrally agree that loyalty programme influence repatronage intention of customers. SD is highest for RI2 (1.123) followed by PR2 which has 1.059

Programme Utility Perception
 The process, by which individuals organize and interpret their sensory impressions in order to give meaning to their environment, is referred to as perception.

Measures of Programme Utility Perception

Measures	Item Acronym	Mean	Mode	SD
I am attracted to a particular store by the gifts it offers	PUP1	3.43	4	1.185
I redeem the points for goods offered	PUP2	3.74	4	.909

Mean for PUP2 is the highest (3.74) and PUP1 has the mean of 3.43.Mode for the 2 measures is 4.Thus we can conclude that customers perception regarding loyalty programme is good.

Attitudinal Loyalty

A person who shops simply feels really positive about the brand him or herself internally, is "attitudinally" loyal. Attitudinally loyal customers are great for businesses because they add strength to already positive brands, plus their word of mouth promotions can be invaluable in attracting other customers.

Measures of Attitudinal Loyalty

Measures	Item Acronym	Mean	Mode	SD
Based on your utility/experience would you recommend this to others	ATL2	3.74	4	.762
Loyalty programmes values people and relationship ahead of short term goals	ATL3	3.82	4	.790

Mean for ATL3 is highest among the above measures(3.82). The mode is 4 for ATL2 and ATL3. It is therefore evident that customers agree that they show attitudinal loyalty towards various loyalty programme.

Usage of Loyalty Cards

Usage of Loyalty Cards

Scales	Frequency	Percentage
Less than 6 months	29	25.2%
More than 6 months	28	24.3%
1year-3 years	32	27.8%
3year and above	26	22.7%
TOTAL	**115**	**100%**

From the table it can be concluded that most of the respondents have been using loyalty cards for more than 1 year and less than 3 years. But it is clear from the above table that other category also include almost the same number of respondents.

Behavioural Loyalty

Behavioural Loyalty Models of behavioural loyalty were primarily defined by patterns of brand allegiance or the expenditure of purchases towards a brand over a period of time.

Measures of Behavioural Loyalty

Measures	Item Acronym	Mean	Mode	SD
I am a regular customer of a particular supermarket because of the discount it offers	BL1	3.58	4	.991
Having a loyalty card makes me want to shop at the same store more frequently	BL2	3.70	4	.929

Mean for BL2 is slightly higher than BL1 ie 3.70 and 3.58 respectively. The mode is 4 for both the measures. It is therefore evident that customers agree that they show behavioural loyalty towards various loyalty programme offered by various stores or brand.

Mercenary Loyalty

It is defined as paying customers for their loyalty. This could be with traditional punch cards, excessive membership discounts etc

Measures of Mercenary Loyalty

Measures	Item Acronym	Mean	Mode	SD
I get vouchers for the loyalty I show towards a particular store (i.e. rewarded according to how much I shop)	ML1	3.68	4	.913
I buy products that earn me extra points	ML2	3.45	4	1.045

Mean for ML1 is the highest (3.68) and ML2 has the lowest mean (3.66) .Mode for the 2 measures is 4.Thus we can conclude that customers agrees that they exhibit mercenary loyalty towards loyalty programme offered .

Cult Loyalty

At this tier the customer and the brand begin to merge, so that rejecting the brand would be like rejecting your own values. It can be cultivated, particularly through an effective social-media strategy.

Measures of Cult Loyalty

Measures	Item Acronym	Mean	Mode	SD
Do you consider the loyalty programme as reliable & valuable	CL1	3.71	4	.747
Would you like to switch brands/ store if an alternate brand / store offers you better offers	CL2	3.85	4	.910

Mean for CL2 is the highest (3.85) and followed by CL1 which has got a mean of 3.71 .Mode for both the measures is 4. It is evident from the table that most of the customers exhibit cult loyalty as they consider these programmes as a part of themselves.

Inertia Loyalty

Inertia loyalty make it hard to leave the programme, rather than irresistible to stay.

Customers in this tier stick around because it's too inconvenient to escape.

Measures of Inertia Loyalty

Measures	Item Acronym	Mean	Mode	SD
When it comes to substitute goods I go for the ones that are on discount	IL1	3.92	4	.860
The point build up creates emotional relationship, hence results in continued frequency at the supermarket.	IL2	3.63	4	.932
Is the switching cost that makes you stick to a particular store	IL3	3.50	4	1.021

Mean for IL1 is the highest (3.92) and IL3 has the lowest mean (3.50) .Mode for the 3 measures is 4.Thus we can conclude that inertia loyalty makes customers to stay with certain loyalty programmes.

Purchase Intention

In simplest of terms, purchase intention is the likelihood of a customer buying the same product again based on their purchase history or it can also be the need of a product which is driving the customer towards a purchase..

Measures of Purchase Intention

Measures	Item Acronym	Mean	Mode	SD
Do you think the relevance of the loyalty programme is influential while making a purchase decision	PI1	3.70	4	.870
Do you buy a product based on the attractiveness of the reality than the loyalty programme offered	PI2	3.63	4	.958
Do you stick on to the same brand/store irrespective of loyalty programme offered	PI4	3.22	3	.953

The mean, mode and SD for PI1, PI2 and PI4 are given in Table 3.2.10. Mean for PI1 is the highest (3.70) and PI4 has the lowest mean (3.22) and PI2 has the mean 3.22. Mode for PI1 and PI2 is 4 and from this we can conclude that most of the respondents very likely and their purchase decision is influenced by loyalty programme.

Factors determining purchase decision

Scales	Frequency	Percentage
Quality of the product	11	9.6%
Loyalty Programme	88	76.5%
Peer Influence	11	9.6%
Image of the brand	5	4.3%
TOTAL	**115**	**100%**

From the above table it is evident that for more than half of the respondents Loyalty programme is an important factor that influences their purchase decision. Other factors that influence the purchase decision are less than 15% and therefore not significant.

Measures of variables

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Measures of variables

Measures	Item acronym	No. Of Items	Mean	SD
Customer equity	CE	3	11.1913	1.9371
Repatronage Intention	RI	2	6.3565	1.9609
Programme utility perception	PUP	2	7.1652	1.8109
Attitudinal Loyalty	ATL	3	10.0609	1.5799
Behavioural Loyalty	BL	2	7.2783	1.5979
Mercenary Loyalty	ML	2	7.1304	1.7498
Cult Loyalty	CL	2	7.5652	1.2986
Inertia Loyalty	IL	3	11.0435	2.3032
Purchase Intention	PI	4	11.9652	1.9909

The highest mean value is for PI (Purchase Intention) of 11.9652. RI (Repatronage Intention) has the lowest mean value of 6.3565. Highest SD is for IL (Inertia Loyalty) with 2.3032 and lowest SD is of CL (Cult Loyalty) with 1.2986.

Regression analysis and model validation

Correlation analysis

Correlation analysis is carried out before conducting regression analysis in order to quantify the strength of relationship between the variables. It tests the linear relationship between the variables.

Each correlation appears twice: above and below the main diagonal. The correlations on the main diagonal are the correlations between each variable and itself.

Table showing the correlation between independent and dependent variables.

	CE	RI	PUP	ATL	BL	ML	CL	IL	PI
CE	1	.331**	.376**	.372**	.473**	.464**	.441**	.415**	.407**
RI		1	.680**	.352**	.472**	.610**	.315**	.400**	.249**
PUP			1	.214*	.566**	.511**	.400**	.354**	.311**
ATL				1	.278**	.226*	.290**	.301**	.391**
BL					1	.457**	.507**	.371**	.293**
ML						1	.288**	.460**	.404**
CL							1	.306**	.311**
IL								1	.324**
PI									1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

This table shows the correlation between independent variables like Customer Equity, Repatronage Intention, Programme Utility Perception, Attitudinal Loyalty, Behavioural Loyalty, Mercenary Loyalty, Cult Loyalty, Inertia Loyalty and the dependent variable Purchase Intention. The correlation coefficient should always be in the range of -1 to 1.A correlation is statistically significant if it is P value < 0.05 and P value <0.01. Based on the coefficient of correlation in the above table it is inferred that there exists a high positive correlation between all the variables.

Table of Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the estimates	DurbanWatson
1	.560[a]	.314	.262	1.70998	2.286

a .Predictors: (Constant), Inertia Loyalty, Attitudinal Loyalty, Cult Loyalty, Repatronage Intention, Customer Equity, Behavioural Loyalty, Mercenary Loyalty, Programme Utility Perception

R square is the percent of the variance in the dependent explained uniquely or jointly by the independents. The R square and adjusted R square will be same when used for the case of few independents. The R square and adjusted R square shown is almost the same. The Durbin-Watson statistic is 2.286, which indicates independence of observations. It is a good practice to find the adjusted R square value because it explicitly takes into account the number of variables included in the model. Hence adjusted R square value is used for interpreting the results.

ANOVA of regression model

ANOVAª					
Model	**Sum Of Square**	**Df**	**Mean Square**	**F**	**Sig.**
Regression	141.915	8	17.739	6.067	.000ª
Residual	309.946	106	2.924		
Total	**451.861**	**114**			

a .Predictors: (Constant), Inertia Loyalty, Attitudinal Loyalty, Cult Loyalty, Repatronage Intention, Customer Equity, Behavioural Loyalty, Mercenary Loyalty, Programme Utility Perception

ANOVA table showing the regression model fit, presented shows that the model is statistically significant at 1 percent significance level.

Coefficients of regression analysis

Variables	Item acronym	Standardized Beta coefficient	P value
Customer Equity	CE	.334	.000**
Repatronage Intention	RI	.288	.007**
Programme Utility Perception	PUP	.174	.049*
Attitudinal Loyalty	ATL	.084	.235
Behavioural Loyalty	BL	.242	.004**
Mercenary Loyalty	ML	.112	.023*
Cult Loyalty	CL	.312	.010*
Inertia Loyalty	IL	.321	.014*

** Denotes significance at 1% level
* Denotes significance at 5% level

The above table states that there is a significant relation between the variables and all these variables are directly or indirectly tends to Purchase Intention. It also presents the Standardized Beta coefficient values and significant values of independent variables Customer Equity, Programme Utility Perception, Attitudinal Loyalty, Behavioural Loyalty, Mercenary Loyalty, Cult Loyalty and Inertia Loyalty. The independent variables Customer Equity, Repatronage Intention and Behavioural Loyalty are statistically significant at 1 percent significance level and the independent variables Programme Utility Perception, Mercenary Loyalty, Cult Loyalty and Inertia Loyalty are statistically significant at 5 percent significance level. It means that these seven independent variables have significant positive effect on Purchase Intention. Hence H01, H02, H03, H05, H06, H07 and H08 are rejected. The beta coefficients give a measure of the contribution of each variable to the model. Higher the beta value, the greater is the effect of independent variable on the dependent variable.

VALIDATED MODEL
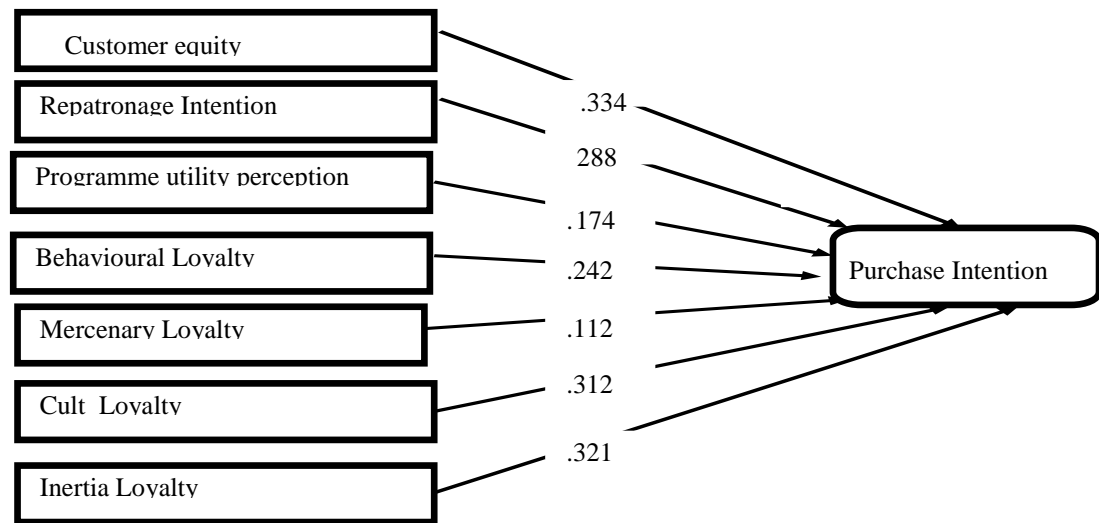
The above model states that there is a significant relation between the variables. The entire null hypothesis (H$_0$1, H$_0$2, H$_0$3, H$_0$5, H$_0$6, H$_0$7, H$_0$8) are rejected and it is proved that there exist a strong significant relationship between these variables. Based on the Standardised beta co-efficient given in the above table following interpretations can be made:

H$_0$1: Customer Equity has strong relationship of 33.4 percent over Purchase Intention.

H$_0$2: Repatronage Intention has relationship of 28.8 percent over Purchase Intention.

H$_0$3: Programme Utility Perception has relationship of 17.4 percent over Purchase Intention.

H04: Attitudinal Loyalty has impact of only 8.4 percent over Purchase Intention.

H$_0$5: Behavioural Loyalty has impact of only 24.2 percent over Purchase Intention.

H$_0$6:Mercenary Loyalty has impact of only 11.2 percent over Purchase Intention.

H$_0$7: Cult Loyalty has impact of only 31.2 percent over Purchase Intention.

H$_0$8: Inertia Loyalty has impact of only 32.1 percent over Purchase Intention.

Multiple regression analysis examined the effect of Customer Equity, Programme Utility Perception, Attitudinal Loyalty, Behavioural Loyalty, Mercenary Loyalty, Cult Loyalty and Inertia Loyalty on Purchase Intention. Regression model was formed using step-wise method. The model is statistically significant at 0.01 level and 0.05 level. Customer Equity has the highest beta coefficient followed by Inertia Loyalty. The model states that the variable Customer Equity followed by Inertia Loyalty has a major influence on Purchase Intention compared to other variables. Among the independent variables Customer Equity has greater effect followed by Inertia Loyalty, Cult Loyalty, Repatronage Intention, Behavioural Loyalty, Programme Utility Perception and Mercenary Loyalty. It is also inferred that the independent variable Attitudinal

Loyalty is statistically not significant even at 5 percent significance level. Hence H_04 is accepted. It means that Attitudinal Loyalty has no significant effect of Purchase Intention.

MAJOR FINDINGS

1. Customer Equity is found to be a strong factor which leads to Purchase Intention. It is evident from the Beta Coefficient of 33.4 percent. Thus Customer Equity establishes strong positive relation over Purchase Intention.

2. There exists a positive relation between Repatronage Intention and Purchase Intention. Based on the Beta coefficient, it is evident that there is 28.8 percent impact over Purchase Intention.

3. Programme Utility Perception establishes positive relation over Purchase Intention with the Beta coefficient of 17.4 percent.

4. Attitudinal Loyalty establishes least positive relationship with Purchase Intention which is shown by Beta Coefficient of 8.4 percent.

5. There exists a positive relation between Behavioural Loyalty and Purchade Intention. Its Beta Coefficient gives 24.2 percent impact over Purchase Intention.

6. Mercenary Loyalty establishes positive relation over Purchase Intention with its Beta Coefficient of 11.2 percent.

7. Cult Loyalty establishes strong positive relation over Purchase Intention with its Beta Coefficient of 31.2 percent.

8. Inertia Loyalty has a strong positive impact over Purchase Intention. Its Beta Coefficient is 32.1 percent which shows strong positive relation between them.

All the factors identified in the study have a positive effect over Purchase Intention. From the study, it is also evident that the Customer's Equity towards loyalty programme has significantly influenced the purchase intention of customers. Moreover it has also increased the number of purchases made by the customers with the use of loyalty cards.

CONCLUSION

The study concludes that Loyalty Programme has significant impact on purchase intention of consumers. According to the finding of this study, we are able to observe that there exist positive correlations between various factors that affect customer loyalty and purchase intention. major factor that affect the purchase intention of the customers are customer equity, repatronage intention, programme utility perception, Behavioural loyalty, mercenary loyalty cult loyalty and inertia loyalty. This study also affirms the importance of effect of loyalty programme on purchase intention; it positively influences the buying intention of the customers.

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A Study on Influence in Investment Decisions By Recognition Heuristics Cues

Ajay Joseph*
Dr Gireesh Kumar **

*(Assistant Professor, Bharata Mata College, Thrikkakara and Research Scholar Nirmala College Muvattupuzha)
**(Principal, Henry Baker College, Melukavumattam and Research Guide, Nirmala College Muvattupuzha)

Abstract

People often face constraints such as lack of time or information in taking decisions, which leads them to heuristics. Heuristics are useful to take some shortcuts in order to decide faster and with fewer resources, even if that leads to suboptimal decisions. When applied to financial markets, the Recognition Heuristic predicts that investors acquire the stocks that they are aware of. The Recognition Heuristics state that an individual, when facing the challenge to choose between two objects and he is familiar with only one of the objects, the individual would always choose the object that he is familiar with. The concept of Recognition Heuristics has its origin on the psychology and intends to be a fast and frugal way of thinking to take decisions on a bounded rationality scenario. Volatility has become the order of the day. The kind of volatility we have witnessed in the Indian Equity market in recent times is unprecedented. Even though this study is limited to the investments in security markets, it is true with other assets like gold, currencies, real estate etc. This leaves the Indian investors baffled at times. The main objective of this study is to study various factors leading the investors to adopt recognition heuristics in investment decisions and also find which factor influences more. There are limited studies in the area of behavior finance in India, especially the relationship between Recognition Heuristics and investment decisions. The study begins with the existing factors of Recognition Heuristics in behavioral finance, based on which, hypothesis are proposed. Then, the hypothesis is tested using multiple regressions. The results showed that Recognition heuristics has a great impact on individual investment decisions and among the variables herding instinct has the highest effect. The study is limited to the individual investors in security markets.

Key words: Behavioral finance, Recognition Heuristics, Investment Decisions, Herding, Anchoring, Representativeness bias, Over confidence bias, Availability bias

INTRODUCTION

The concept of Recognition Heuristics has its origin from the psychology and states that an individual, when facing the challenge to choose between two objects and he is familiar with only one

GIS Business

of the objects, the individual would always choose the object that he is familiar with. When applied to financial markets, it is supposed that investors may acquire only the stocks that they are aware of, inflating the price of the most recognized stocks.

Human decisions often depend on their nature, intuitions, and habits, cognitive or emotional biases hidden deeply at one's mind. Behavior finance is the study of how psychology affects financial decisions and financial markets. Since psychology explores human judgment, behavior and welfare, it can also provide important facts about how human actions differ from traditional economic assumptions (Pompian ,2012). Psychological factors like anchoring , depending on too low available information, being over confidenton their own knowledge, past experiences, following the crowd etc lead investors to recognition heuristics in investment decisions.

REVIEW OF LITERATURE AND MODEL DEVELOPMENT

The concept of recognition heuristic was introduced by Goldstein &Gigerenzer (1999, 2002) and its pretended to "exploit the vast and efficient capacity of recognition to make inferences about unknown aspects of the world" (Goldstein and Gigerenzer, 1999, p. 4). Merton (1987) was the first economist to point out the concept of recognition and to presume that investor attention may be relevant to stock pricing. Anchoring is a bias in recognition heuristics in which people make their decision based on initial point (Pompian, 2011). Montier (2002) argues that investors use previous stock price as anchor for today stock price, which result to underreact to fundamental information and change in stock price. Shiller (2000) results showed that investors tend to be optimistic in bull market and pessimistic in bear market. Availability refer to the tendency in which people relies upon knowledge that is easily available (Tversky and Kahneman, 1974). Investors give more weight on easily available information (Pompian, 2011).. According to Kahneman and Tversky (1974), individuals use the availability heuristic when making judgments on the basis of how easily they can use the memory of what they perceive as relevant circumstances of a phenomenon. Tversky and Kahneman, (1974) , "Availability is a useful clue for assessing frequency or probability, because of instances of large classes (Kahneman and Tversky, 1974, p. 1127). The overconfidence bias which is related to the self- attribution bias is the tendency of an individual to attribute his success to his own talent and ability while blaming 'bad luck' for his failure, making himself overestimating his talent.

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Qadri&Shabbir (2013), Lim (2012), Qureshi et al. (2012) and Bashir et al. (2013) have found overconfidence to have positive significant impact on investors' decision making. Atif (2014) and Kengatharan (2014) found overconfidence to have negative impact on decision making.According to Pompian (2012), representativeness bias is a belief perseverance bias in which people tend to classify new information based on past experiences and classifications. It has also been shown that investors were prone to invest in stocks with higher recent past returns, the latter being consider as representative for future returns (DeBondt, 1993). This is consistent with Dhar, Kumar (2001) who have investigated the price trends of stocks and have shown that stocks with positive abnormal recent returns are preferred to others.According to Luong& Thu Ha (2011), the herding individual will base his investment decision on the crowd actions of buying and selling, creating speculative bubbles phenomenon hence making the stock market to be inefficient.Further, some significant studies (Grinblatt et al., 1995; Lakonishok et al., 1992; Wermers, 1999) have been conducted on the herd behaviour in investment decision-making.
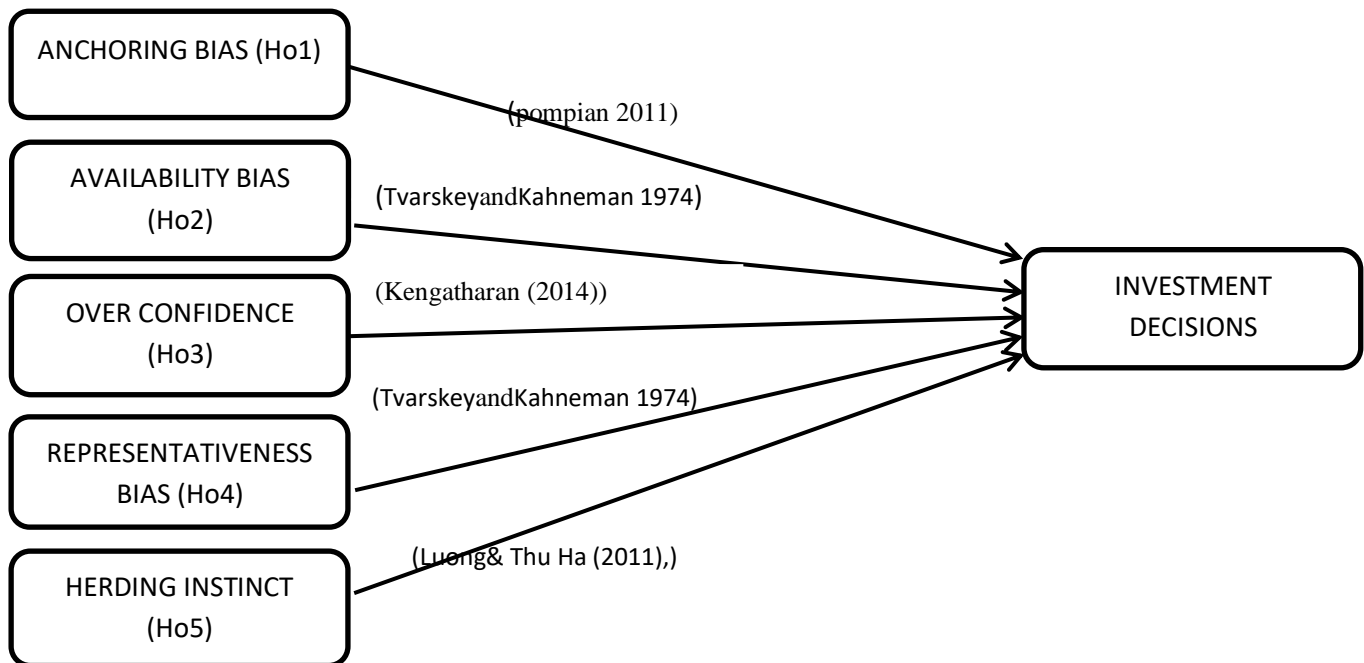

Figure 2 :Hypothesized model

Source: Compiled by the Researcher based on extensive review.

RESEARCH GAP

Investors have an attitude of sticking towards a particular investment; they are ruled by emotions rather than rationality. Charles Dow has stated in his famous theory about technical analysis of securities that the investors' decision making is 90% psychological and 10% logical.Heuristics and frame of mind play an important role while deciding to choose investments in financial markets in India. (Dr. Deshmukh, DrSanskruthy Joseph 2016). Though there are a large number of studies on Heuristics and its effects, no studies have so far extended to the exclusive study of a type of heuristics like Recognition.

OBJECTIVE

The Study"A Study on influence in Investment Decisions by Recognition Heuristics cues" is anchored on following objectives:

1. To explore the factors influencing recognition heuristics cue of the investors.
2. To Unearth the effect of recognition heuristics cue on investment decisions of investor

PREPOSITIONS

Ho1: Anchoring has no significant effect on investment decisions.

Ho2: Availability has no significant effect on investment decisions.

Ho3: Confidence has no significant effect on investment decisions.

Ho4: Representativeness has no significant effect on investment decisions.

Ho5: Herding Instinct has no significant effect on investment decisions.

METHODS AND MATERIALS USED

The study is empirical in nature and survey method been used to collect primary data from127 individual investors from different parts of South India. A combination of convenience and random sampling method were used because of the difficulty in obtaining details from individual investors. The constructs used for RH is obtained from the original work of Goldstein, D. G., &Gigerenzer,G. The constructs used for AN,OC, and HI are obtained from Murithi (2014), AV and ID fromMirzatUllahKhan (2015) , constructs of RB from Pompian (2012) Murithi(2014), thus ensuring content validity. The constructs were measured on a five-point Likert scale with responses

ranging from strongly agree (5) to strongly disagree (1). To measure customer satisfaction construct also, five-point Likert scale with responses ranging from strongly agree (5) strongly disagree (1) were used. Multiple regression analysis was used to validate the model.

DEMOGRAPHICS OF THE STUDY

The demographic variables like gender, age and experience play a pertinent role in the investment decision making of investors through recognition heuristics. The study was conducted among 127 individual investors out of which 79 were men and 48 were women. Majority of the respondents were under the age of 30. Only 9 respondents are above the age of 60. The experience in investment area is very much low. More than 70% of the respondents are less experienced. To put it succinctly, young males with less experience are the major part of investors who use recognition heuristics as a tool for selecting an investment.

RESULTS AND DISCUSSION

Reliability analysis

A Reliability Test was carried out using Cronbach's Alpha, which measures the internal consistency of research constructs and the result is exhibited in Table 1. The Alpha values for all the 6 factors are above 0.70, the threshold suggested by Nunnally (1978). Thus it can be concluded that the scale has internal consistency and reliability. In other words, the items that are used in it measures what are intended to measure.

Table 1Cronbach's Co-efficient Alpha – AN, AV, OC, RB, HI, ID

Sl. No	Factors (constructs)	Number of items	Cronbach's alpha
1	Anchoring bias	4	.852
2	Availability bias	4	.741
3	Over confidence	4	.749
4	Representativeness bias	4	.704
5	Herding instinct	4	.809
6	Investment decisions	5	.843

Source : author's calculation

Correlation analysis

Correlation analysis is carried out before conducting regression analysis in order to quantify the strength of relationship between the variables. It tests the linear relationship between the variables.

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Table 2shows the correlation between independent and dependent variables

Table 2 Correlation

Variable Name and Acronym	AN	AV	OC	RB	HI	ID
Anchoring Bias (AN)	1	.568**	.400**	.406**	.537**	.513**
Availability Bias (AV)		1	.416**	.437**	.437**	.519**
Over Confidence (OC)			1	.560**	.490**	.618**
Representativeness Bias (RB)				1	.372**	.555**
Herding Instinct (HI)					1	.641**
Investment Decisions (ID)						1

** Correlation is significant at the 0.01 level (2-tailed).

This table shows the correlation between independent variables and the dependent variable. The correlation coefficient should always be in the range of -1 to 1.A correlation is statistically significant if it is "Sig. (2-tailed)" < 0.05. Based on the coefficient of correlation in the above table it is inferred that there exists a high positive correlation between all the variables.

Coefficients of regression analysis

Table 3Coefficients of Regression Analysis

Variables	Item acronym	Beta	P value	Adjusted R Square	Durbin-Watson
Anchoring bias	AN	.066	.393	.577	2.219
Availability bias	AV	.139	.049[*]		
Over confidence	OC	.253	.001**		
Representativenes s bias	RB	.196	.008**		
Herding instinct	HI	.347	.000**		

Source: Authors' calculation. R-squared = 0.594

** Denotes significance at 1% level

* Denotes significance at 5% level

Multiple regression analysis examined the effect of independent variables on dependent variable. The Durbin-Watson statistic is 2.219 which indicates independence of observations. The model is statistically significant at 1% level and 5% level respectively. HI has the highest beta coefficient (0.347) followed by OC (0.253). The model states that the variable herding instinct followed by over confidence has a major influence on brand image compared to other variable

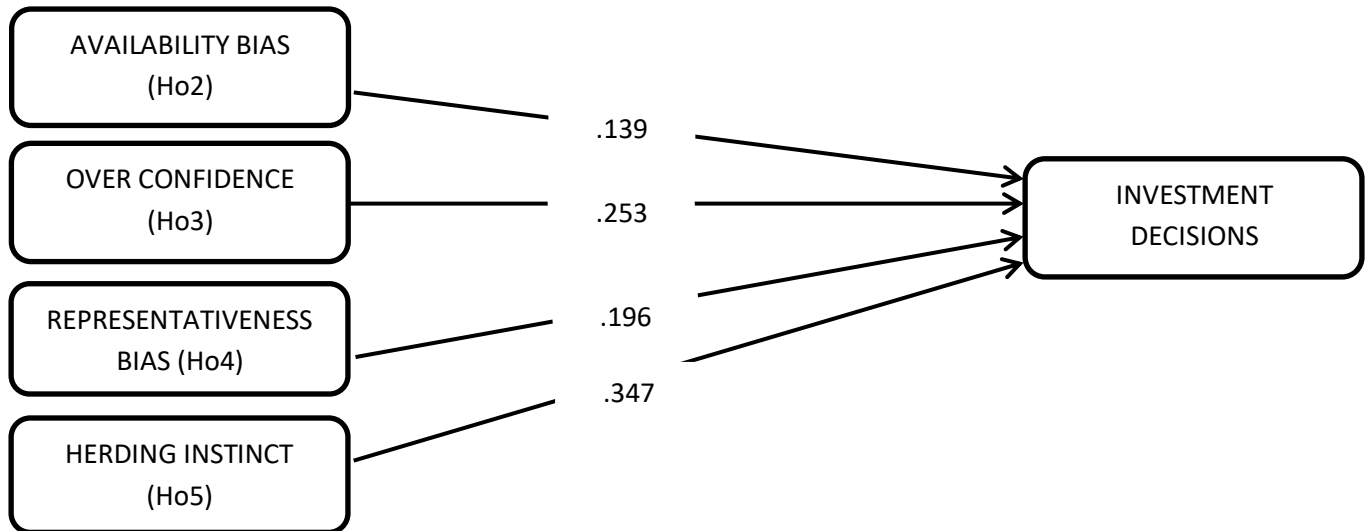# GIS Business

Validated model

Figure 2: Empirically Validated Model

Empirically validated model is portrayed in the figure 2. It is been found that herding instinct has the highest impact of .347 for every 1 unit of investment decisions. Similarly 25.3%, 19.6% and 13.69% impact is made by over confidence, representativeness bias and availability bias respectively.

CONCLUSION AND SCOPE FOR FURTHER RESEARCH

The study was conducted on the topic "Recognition Heuristics cues in Investment decisions" with an objective of identifying the various factors of recognition heuristics that lead to investment decisions and to validate a model. The study was conducted over a period of one year. Though there are plenty of literatures that have explored the area heuristics, a comprehensive study which covers a single type of heuristics called recognition heuristics and its factors in depth leading to investment decisions of individual investors are rarely found in the literature, especially in India. Five constructs of Recognition Heuristics were used in the study. Among them Herding Instinct, Over confidence, Representativeness bias and Availability bias are the biases having significant effect on investment decisions and Anchoring bias was found non influential. Thus the study paves path for the future researches to explore whether these biases are having a positive or negative effect on the investment

decisions. It is also important for research to be carried out on the effect of behavioural finance on other kinds of investors like institutional investors.

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