The 5th INTERNATIONAL CONFERENCE ON DEVELOPMENT POLICY - TRANSFER OF TECHNOLOGY FOR SUSTAINABLE GROWTH AND DEVELOPMENT: LESSONS AND EXPERIENCES

21st & 22nd August 2014

Edited By

Dr. K.T. GEETHA

Dr. V. VIMALA

UGC SPONSORED

AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND HIGHER EDUCATION FOR WOMEN, COIMBAORE

(University Estd., under Section 3 of UGC Act 1956)

In collaboration with

The Institute of Finance management, Dar es salaam, Tanzania

Jointly organized

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PROCEEDINGS

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Published by V. Ramesh for Scitech Publications (India) Pvt. Ltd., Plot No: 52, Door No: 2/619, First Main Road, VGN Nagar, Iyyappanthangal, Chennai - 600 056.

Preface

Sustainable development is probably the most daunting challenge that humanity has ever faced, and achieving it is a task that requires the fundamental issues be addressed immediately at local, regional and global levels. At all scales, the role of science and technology is crucial; scientific knowledge and appropriate technologies are central to resolving the economic, social and environmental problems that make current development paths unsustainable. Technological innovation and Information Communication Technologies (ICTs) represent a way for developing world nations to foster economic development, improve levels of education and training, as well as address critical issues within society. Bridging the development gap between the North and the South, and alleviating poverty to provide a more equitable and sustainable future for all, requires novel integrated approaches that fully incorporate existing and new scientific knowledge.

The impact of new technologies on society and development affects various interests and domains, and the effective and appropriate use of technology requires consideration of social, cultural, economic, political, and environmental contexts and effects. The opportunities and challenges applying the technologies to old problems require the guidance from a new breed of professionals and policymakers who can integrate technological expertise and a clear understanding of its wider ramifications as a guide to strategies for applying technology to the tasks of achieving sustainable development.

Avinashilingam Institute for Home Science and Higher Education for Women (Estd. u/s 3 of UGC Act 1956), Coimbatore, Tamil Nadu jointly with The Institute of Finance Management, Tanzania, organised The 5^{th} **International Conference on Development Policy -Transfer of Technology for Sustainable Growth and Development: Lessons and Experiences**, on 21st - 22nd August 2014 at Avinashilingam Institute for Home Science and Higher Education for women, Coimbatore. The conference addressed longstanding issues relating to the impact of technology on development. The conference highlighted on:

- The role of technology in promoting sustainable development;
- The various approaches to integrate technology into a specific environment with particular attention to social, economic, and environmental impacts;
- Transfer of Technology, innovation and creativity in globalised scenario;
- How to leverage technology for industrial advancements; and
- Enable participants to work more effectively to promote the development and application of new technologies for sustainable development.

Three Plenary sessions were scheduled for the two days conference in the university venue. Thirty - five papers on various titles from various participants supporting the theme of the conference were presented. A wide range of experts, specialists, researchers and academicians chaired and spoke in conference plenary sessions, where they discussed and presented the latest information and findings for quality technology enhanced learning and experiences on international technology transfer, technology adoption and management in connection with economics, accounting,

trade transfer, insurance and financial services, quality management and information systems in embracing the ecosystem.

This global event features more than 18 speakers', 300 participants and 35 delegates from various countries like Netherland, Malaysia, Ethiopia, Sultanate of Oman and USA.

This book is the outcome of the 5th International Conference on *Development Policy -Transfer of Technology for Sustainable Growth and Development: Lessons and Experiences*. The book consists of 18 selected peer - reviewed papers that were presented in the conference and approved for publications. This book will be useful not only for academicians and research scholars, but also for policy - makers and persons at the helm of affairs to understand the significance of technology in building a more competitive and dynamic Indian economy to fulfill the Vision - 2020 of Dr.A.P.J.Kalam, former President of India.

Dr. U. Jerinabi

Dean, Faculty of Business Administration,
Avinashilingam Institute for Home Science and
Higher Education for Women, Coimbatore.

Acknowledgements

This book is the outcome of the 5th International Conference on Development: *Transfer of technology for Sustainable Growth and development: Lessons and Experiences* held on 21st - 22nd August 2014 at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore in collaboration with Institute of Finance Management (IFM), Dar es Salaam, Tanzania. The book consists of selected papers presented in the aforesaid conference.

We acknowledge our deep sense of gratitude to Dr. T.S.K. Meenakshisundaram, Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, India for the constant support and guidance in bringing out this book.

We profusely thank Dr. Sheela Ramachandran, Vice Chancellor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for the encouragement, invaluable support, guidance and counseling at different stages, which paved the way for this publication.

We extend our gratitude to Dr. A. Venmathi, Registrar (i/c), Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for her constant support in bringing out this book.

We are extremely thankful to Dr. U. Jerinabi, Dean, Faculty of Business Administration, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, for her constant advice, encouragement and enthusiasm in giving shape to this book.

We express our heartfelt gratitude Dr. Kadida Mashaushi and Dr. Godwin Kaganda, Institute of Finance Management (IFM), Dar es Salaam, Tanzania, Institute of Financial for their valuable advice and support in the conduct of the Conference.

We also place on record our appreciation to the Dr. (Mrs.) P. Chitramani, HOD, Avinashilingam School of Management, Dr. G. Padmavathi, Professor and HOD, Department of Computer Science and Faculty Members of Avinashilingam School of Management, Commerce, Economics and Tourism for their constant support in the conduct of the conference and bringing out this Conference Proceedings.

We extend our appreciation to all the paper contributors whose contribution has been invaluable in bringing out this volume. We remain grateful to the University Grants Commission (UGC) for being generous in funding the conference as a result of which this book sees the light of the day.

We would like place on record our profound sense of gratitude to SCITECH Publications (India) Private Limited, Chennai, India, who readily agreed to take up the assignment of publishing this book and executed the task within the shortest possible time.

Dr. K. T. Geetha

Dr. V. Vimala

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(Deemed University under Category 'A' by MHRD)
Re-accredited with 'A' Grade by NAAC

Dr. T.S.K. Meenakshisundaram **Date: .....**

M.A., M.Phil., Ph.D.
Chancellor

Message from the Chancellor

Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore and The Institute of Finance Management, Dar cs Sallam, Tanzania conducted the 5th International Conference on Development Policy-Transfer of Technology for Sustainable Growth and Development: Lessons and Experiences on 21-22nd August 2014. The objective of the conference is to review the developments in technology, evaluate their impact on industrial development, and attempts to derive lessons that may be applicable to the economy.

Bridging the development gap between the North and the South, and alleviating poverty to provide a more equitable and sustainable future for all, require novel integrated approaches that fully incorporate existing and new technical knowledge. However, technology has been identified with a host of problems. In this era of knowledge management, it is imminent on the part of the institutions of higher learning to provide opportunities for harnessing the potential of academicians, professionals and researchers alike in identifying to technological issues as well as identify strategies for applying technology to the tasks of achieving sustainable development.

I appreciate the organizers for choosing the topics relevant in present context and I hope this volume brings together views, perspectives, and insights from policy makers, practitioners, and leading experts on skills development for inclusive and sustainable growth.

T.S.K. Meenakshisundaram

Dr. T.S.K. Meenakshisundaram
Chancellor
Avinashilingam Institute for Home Science and
Higher Education for Women, Coimbatore.

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Prof. Sheela Ramachandran
M.sc., P.G. Dip. (Fd.Sc. & P), Ph.D.
Vice-Chancellor

Date: .....

Message from the Vice-Chancellor

Technology remains as the fountainhead for human development and economic growth. But its spread continues to be painfully slow. Electric power, inspite of its unmatched technical prowess, took almost one hundred years to become commonplace. Even after a century of telephones, billions of people have no access to it. Technological prowess alone is inadequate to guarantee success. Other factors matter; its relevance, availability, affordability, the speed of diffusion, and the social and environmental costs for harnessing it. The development divide we see among and within nations is due to these factors being different across countries, rather that due to technologies per se. The impact of new technologies on society and development affects various interests and domains, and the effective and appropriate use of technology requires consideration of social, cultural, economic, political, and environmental contexts and effects. The opportunities and challenges applying the technologies to old problems require the guidance from a new breed of professionals and policymakers who can integrate technological expertise and a clear understanding of its wider ramifications as a guide to strategies for applying technology to the tasks of achieving sustainable development.

Recognizing the urge for a broad-based appreciation of the need to understand technology in the context of development, the Avinashilingam Institute for Home Science and Higher Education for Women (a UGC maintained Deemed University), Coimbatore, in collaboration with The Institute fo Finance Management, Dar es Salaam,Tanzania, initiated to Conference to bring out a convergence of multifaceted interest so as to serve as a platform for industrialists, entrepreneurs, corporates, academicians, researchers and the others to share their experiences and achievements in transfer of technology for sustainable growth and development. The deliberation provided the participants and insight on the technological and institutional barriers in the diffusion and adop-

tion of the efficient and sustainable technologies and a better understanding of the influence of the twenty-first century technologies on business decisions.

This book entitled Transfer of Technology for sustainable Growth and Development Lessons and Experiences is a compilation of the papers presented in the 5th International Conference on Transfer of Technology for Sustainable Growth and Development: Lessons and Experiences on 21st and 22nd August 2014. The papers presented in the book were selected after due review process carried out by Prof. U. Jerinabi, Deen, Faculty of Business Administration, Prof. K.R.Geetha, Department of Economics and Dr. V. Vimala, Assistant Professor, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.

The readings of this book will enrich the knowledge on the Transfer of Technology for Sustainable Growth and Development in India and at the global level. I wish to appreciate the relevance of the topics of this conference and hope and wish this book would bring insights in these fields and act as an eye opener to the scholars in this field of inquiry.

Vice Chancellor

Brief Profile of the Editors

Dr. K.T. Geetha presently is the Professor of Economics in Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu state, India. She is an eminent scholar having rich academic background (34 years of Services) and had specialized in Development Economics. She has participated in a number of International and National conferences and seminars. She has published number of research papers in reputed National and International Journals and won best paper award both at the international and national level. She is in the Board of Examination of various Universities in Tamil Nadu. She has completed four major research projects and has two ongoing research projects from UGC and ICSSR.

Dr. V. Vimala, Assistant Professor, presently working at Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore - 641043, Tamil Nadu state, India. She is a renowned scholar having affluent academic background (Nine years of Services) and had specialized in Commerce and Management (Specialized in Banking and Finance). She has published 15 articles in reputed national and international journals, 07 seminar proceedings, presented 44 papers in both national and international seminars/conferences, attended 17 workshops, 08 International Conference, 04 State level seminars and participated in 38 National level seminars, since 2005. She also organized two National workshops and one National level conference. In the year 2011, to her credit, she won the Citation of Award in the Name of Prof. *Manubhai M. Shah Memorial Research Award and the Gold Medals*.

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Contents

Security Through Engagement-Lessons and Experience: A Tanzanian Perspective

Said Jafari, The Institute of Finance Management, Dar es Salaam

Abstract

This paper presents the survey conducted to assess end-user engageability in building organization's security. A total of forty eight (48) responses were collected from fifteen (15) business organizations and institutions in Tanzania. The results show that little has been done facilitate end-user engagement in building secure organization. Also, the survey showed that old security problem such as passwords sharing still exist. The findings from this paper can be used by security implementers within organization to build and maintain sustainable secure organization.

Keywords

Security engagement, Building secure organization, end-user engagement?

Introduction

Tanzania, like other developing countries in Africa is witnessing a notable proliferation of automation in business operations as well as in social activities such as social networking. Operational efficiency, flexibility and convenience fostered by improved ways of data sharing and collaborations are influencing this trend. Despite the benefits, this proliferation amplifies information security problem particularly to business organizations. Protecting information in a ubiquitous computing environment where utilization of hand held gadgets is on the rise is a challenging task. Thus, organizations have to employ new strategies in order to maintain its security to an acceptable level.

Contemporary information security management paradigms emphasizes on attributing security as a priority item for top management in organizations. Among the reasons behind this move is that security agenda should get an organizational-wide support including that of top management. While this vision is arguably a recommendable strategy, lack of concrete focus on users (end-users) jeopardize efforts to address security challenges. Parallel to that, end-users are increasing using smart portable devices for various activities including accessing social networking portals and organizations' portals. As a result, traditional perimeter defense for business information resources disappears. Thus, increasing attack surface and security challenges.

The fact that people are the weakest link in the security chain necessitates organizations to employ innovative approaches to reduce attack surface. Human behavior such as casualness and

lack of proper security awareness can lead to the deepening of the problem. Therefore, a security management approach that builds organization's security mechanisms around its employees can possibly reduce attack surface.

This paper brings forward a discussion on lessons learnt and experiences from business organizations operating in Tanzania in preparing, promoting and ensuring sustainable security culture among its employees. A major focus being end-user engagement practices in the effort to address security challenges facing business organizations.

Literature Review

What is Protected?

According to the ISO/IEC[1] 27002 directive of 2005 - Information Technology - Security techniques - Code of practice for information security management, information is an important organizational asset worth protecting. Furthermore, supporting processes, systems and networks are essential assets of the organization. In the ever increasingly networked business environment, these assets need be protected from a wide range of threats to ensure business continuity and to maintain a competitive in business edge.

In a nutshell, all assets of an organization (physical and non-physical) can be represented as information. Thus, protecting information assets is protecting the entire organization from security threats. The Common Criteria, like ISO/IEC 27002, positions protection of organization's assets as the central focus of information security. Figure 1 illustrates this positioning and relationships of assets and asset owner with security threats, security protection (in Figure 1 is referred as countermeasures) and security risks.

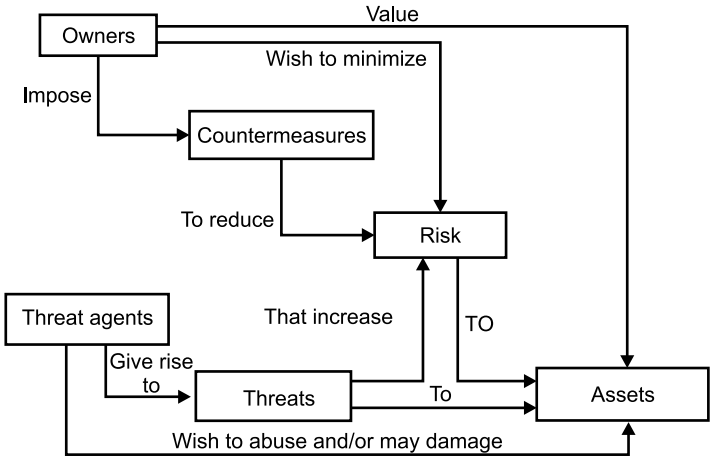

Figure 1 Security concepts and relationships (CC-1, 2009)

[1]ISO/IEC is a Joint Technical Committee of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC)

Protection Mechanisms and Security Dimensions

Protection of organizational information in computer systems is a long standing challenge (Saltzer & Schroeder, 1975). As organizations are increasingly depending on computer-driven systems for handling communication and business transactions, protection of these systems and information there in is inevitable. It is widely accepted that information protection mechanisms should address diversified facets to maintain organization security to an acceptable level. These facets according to Von Solms (2001) include the strategic dimension, the organization governance dimension, the policy dimension, the best practice dimension, the ethical dimension, the technical dimension, the legal dimension, the insurance dimension, and the human dimension. The human dimension has received considerable attention from researchers and practitioners (Von Solms (2001), Gonzalez & Sawicka (2002), Vroom Von Solms (2004), Staton et. al., (2005), Herath & Rao (2009), Lacey (2011)).

In an attempt to understand the effect of human factor in maintaining secure organization, Gonzalez & Sawicka (2002) examined the interplay among technology, work environment and human behavior, noting that secure organization cannot be attained unless human dimension is given a sensible consideration. Thus, organizations need to maintain a balance among several security dimensions to remain secure. This requires an ability to audit every security dimension considered by the organization. However, auditing of human behavior as one of the security dimension is a long standing challenge. Awareness, perceptions, and contexts affect the correctness of information an end user can reveal during such auditing (Vroom, 2004).

Furthermore, Staton et. al., (2005) developed a taxonomy for end user security related behavior noting that some feedback cannot be obtained through user assessment alone. Technology can play crucial role in eliciting what is going on in organizations. This can be done by means of web content filtering and monitoring of audit trails. The challenge lies in the ability to obtain and manage a comprehensive data logs from various sources such as operating systems, database and application systems, and many network nodes.

On the other hand, technical and policy dimensions are relatively classical security facets. They have been dealt since the study of computer security emerged. In early days, computer security was about technical security controls such as cryptosystems and access control models. The challenges of relying on technical controls were apparent (Anderson, 1993; Ohm, 2009). Some of the contributing factors, according to Anderson (1993) were misalignment of how the system should behave and the human factors. Later, soft elements such as policy and governance dimension were brought up to supplement technical controls and a broader view of security emerged (Hong et. al., 2003).

Both designing and implementing of technical and policy dimensions of security require effective user involvement (Adams & Sasse, 1999). However, the practicality of embracing this philosophy in building organization security is a notable challenge. Thus, organization should address and build its security around its end-users and that all other security dimensions should be aligned with human factors. As noted by Shneier (2004), security as a chain is as strong as the weakest link.

Study Objectives

Based on the literature analysis, this paper seeks to reveal lessons and experiences in the course of managing organization's security in the modern ubiquitous environment. Further to that, the paper seeks to capture the extent end-users (employee) are engaged in the protection of organization's assets.

Data Analysis, Results & Discussion

Methodology

To gain insights of lessons learnt and experiences in managing organization's security, a survey method was used to study organizations' security practices. The survey involved business organizations and institutions from different sectors in Tanzania. These sectors include telecommunication, education, banking, insurance, healthcare and government agencies or institutions. This multi-sector survey was envisaged to facilitate comparative analysis of findings in order to discriminate generic from sector-specific security scenarios.

The survey was conducted to business organizations and institutions with at least one operational center in Dar es Salaam. A total of fifteen (15) organizations were surveyed. Among these three (3) are from telecommunication sector, two (2) from banking sector, three (3) from education sector, two (2) insurance sector, two (2) from healthcare sector, and three (3) from government agencies or institutions. Each organization was tasked to respond to two different but related set of questions. One set of questions was directed to the organization's security officer or IT/ICT[2] staff while other was for the end-users. Out of sixty (60) questionnaires which were distributed, forty eight (48) responses were collected and analyzed. This figure is equivalent to 80% of all distributed questionnaires.

The questionnaire for IT/ICT staff had nine questions: five were formulated to assess availability and extent of implementation of security countermeasures, availability and extent of utilization of security guidelines and procedures, end-user engagement, and emerging security threats with remedial practices; and the rest were supporting questions. The questionnaire for end-users had three questions: two were formulated to assess awareness on the availability and utilization of security guidelines and procedures, and end-user involvement in designing and implementing security control for organization; the remaining was supporting question. For the complete set of questions, the reader is referred to appendices A and B.

Data Analysis

To reveal the insights from collected responses, different questions were analyzed differently. For example, survey questions with yes/no answers were analyzed through simple counting. Questions with percentage answers were re-scaled and coded into three categories; 0 - 35% $\Rightarrow$ Poor, 36 - 65% $\Rightarrow$ Average, and 66 - 100% $\Rightarrow$ Good. This scaling is preferred because it reduces human bias caused by difficulty to discriminate two adjacent figures (percentages). Other open ended questions were analyzed using an inductive approach in order to reveal common themes from collected responses.

[2]IT/ICT stands for Information Technology/Information and Communication Technology

Results and Discussion

Availability and extent of implementation of technical controls

It was noted that security technical controls for provide the first line of defense to the organization. Thus, the survey seeks to reveal availability of technical control and the extent in they are implemented. This question was responded by IT/ICT staff only, one response per organization. Results, as indicated in Table 1, show that all surveyed organizations from different sectors implement majority of the enquired technical controls. Unlike other assessed controls, intrusion detection and management is not implemented by several organizations. Complexity of its implementation and organization's priority were cited as major reasons for not implementing intrusion detection systems. Generally, from technical control perspective, there were no significant discrimination between different sectors.

Availability and degree of compliance to security guidelines and procedures

Security guidelines and procedures enhance systematic management of security in the organization. Thus, the survey seeks to understand availability and degree of compliance to security guidelines and procedures. Results, as indicated in Table 2, show discrepancy in terms of availability of guidelines and procedures. Healthcare organizations and Financial related organizations such as banks and insurance organizations have implemented relatively more guidelines and procedures compared to other surveyed sectors. Similarly, the degree of compliance is comparatively higher than that observed in other sectors. Furthermore, organizations from telecommunication sector, education sector and government agencies showed slightly similar responses. The discriminative variables include disposal of electronic equipment and data, and use of personal portable devices such as laptops, memory sticks and smart phones.

Table 1 Technical controls

Technical control or related activity	Response		% Response		Average utilization[3]
	Yes	No	Yes	No	
Network hardening - i.e.: controls to secure corporate network	15	0	100	0	Good
Vulnerability scanning (server, pc, laptops, and network devices).	13	2	86.7	13.3	Average
Audit trail management — at least for classified transactions.	11	4	73.3	26.7	Average
Intrusion detection and management	3	12	20	80	Poor

Similar question was modified (refer to appendix B) and administered to end-users as double blind check in order to confirm responses and determine disengagement of end-users from organization's security practices. Responses did not show significant disparity (proportionally) from the results tabulated in Table 2.

Table 2 Security guidelines and procedures

Activity/Transaction	Response		% Response		Average utilization
	Yes	No	Yes	No	
Electronic exchange of official information	13	2	86.7	13.3	Average
Storage of electronic data	13	2	86.7	13.3	Average
Disposal of electronic equipments	8	7	53.3	46.7	Good
Disposal of electronic data	8	7	53.3	46.7	Good
Use of Personal Portable devices such laptops	7	8	46.7	53.3	Good
Use of Personal Portable devices (such as memory sticks and smart phones)	7	8	46.7	53.3	Good
Utilization of ICT organization assets	14	1	93.3	6.7	Average

End-user engagement in the protection of organization's assets

As noted earlier in this paper, end-users play vital role in the security of any organization. Therefore, the survey seeks to understand the extent in which end-users are involved as active participants in building and maintaining a secure organization. Results, as indicated in Table 3, show that many organizations do not involve end-user as active participant in formulating and developing security guidelines or procedure. Also, few organizations have clear policy or directive that explicitly warrant employee (end-user) to be responsible for actions. Other assessed issues received considerably high score as shown in Table 3.

Table 3 End user engagement

Activity	Response		% Response		Degree of compliance
	Yes	No	Yes	No	
Users are involved in developing guidelines or procedures	2	13	13.3	86.7	Good
Dissemination and training of guidelines/procedures are effective	15	0	100	0	Average
Users are accountable for their actions	3	12	20	80	Average
Users know that they are equally responsible to protect organization assets	14	1	93.3	6.7	Average
Security incidence reporting is easy and known to users	13	2	86.7	13.3	Average

Also, this question was modified and administered to end-users (see appendix B) in order to assess their opinions on end-user engagement. The results was congruent on one item which is "users are involved in developing security guidelines or procedures". All other assessed issues were scored "Poor". These results imply that there is mismatch between end-users and IT/ICT staff in perceiving and/or facilitating end-user engagement.

Other issues surveyed were the emerging security threats facing organizations and its associated remedial measures. The main themes emerged from the responses were concerns of password

sharing, accessing corporate portals using personal portable devices such as smart phones. Also, cases of writing passwords in smart phone were reported. Furthermore, it was observed that more than half (21) of all end-user involved in this survey uses personal portable devices such as smart phones and laptops to access corporate assets.

Implications, Limitation and Conclusion

Implications

The survey reveals that while new threats emerge with advancements of technology, old problems such as password sharing still persist. Also, despite the fact that human factor in information security is well documented; its implementation is still minimal compared to other dimensions of security. Thus, as organizations continue to put much focus on technical controls and less on human dimension, security breaches, data loses and industrial espionage shall continue to rise.

Survey Limitation

The survey data were collected from business organization and institutions which operate or had branch in Dar es Salaam. Given the size of this country, a more representative sample that includes organizations operating in other regions would have benefited the survey. However, since Dar es Salaam in a business city of Tanzania, the chosen samples are sufficient to draw meaningful conclusion from collected data.

Conclusion

The survey results presented in this paper revealed security practices as lessons and experiences from organizations operating in Tanzania. Little has been done to effectively facilitate end-user engagement in building and maintaining secure organization. Effort should be directed to build security of the organization around its employees (end-users). Technical controls and other security dimensions should be considered as peripherals or tools for use by end-user to achieve sustainable security.

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Acknowledgement

I would like to extend my appreciation to all organizations and professional staff who participated in the survey. To protect identities of organizations and staff involved, I will not mention your names.

Rural Women Empowerment Through Microfinance Enabled Technology in Tamil Nadu, India

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Abstract

Rural development is more than ever before linked to women entrepreneurs. The women entrepreneurs have their own identity in the world of entrepreneurship. Entrepreneurship is the only solution to the growing employment among rural youth. Rural women possess abundant resources to take up enterprises and with the help of information technology they are able to run the micro enterprises successfully in the competitive world. Information technology has become a core for every enterprise- helping manage everything, right from prospectus and customer management to meeting order requirement and delivery.

Women are capable of adopting new technology that helps them to improve their entrepreneurship and lifestyle. In this context a research study has been undertaken to study the SHG women entrepreneurs' technological development in Coimbatore and Tiruppur Districts in Tamil Nadu. Based on the stratified convenience sampling method 120 SHG micro entrepreneurs in each district having five years of business experience have been selected and thus 240 entrepreneurs in total are the sample respondents. The primary data was collected through a detailed interview schedule during the period February 2014 to April 2014. Statistical tools like Simple percentages, 't' test and Empowerment Index based on Five point Likert scale were applied.

The study results shows that rural women entrepreneurs are better to understand the links between micro credit, information technology and income enhancement. Use of mobile phone has proved more advantages than computer, internet or e-mail. In business matters, mobile phone has increased profitability through better and timely access to market information and better customer relation. On the family and social front it has facilitated communication thereby relieving stress and promoting trust and has helped to access certain public services. For women entrepreneurs, the mobile phone facilitates juggling multiple roles and responsibilities. The efficacy of microcredit interventions for women in the rural sector is enhanced through facilitating ICT.

Keywords

Microfinance-InformationTechnology-MicroEnterprises-Ruralwomen-Empowerment

Introduction

Indian microfinance has strongly developed during the last decade to a great extent under the impulse of government programmes (Fouillet, 2005) with two main objectives:

- To allow these populations to develop income - generating activities and, therefore to reduce their poverty
- To remove the population from "The clutches of the money lenders" by giving them access to less costly loans and by the leverage effect, to the banking system.

By acting at the same time on the income and on rounding out the budget through loans, microfinance is supposed to reduce the vulnerability of households to risks. Microfinance through SHG Bank Linkage could be considered as a landmark development in bank with poor. Empowerment of women has emerged as an important issue in recent times. The economic empowerment of women is being regarded these days as a sine-quo-non of progress for a country: hence, the issue of economic empowerment of women is of paramount importance to political thinkers, social scientists and reformers.

Micro Finance and Information Technology

The delivery of microfinance to the poor is smooth: effective and less costly if they are organized into SHGs. SHGs are promoting micro-enterprise through micro-credit intervention and micro-enterprises are an effective instrument of social and economic development. Rural development is more than ever before linked to women entrepreneurs. The women entrepreneurs have their own identity in the world of entrepreneurship and entrepreneurship is the only solution to the growing employment among rural youth. Rural women possess abundant resources to take up enterprises and with the help of information technology they are able to run the micro enterprises successfully in the competitive world. Information technology has become a core for every enterprise- helping manage everything, right from prospectus and customer management to meeting order requirement and delivery (Alok Goyal). It is now easier and cheaper than ever for the entrepreneurial team to develop and mass distribute innovative new products and services with the help of information technology.

Need for the Study

Women comprise half of human resources. They have been identified as key agents of sustainable development and women's equality is as central to a more holistic approach towards stabilizing new patterns, technology and process of development that are sustainable. Women are capable of adopting new technology that helps them to improve their entrepreneurship and lifestyle. In an increasingly dissatisfied world, technology is playing a critical role in not just the way enterprises connect with their customers, but also in the way they manage the processes internally. The use of Mobile Phone, ATM card / Computer / Laptop and Internet are not an exception to micro entrepreneurs. Nowadays the SHG initiated micro entrepreneurs are increasingly using these technologies. Because of the potential to enhance access, the Reserve Bank of India has issued

guidance note which allowed for banks to appoint micro finance entities as agents or correspondents for the taking of small deposits. They can in turn use mobile banking to further advance their extent of coverage and reach among the poor and micro entrepreneurs. In this context a research study has been undertaken to study the SHG women entrepreneurs' technological development in Coimbatore and Tiruppur Districts in Tamil Nadu.

Review of Literature

There has been considerable interest on the gender impact of ICT and the ways in which it could empower women (Anand, 2000: Huyer & Carr, 2002: Best & Maier, 2007). Studies have inquired into issues of access, training and skills acquisition, the kinds of employment generated, the nature of such work and gender issues related to it like wage disparities and discrimination. These studies deal with educated women possessing high literacy skills. There are very few studies on how ICTs impact poor women (Gurumurthy, 2006). Studies on the use of ICT by women entrepreneurs, some adopting an enterprise perspective and others the gender and livelihood perspectives have examined how micro-credit and ICT could be used to promote entrepreneurship among educated women (Sharma, 2003: Ndubisi & Cengiz Kahraman, 2005). Recent studies on the use of mobile phones by low income African women have assessed women's communication needs, their quest for business self-sufficiency and of the ways ICT could promote women's rights through network formation (Comfort & Dada, 2009: Bantebya-Kyomuhendo, 2009: Abraham, 2009). Studies on women entrepreneurship and ICT adoption in the informal sector in India are only now emerging. ICT for rural poverty reduction has received considerable attention (Singh, 2006: Urquhart & Kah, 2007: Tewari, 2008). Micro finance through mobile banking, if enabled by the Reserve Bank of India and Telecom Regulatory Authority of Indian through appropriate regulatory interventions can change the face of micro finance in India and bring financial inclusion to the rural and urban poor (Srilakshmi, 2010), Credit must, above all, be accompanied by some kind of marketable skill development and ICT which the poor seriously lack. For informal sector women the mobile phone facilitates juggling multiple roles and responsibilities. The efficacy of micro-credit interventions for women in the informal sector is enhanced through facilitating ICT technology like the mobile phone (Kalpagam & Asha, 2011). These studies induced the authors to conduct a study on "Rural Women Empowerment through Microfinance Enabled Technology in Tamil Nadu, India".

Objectives of the Study

- To identity the different types of micro-enterprises promoted by the SHG women
- To analyse the nature of technology adopted by women entrepreneurs.
- To study the impact of microfinance enabled technology on empowerment of rural women.

Research Methodology

The study was conducted at the rural areas of Coimbatore and Tiruppur Districts in Tamil Nadu. Based on the stratified convenience sampling method 120 SHG micro entrepreneurs in each district having five years of business experience have been selected and thus 240 entrepreneurs in total are the sample respondents. The primary data was collected through a detailed interview schedule

during the period February 2014 to April 2014. The secondary data were collected from the records of SHGs, the annual reports, administrative guidelines of Coimbatore Mahalir Thittam Office, NGOs and other related publications.

Tools for Analysis

Descriptive statistics 't' test and empowerment index based on Five point Likert scale were used.

Results and Discussion

The findings of the research study are discussed under the following headings:

1. Socio-Economic status of the SHG micro entrepreneurs
2. Different types of micro enterprises promoted
3. Microfinance enabled technology development
    (a) Mobile phone possession and importance of mobile phone connectivity
    (b) Use of ATM card
    (c) Computer and internet awareness
4. Impact of technology development on empowerment of rural women

1. **Socio-Economic Status of SHG Micro Entrepreneurs**

   The socio-economic characteristics of the sample respondents have an important bearing on their entrepreneurial and technological behavior and on sustaining the growth of their micro-enterprises. The socio-economic characteristics of the sample respondents is given in Table 1

Table 1 Distribution of Sample Women Micro Entrepreneurs by Socio- Economic

Characteristics	Number Stated (%)		Characteristics	Number Stated (%)	
	Coimbatore District	Tiruppur District		Coimbatore District	Tiruppur District
Age of the Respondents (Years)			**Community**		
Below 30	18	16	Backward	43	46
31-40	37	39	Most backward	23	27
41-50	28	27	Scheduled caste	19	16
More	17	18	Scheduled tribe	8	7
			Others	7	4
Educational Status			**Land Holding Status**		
Illiterate	11	10	Land less	76	78
Primary	18	35	Having own land	12	13
Middle	32	26	Having leased land	12	9
High school	32	25	**Type of Family**		
Graduation	7	4	Nuclear Family	71	72
Marital Status			Joint Family	29	28
Married	93	95	**Income earners in the family**		
Unmarried	2	3	Income earners	34	41
Widow	5	2	Others	66	59

Source: Field Survey 2014.

It could be noted from table that in both the Districts the majority of the respondents were in the age group of 31-40 years indicating their maturity in handling the issues and at the same time active and enthusiastic age to work hard. Nearly 11 percent of the women entrepreneurs are illiterate and the rest have some basic education and seven percent from Coimbatore District and four percent from Tiruppur District were graduated indicating their awareness and interest to gain benefit and improve their standard of living. The major category of caste is backward class and the coverage of scheduled caste and scheduled tribes 27 percent in Coimbatore District and 23 percent in Trippur District showing the involvement of SCs / STs in micro entrepreneurship. About 94 percent of married. The targeting of the poorest in the study area has been good as 76 percent of the respondents in Coimbatore District and 78 percent in Trippur District are landless.

Family is the environment which motivates the women entrepreneurs in India nuclear and joint families exists. The study reveals that 29 percent of the respondents are having joint family and income earners are only 34 percent in Coimbatore District and 41 percent is Trippur District. The socio-economic status of the respondent's reveals that the women are highly in need of financial and technology support to develop enterprises and is improve their family status.

2. **Micro Enterprises promoted by the Respondents**

The respondents are engaged either in farm sector activities (or) non-farm sector activities or in both sectors depending upon the skills possessed by the household members and the resources available in the household. The District-wise sectoral distribution of respondent's economic activities is given in Table 2.

Table 2 District-wise Sectoral Distribution of Respondents Micro Enterprises

S.No.	Types of Enterprise	Number stated (%)	
		Coimbatore District	Tiruppur District
1.	Agriculture	24	25
2.	Animal husbandry	18	22
3.	Manufacturing	22	23
4.	Services	17	16
5.	Trading	19	14

Source: Field Survey 2014.

The Table 2 indicates that with the help of micro credit the SHG members initiated different type of micro enterprises and majority are engaged in trading: representing 33 percent in Coimbatore District and 36 percent in Tiruppur District, followed by 24 percent in each District rearing animal husbandry since they are village oriented and the rest are engaged in agriculture, manufacturing and service sectors.

3. **Micro Finance Enabled Technology Development**

Hosting a business venture entirely through Information Technology (IT) has increasingly been the initiative of many entrepreneurs. The existence of IT in the small-business sector

promotes entrepreneurship by providing opportunities outside of any other business realm: using IT as a strategic advantage, entrepreneurs can quickly move toward achieving their business goals. Aminuzzaman, Baldersheim and Jamil (2003) have distinguished technologies that have a ripple-effect and those that have segmentation impact. It is clear from their analysis that the ripple effects of technologies extend beyond the economic impacts to include other social effects, and they found the mobile phone to create such ripple effects in Bangladesh rural society. The mobile phone could help to promote network growth in society and increase the density of social interactions thereby reducing isolation, improving trust and the formation of social capital.

Micro finance enabled technology development has been analysed under the following headings

(a) Mobile phone possession and importance of mobile phone connectivity
(b) Use of ATM card
(c) Computer and internet awareness

(a) **Mobile phone possession and importance of mobile phone connectivity**

Table 3 Mobile Phone Possession

S.No.	Mobile Phone Details	Number stated (%)	
		Coimbatore District	Tiruppur District
Mobile Phone Possession			
1.	Own mobile (Purchased out of their income)	74	70
2.	Gifted by family members	18	14
3.	Using family members mobile	8	16
Cost of Mobile Phone purchased out of their Income (Price range)			
1.	Rs.1000 - Rs. 1500	28	32
2.	Rs.1501 - Rs. 2000	36	29
3.	Rs.2001 - Rs. 3000	6	6
4.	Above Rs. 3000	4	3
Frequency of Recharge			
1.	Weekly once	35	28
2.	Twice in a Month	51	59
3.	Once in a Month	12	10
4.	Once in Two Months	2	3
Monthly Expenses on Recharge			
1.	Below Rs.100	28	31
2.	Rs.101 - Rs.200	49	52
3.	Rs.201 - Rs.300	23	17

Source: Field Survey 2014.

The rural women have received the micro loans and started their micro enterprises and those who have proved their worth are able to get loans repeatedly as and when they repay the loan. Such a proven entrepreneurs group helps to better understand the links

between micro-credit, mobile phone and income enhancement. Timely and low cost micro-credit helps these micro-entrepreneurs in their business for they need not depend on usurious moneylenders for their working capital requirements. Carrying on their business transactions partly through the aid of the mobile phone is also enables better access to market information, suppliers and clientele and efficiency in dealing with micro-credit transactions as well. The details of mobile phone possession are given in Table 3.

It could be observed that all the sample respondents are able to access the mobile phone out of which 74 percent from Coimbatore District and 70 percent from Tiruppur District are able to buy mobile phones out of their earnings from their business. Majority of them purchased the mobile within the range of Rs.501 - Rs.2000 and are able recharge twice in a month.

Importance of Mobile Phone Connectivity

The sample respondents claimed that mobile connectivity is important for women and cited reasons that are presented in table 4.

Table 4 Reasons for the Importance of Mobile Connectivity to Women

S.No.	Reasons Specified	Number stated (%)	
		Coimbatore District	Tiruppur District
1.	To get orders	82	79
2.	To get clear information	100	100
3.	To Maintain contacts with clients through phone	86	91
4.	To place an order	82	84
5.	To call vehicles while bringing the products	79	82
6.	If they have any problem they can solve it by using their mobiles	69	72
7.	To get information regarding business	74	68
8.	Exchange of information/communication	96	97
9.	Enquiry about loan dates	94	84
10.	Pass information about loan dates to the group members	88	82
11.	Times of emergency	95	92
12.	To purchase and sell one's products	84	78
13.	To stay in touch	100	100
14.	To get information/ communication - when the family members will reach home	92	94
15.	To listen to Music/alarm/torch/store number	96	98

Source: Field Survey 2014. *Multiple responses

The respondents felt that mobile connectivity is very important for smooth running in their business. Increasingly many welfare and social security schemes including NREGA require the poor to open bank accounts so that payment could be channelized

through banks. The possession of a mobile phone would improve such service delivery as the banks could provide over the phone information on payment dates etc. The SHG women also claimed that it enhanced functional efficiency in their varied roles as wives, mothers and entrepreneurs. Across the spectrum of informal sector occupations, women reported that the use of the mobile phones has helped them in business through getting information, orders and better customer relations. Mobile phones help enquire details regarding product availability and access information on prices, quantities, supply and crowds at the wholesale markets from where vendors get their procurement. Mobile phone helps in both retaining customers and business growth (Donner, 2005).

(b) **Usage of ATM Card**

The survey revealed that 36 percent respondents of Coimbatore District and 29 percent of respondents of Tiruppur District possess ATM card and they use it mainly for withdrawal purpose. The rest of the respondents were not much aware of ATM card and even if they aware of it they hesitate to use it because of the fear of operation. They need proper training to use the ATM card. While ATM card penetration has been quite rapid still majority of the respondents in rural areas do not possess ATM card. If "Information Poverty" can be indexed by the non-possession of ATM card, there is clearly "Information Poverty" that needs to overcome.

(c) **Computer and Internet Awareness**

Most of the member have heard and seen computers but have not operated it as they do not perceive any benefits for themselves on account of low literacy, skill level and their occupations. But they do perceive computer skills as gateway to mobility and to better paying jobs and would like their children to acquire the computer skills. This is the kind of "aspirational" discourse of ICTD permeating the Indian social environment that Pal (2008) has highlighted. Computer usage and internet awareness of the SHG entrepreneurs is given in Table 5.

Table 5 Computer Usage and Internet Awareness

Reasons Specified	Number stated (%)	
	Coimbatore District	Tiruppur District
Computer Usage		
Computer / Laptop	8	6
Internet usage	13	9
E-mail account	9	7

Source: Field Survey 2014.

It could be inferred from the table that only 8 percent of respondents from Coimbatore District and 6 percent from the Tiruppur District are able to possess Computer/ Laptop and this is mainly purchased for the benefit of their children and the family. They are learning to operate and getting training from their children and relatives. Similarly 13 percent from Coimbatore District and 9 percent from Triuppur District are able to search in the internet again with the help of children and family members. Further it is noted that 9 percent from Coimbatore District and seven percent from Tiruppur District,

respondents are able to have E-mail account which helps them to have online communication, along with the mobile phone to improve their business correspondences. There was low use of the computer & internet among Micro Enterprise owners (Donner, 2006).

4. **Impact of Technology Development on Rural Women Empowerment**

Adoption of technology enabled the women entrepreneurs to develop their business to some extent and they are able to increase the sales and profitability in their business. In recent times there has been exponential growth in the development and use of ICT in various aspects of human life including business transactions, communications, economics and politics (OECD, 2004). This is because ICT has the potential for augmenting economic growth and raising living standard for mankind. Impact on empowerment of women is analysed as economic empowerment and social empowerment.

Economic Empowerment

The technology adopted by the respondents in the present study resulted in increase in profit from the business, able to acquire skills and enjoy certain benefits. The increase in profit of the SHG entrepreneurs after technology adoption is shown in Table 6.

Table 6 Changes in the Annual Average Profit after Technology Adoption

Changes in Profit									**Paired 't' Test**
S.No.	**Activities**	**Pre-Technology adoption**		**Post-Technology adoption**		**Increment**		**Percentage of increment**	**Paired 't' value**
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**		
1.	Agriculture	18500	2815.22	30800	6980.5	12300	5618.05	66.5	36.976 **
2.	Animal husbandry	20600	3480.65	36400	7120.1	15800	5994.81	76.7	38.118 **
3.	Manufacturing	22800	4945.3	36900	7415.7	14100	5732.78	61.84	34.176 **
4.	Services	18600	2896.10	29800	6780.06	11200	4714.01	60.22	33.141 **
5.	Trading	17600	2542.6	31800	7116.07	14200	5791.87	80.68	51.187 **

Source: Computed based on Field Survey 2014.

The increase in the average profit of micro entrepreneurs after technology adoption were statistically significant and the percentage of increase of average profit was higher for the entrepreneurs engaged in trading followed by entrepreneurs engaged in animal rearing. The micro entrepreneurs are able to realize the efficacy of better communication and have acquired the mobile phones and slowly adopting other technologies.

Social Empowerment

Social empowerment is a process that addresses all sources and structures of power. The social empowerment of rural women through micro finance enabled technology was measured by Empowerment Index based on five points Likert Scale. For this 10 variables representing empowerment were placed before 240 respondents to mark their choice showing their degree of agreement

or disagreement to each variable. The points for choices were assigned as for strongly agree (2), Agree (1), undecided (0) Disagree (-1), Strongly Disagree (-2). To measure the extent of empowerment the following decision criteria was used:

Zero and below Zero = No empowerment, Between Zero and Below 33.33 = Low Empowerment, Between 33.33 and 66.67 = moderate empowerment, Above 66.67 = High empowerment.

Table 7 Extent of Empowerment

S.No.	Variables	No.of. respondents					EI
		SA	A	NO	D	SD	
1.	Self confidence	70	122	14	18	16	88.33
2.	Social status	72	114	12	20	22	80.83
3.	Mobility	62	134	21	25	14	85.42
4.	Involvement in public activities	66	106	30	20	18	75.83
5.	Awareness in legal and political matters	58	106	31	29	16	62.92
6.	Decision making in the family	89	81	44	22	14	87.08
7.	Health and hygiene	60	104	41	19	16	72.08
8.	Leadership	66	104	32	20	18	75.00
9.	Communication	102	90	10	19	19	98.75
10.	Creativity	91	97	18	15	19	94.17

Source: Computed based on Field Survey 2014.

SA = Strongly Agree D=Disagree

NO=No Objection SD-Strongly Disagree A=Agree

It can be seen from the table that the composite index on empowerment was 82.04 and it was above 66.67. From this, it can be inferred that the level of empowerment achieved by the beneficiaries was very high. The average indices among the variables varied between 62.92 and 98.75. The highest average index was on the variable communication and the least was on awareness in legal and political matters. The micro finance enabled technologies provided ample scope for the micro entrepreneurs for social empowerment. This type of positive impact had gone a long way in improving the quality of life of the members.

Conclusion

The results of the analysis clearly indicate that the adoption of information technology serves useful purposes in promoting women's micro business through access to market information and reduce transaction costs. The use of ICT in 'Extensive' application is likely to increase productivity and profitability. The analysis shows how the rural micro entrepreneurs are handling multiple roles and how it has fostered their entitlements through business promotion and increased incomes and choice in different aspects of their lives contributing to increased empowerment. Clearly, in terms of policy, there is a need to move towards universal coverage of ICT for those below the poverty line and provide free help-line services for accessing various services.

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Manufacturing Handmade Paperboard Products - A ToT Towards Gandhian Villages

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Abstract

Recent statistical predictions indicate that the migration of people from Villages to Cities will continue for decades to come. This may result in more cities being created while villages slowly disappear. While urbanization has to be welcomed, it cannot be accepted at the cost of losing villages. It is essential to make Gandhi's statement - '*The future of India lies in its villages*', a reality, at a faster pace.

In this paper, we present a case of the village in our vicinity, where agriculture which is the primary livelihood, is facing the wrath of climate change, and therefore people are tending to move to cities. For this case, we have identified, '*Hand-made paper-board manufacture using a range of natural fibers*', as a business that is feasible, economic and adaptable, by the villagers. Water-hyacinth- which is a menace to the Coimbatore lakes, agri-waste, banana stem, and food waste, are raw materials for the recycled paper boards, in addition to paper waste.

Our experiences in exploring the properties of such paperboards indicate that they can be thermal insulators, and hence are useful as green-building material.

Thus our primary contribution in this paper is a *Transfer of Technology process for hand-made paperboard products*, customized to a specific village. We substantiate our proposal with (i) a survey of the present economic status of villagers, (ii) the manufacture process flow for paper-board products along with our experimental results and (iii) discuss the factors favorable for starting a business in paperboards with the help of a business model.

Through this work we hope to open an avenue of alternate livelihood for villagers and at the same time promote an eco-friendly product, thereby attempting to realize Gandhi's dream.

Keywords

Handmade paper Technology, water hyacinth, Green insulating material

Introduction

Economic development is closely interrelated with the work participation rate of population. However, in a developing traditional society modernization leading to increase in the income level of

population initially shows low level work participation because of withdrawal of women and children from the less prestigious and low paying work [1].

The growth in aggregate GDP in the last three decades has happened largely on the back of a higher growth of non-farm GDP. Thus the share of agriculture in overall income has fallen from 57% in 1957-58 to 40% by 1983 to 33% in 1993 and 15% by 2008-09[2]. This condition however needs to be improved. Even the overall GDP of the country shows improvement, overall agricultural growth shows a decline. Agriculture's share, already less than 20% of GDP, will fall still further. The small agriculturist must be given an alternative platform for income generation during the draught period.

Our 18-year Institute is located amidst villages and hills in a serene environment. Due to scarce rainfall, over these years, we have been witnessing agricultural lands in the vicinity, becoming residential areas, farmers are seeking non-agricultural salaried jobs outside their farms. The next generation is being educated to seek jobs in far off cities. This has motivated us to probe into feasible sustainable business opportunities for such persons.

Towards this goal, our primary contribution in this paper is a business model that can bring the Paper Making Technology to the Indian villages, as an alternate business during the period when their primary means of living, say agriculture, is at a low ebb.

With the global threat to the environment rising exponentially, it is necessary that every product designed and produced be eco-friendly. Thus, the other contributionin this paper is that the proposed business is eco-friendly as it can consume (i) the available agro waste material available in the villages and well as (ii) the water-hyacinth which is a menace to ponds in Coimbatore.

The rest of the paper is organised as follows: Section 2 details the manufacture of paper boards using water hyacinth as a raw material. In Section 3 we present the results of our experiments in testing the thermal conductivity of Water-Hyacinth based paper boards. The business model to facilitate villagers with an alternate business and thereby retain them in villages, is described in Section 4. The paper concludes with Section 5.

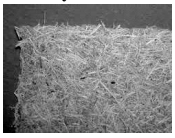
Production Process for Water Hyacinth based eco-friendly boards

The common water hyacinth is a vigorous grower known to double their population in two weeks. The average cellulose content of hyacinth is about 84.8% and also the quality of hyacinth pulp is good [3]. Considering it as a good potential source of long fiber pulp, the wood fiber insufficiency as raw material can be solved by blending the Hyacinth's with waste paper to obtain a reasonable quality pulp and paper.

The paper board making process consists of Six major stages: Raw material collection, Chipping and cutting, Beating, Lifting and Couching, Papermaking and finally Drying and Sizing. Water Hyacinth is collected from lakes and dried in the open until semi-crispy stage is attained. The stem of the plant is cut and made into small pieces. The pieces are put in the blender and the pulp is extracted from it. The pulp is poured in to the beater. Similarly waste paper is shredded and soaked in water overnight and beat in Hollander type beater.

The waste paper pulp and water hyacinth pulp is mixed in appropriate proportion. Using the pulp drainer, a wooden frame with fine gauze, excess water in the pulp is removed. When the water has settled, the frame will be gently agitated. Using a small, dry cloth, the wet pulp is dried in sunlight (driers can also be used during wet climate). Depending on the intensity of

Figure 1 Paper Production process

Process flow	Workflow with Pictures	
Raw Material	Water hyacinth 	Used Paper 
Material Sorting	Manual material sorting- recycling needs clean recovered paper free from contaminants like food, pin, plastic materials, metals and other trashes.	
Slitting of Raw Materials		The screened paper should be chipped into small pieces using paper chipper before sending to the grinding machine
Soaking of Raw materials (5 hours)		The chopped paper and water hyacinth needs to be converted as pulp by mixing it with water. Then it is sent for grinding.
Beating of raw materials (Mechanical Beater)		Pulping process The above ingredients are to be converted as pulp by grinding it in the grinding machine for about 3 hrs with some additive agents to get the required paper quality.
Paper base formation	 Pulp is poured and excess water is drained by agitation. The pulp obtained will be in watery stage, this is to be sent to the screen where, water starts to drain from the pulp . The screen is mechanically agitated to augment the water d raining. At this stage the recycled fibers quickly begin to bond together to form a watery sheet.	 Hydraulic press, excess water is drained using hydraulic press. The watery sheet is even more drained by placing it under hydraulic press, where in excess wa ter gets removed at this stage and the watery sheet now becomes moistened paper board.
Paper drying	 Next stage is to dry the moister paper board completely, this can be done by either sending it through the drier or it can be sun dried for several hours. At the end of this stage a curly unstructured board is obtained.	
Calendaring (Paper surface smoothing)		Calendaring Process - Calendaring machine – to give smooth surface finish to the paper
Finished Product	**Water hyacinth board** 	Insulating materials for green buildings 

the temperature the pulp may require 24hrs- 36hrs of drying. This results in a Semi-finished paperboard. Depending on its final application the board may be given a smooth finish if using a calendaring machine.

Thermal Conductivity Tests and Results

Insulating Material: The lower the thermal conductivity of the material the greater the material's ability to resist heat transfer, and hence the greater the insulation's effectiveness. Hence a low thermal conductive material can be a good insulating material. Commonly used insulants tend to have a thermal conductivity between 0.019 W/mK and 0.046 W/mK[4]. Green Public Procurement-Thermal insulation Technical background report, has accepted Cellulose paper board as one of the Green insulating material. The idea behind this paper is to find the suitability of water hyacinth usage as one of the ingredient to the recycled paper and the suitability as a green insulating material.

Multiple trials were done with different proportions of Water Hyacinth pulp and wastepaper pulp. It has been found that waste paper pulp and water hyacinth must be added in the ratio of 2:1 to suite our final application.

Experimental results through Lee's Disc method shows that the water hyacinth based recycled paper falls under the category of insulating material.

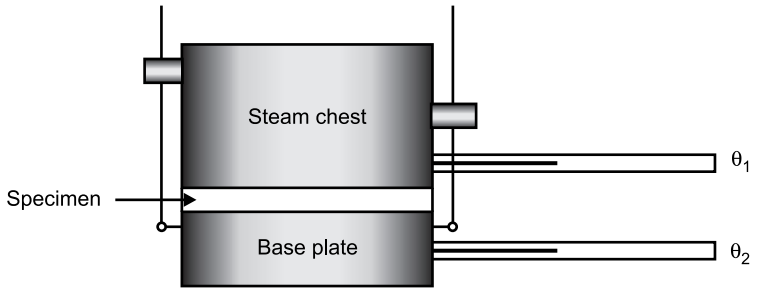


Figure 1 Lee's disc apparatus

Table 1 Experimental Values of Thermal Conductivity

Material	Water hyacinth paper	Recycled paper board	Thermocol
Thickness	1.7 mm	1.67 mm	1.7 mm
Thermal conductivity	0.03005	0.02917	0.03001

The result shows water hyacinth paper can significantly act as a thermal insulating material, having a value equivalent to Thermocol, which is been used as a thermal insulating material in normal buildings. Thermocol is basically polystyrene. Polystyrene is a polymer made from the monomer styrene, a liquid hydrocarbon that is commercially manufactured from petroleum. It is a non-biodegradable and resistant to photolysis, they continue to remain intact in the soil, without undergoing bacterial decomposition, thereby turning it infertile. This,combined with their light-weighted nature causes them to float, resulting in huge quantities of polystyrene accumulating along coasts and waterways around the world, forming part of what is called marine debris.

Although we cannot replace the usage of Thermocol completely a small initiative like using alternate material like paper board can decrease the usage of such synthetic materials.

Proposed Business Model for ToT towards Gandhian Villages

In this Section, we present a ToT model with the objective of providing an income-generating means (i.e., a business) for those seeking to migrate to urban areas, leaving behind their ancestral profession such as farming, poultry, pottery, etc., due to the ill-effects of climate change and urbanization.

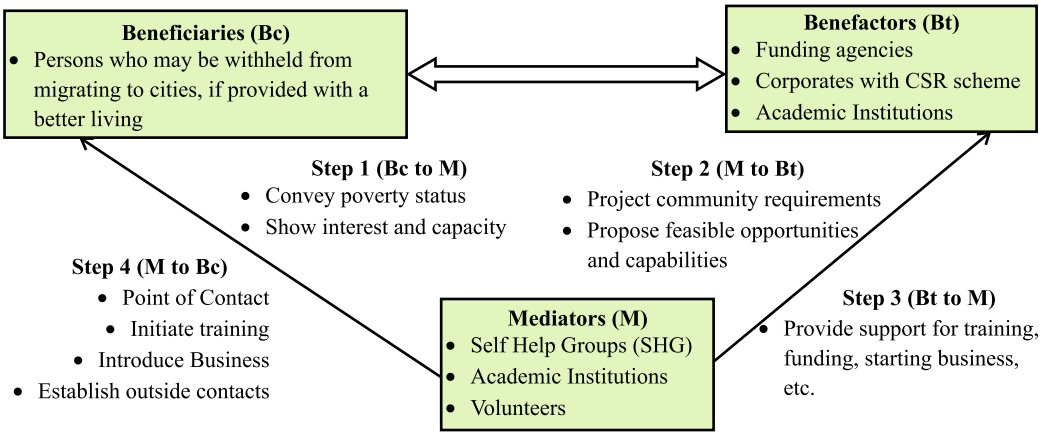


Figure 2 Relationship between the players in the Business model

The three players in the model as illustrated in Figure 3 are i) Beneficiaries ii) Benefactors iii) Mediators. The *Beneficiariesare* the villagers who are in needof an access to the opportunities and economic benefits that can keep them in their own village. In order to utilize the benefits provided by funding agencies (i.e., Government, NGOs, corporates, etc.) that support the betterment of agriculture, village art craft that is facing extinction, etc.,knowledgeable *Mediatorsplay* a crucial role. Mediators can be the academic institutions, volunteers, or Self Help Groups. Mediators can analyse the Beneficiaries and project the status and requirement. The *Benefactorsinclude* the corporates, academic institutions and are the ones who provide the funding / training to elevate the status of the economically hit villagers.

The relationship between these three players can be described with a 4-step interaction process, as labelled in Figure 3.

Step 1 (Bc to M) - Beneficiary to Mediators - The first step is the link between the villagers and an approachable person/agency, i.e., Beneficiaries can approach Mediators and express their status and requirements. The Mediators interact closely with Beneficiaries to make a survey and analyse the conditions (financial and social) along with the skill sets and interests of the Beneficiaries.

Step 2 (M to Bt) - Mediators to Benefactors - The second step is the escalation of the results of analysis along with a proposal from Mediators to Benefactors. The Mediators can support the Beneficiaries to working with individual or multiple donors, Plan special events based on the resource availability and capability of the identified work group and/or Solicit grants from funding agencies.

Step 3 (Bt to M) -Benefactors to Mediators - The Benefactors scrutinize the proposals from the Mediators and release finds and support to the Beneficiaries through the Mediators. Since in most scenarios it is infeasible for the Benefactors to have direct contact with Beneficiaries, Mediators play a vital role.
Step 4 (M to Bc) - Mediators to Beneficiaries - Once support and funds have been released the Mediators kick the business for the Beneficiaries. They monitor the progress and maintain the link between the Beneficiaries and the Benefactors. The Mediators initiate business establishment, training, purchase, product development marketing and accounting.

ToT of Manufacturing Water Hyacinth Based Paper Boards

With our experiences in the making of water-hyacinth based paper boards, and its usefulness as a thermal insulating building material, we are confident that this is a viable business opportunity for commercialization in villages.

The villagers whom we have been focusing upon in this paper are the Beneficiaries in our model; our University will play the role of Mediator and any appropriate funding agency (Govt. of NGOs operating in our region) can become Benefactors.

We, as Mediators are conversant supporting the villagers to source out raw materials, machinery, impart the technology to the villagers and hand hold them in finance, marketing and quality control.

Conclusion

Our contribution in this paper is the identification of a Product Manufacturing process that serves dual purpose: (i) provide a low-investment business opportunity for the underprivileged women and (ii) transform the water-hyacinth menace into an eco-friendly product. We have presented the Transfer of Technology along with our experiences and experimental results. The recycled paper board which has been made from waste paper and water hyacinth had been tested for properties of Thermal Insulating Material for Green Building. Our experimental results are positive. This being an initial stage, commercialization of this eco-friendly board for Green Buildings, requires a few enhancements and finishing operations.

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Reusable Diapers for Sustainable Development

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Abstract

Diapers or Nappies for infants are used to absorb and contain their urine and other excretes. Leak protection, snug fit and comfort are the vital properties expected from a diaper. Reusable and disposable diapers are the two varieties in diapers which remains same in their function but differ in their construction and raw materials. There are mainly two types in reusable diapers which is 1-piece and 2-piece diapers.The raw materials that are used in the reusable diapers are normally natural fibre based fabric (normally cotton woven) and are ecofriendly. Disposable diapers are made of low cost materials and hence can be disposed after its usage.

The effects of disposable diapers are discussed along with the merits of reusable diapers. Disposable diapers are the third largest single consumer item in landfills after newspaper and beverage containers which represent about 4% of solid waste.Disposable diapers use 3.5 times as much energy, 8 times as much non-regenerable raw materials, and 90 times as much renewable material as cloth diapers. A baby before potty training until age of 2.5 years, will use only 15 - 25 reusable diapers. But in case of disposable diapers, baby will consume 5000 - 7500 numbers before potty training.Disposable diapers contain Tributyl-tin (TBT) - a toxic pollutant known to cause hormonal problems in humans and animals. Disposable diapers give the dry feel but still act as source for proliferation of harmful bacteria.Rashes are one among the important problem caused due to the wearing of disposable diapers.Dioxins are the byproducts during the bleaching of the wood pulp which is used as core in the disposable diapers. It is carcinogenic, cause reproductive and other immunity related problems to the babies.Hence, reusable diapers are advised for adopting more sustainable practices and in turn contributing towards lower environment impact products and services.

Keywords

Reusable diapers, disposable diapers, Environmental, health, economic issues.

Introduction

Human survival depends on the natural environment. Sustainability is one where humans and nature can coexist without destroying the resources completely and leaving the same for future generations. Diapers are studied for their sustainability.

Babies almost spend their first 2.5 years using diapers. Diapers or Nappies for infants are used to absorb and contain their urine and other excretes. Diapers should be changed after soiling by the

parents or care givers. Diaper mainly consists of a waterproof outer layer with a core of absorbent material. They have a velcro, snap or other closure for a secured right fit for baby. Reusable and disposable diapers are the two varieties in diapers which remains same in their function but differ in their construction and raw materials. Leak protection, snug fit and comfort are the vital properties expected from a diaper.

Reusable diapers

Reusable diapers can be washed and reused after soiling by the infants. Cotton woven fabrics are normally used as it is meant for their comfort. Reusable diaper allows the parent to examine the health of the baby by observing their stools. A visual guide and stool of the baby is compared in order to determine the health and proper functioning of the baby's digestive system.

There are mainly two types in reusable diapers which is 1-piece and 2-piece diapers.

Two-piece Diapers

Two piece diapers consist of diaper cover layer and an absorbent insert. The inserts may be flat, prefold, contour. They are easy to wash, dry quickly, skin friendly and ecofriendly.

Inserts

Flats and Prefolds

Flats are the fabrics that need to be folded and inserted inside the diaper cover or wrap. The fabrics are folded and stitched together which is ready to be used inside the diaper cover or wrap. It can also be kept in middle of the flats for enhancing the absorbency. They come in various sizesand normally made of are cotton, organic cotton, bamboo and hemp. Microfiber terry and woven clothes are used and sometimes the prefolds is developed in such a way that core remains thick than the outer layers.

Contoured / fitted:

Contoured diapers are made of cotton or bamboo fabric which is stitched together in hourglass shape. It is also attached with elastic leg casing; snap closures for providing snug fit for the babies. Fitted diapers are fastened using velcros for providing the right fit and comfort unlike prefolds and flats which are inserted into the hollow.

Diaper Cover

A diaper cover is usually made of vinyl, polyester and fleece fabric for pre-fold, flat, and contoured/fitted diapers to contain the wetness and excretes. It is normally available in pull on style with elastic band, gussets in the crochet area. Lanolin (wax secreted during harvesting wool) coated wool is normally used as cover as it is water resistant. The life of diaper cover is less and hence it is not washed along with the inserts. Liners are also used as skin contact layer along with the cover for the ease of cleaning the excretes of the skin.

Single-Piece Diapers

Diaper cover and inserts in the two piece diapers are sewn together and are called as Single piece diapers.

All-in-Ones (AIO)

They consist of outer layer, absorbent middle layer with an inner liner and adjustable closures. Fleece fabric is used to wick the wetness away from the baby skin. Micro fiber cloth provides protection against odor and infections. They offer the convenience of washing altogether without removal of absorbent layer but it takes longer drying time. An additional opening is provided for stuffing of absorbent layers in case of increased absorbency requirement.

Materials for reusable diapers

The raw materials that are used in the reusable diapers are normally natural fibre based fabric (normally cotton woven) and are ecofriendly. The first step in the raw material production is the cotton cultivation from its crop. This cotton fibres are then converted into yarn using spinning technology and then into fabric using weaving technology. This fabric is shaped, stitched into a diaper.

The soiled reusable diapers should be washed and cleaned using detergents in home. Incase if laundry service is opted, soiled diapers need to be transported to the outlet, washed with detergent, sanitiser, softener. The washed diapers are dried with tumble drier, ironed and is again transported back home. The waste water after during cleaning is recycled using water treatment plant. The excreta after soiling the diapers is disposed in the toilet which goes to sewage treatment plant and discarded.

The number of diapers change required for the baby; washing parameters including detergents, washing temperatures, frequency, drying method; type of electricity used including coal, gas, hydro etc; amount of water consumed; amount of raw material used are the critical parameters in deciding the cost, utility and eco friendliness of the product.

Disposable diapers

Disposable diapers are made of low cost materials and hence can be disposed after its usage. Disposable diapers mainly consist of top layer, absorbent layer and bottom layer. Top layer is made of nonwoven prepared from synthetic polymers is meant for quick absorption of the fluids and to keep the skin dry. Absorbent layer being the core of the diaper consist of wood pulp and super absorbent polymers that absorbs the fluids passing from the top layer. The bottom layer that prevents leakage is also made of synthetic nonwoven that prevents leakage. Elastic bands and tapes are used to provide the required snug fit and leak protection for the babies. As described, disposable diapers are mainly made of petroleum products except the wood pulp used in the core.

Effects of Disposable diapers

Environmental impact

Disposable diapers are the third largest single consumer item in landfills after newspaper and beverage containers which represent about 4% of solid waste.In a house with a child in diapers, disposables make up 50% of household waste.

Annually in UK, around 2.47 billion disposable nappies are sold which will produce 1,10,000 ton when calculated with an average weight of 44.6g / diaper without including excreta (Absorbent Hygiene Products Manufacturers Association (AHPMA), UK average weight, 2001). Annually, US consumes 28 billion disposable diapers that produces waste of 12,48,800 ton. If 25% of the

infants start using diapers, there will be a market of 8.7 million pieces of disposable diapers per annum in India which will generate a landfill waste of 388 ton.Cloth diapers create less than 13% of the solid waste generated by disposable diapers, most of which is sludge generated at waste water treatment facilities.

Unsustainable sourcing of wood fluff pulp can drive deforestation and biodiversity loss which is major concern as it is a significant threat to global climate. An attempt towards recycling disposable diapers was made in Seattle, involving 800 families, 30 day care centers, a hospital and a Seattle-based recycler for a period of one year. The conclusion made by Procter & Gamble was that recycling disposable diapers was not an economically feasible task on any scale.

The disposable diapers generally disposed to the landfills whose degradation rate is very low (more than 500 years). Chemicals such as dioxins and other contaminants present in the diapers can leach out to the ground water and pose high risk of contamination. Most of the parents discard the disposable diapers along with the feces unknowing to the fact that it is illegal. Feces should be discarded in the toilet and should not be directly thrown into the trash. Feces act as breeding ground for many viruses, bacteria including polio and pose high contamination risk. There is every possibility that such infections can leach and spread to the ground water.

Energy consumption

Disposable diapers use 3.5 times as much energy, 8 times as much non-regenerable raw materials, and 90 times as much renewable material as cloth diapers (The Landbank Consultancy for The Women's Environmental Network). Energy use and GHG emissions from the production of super absorbent polymers, fluff pulp and cotton - above 50%.

Raw material Consumption

The average weight of the diapers is around 45g and the composition of materials used in the baby diapers is tabulated below,

Table 1 Composition of disposable diapers

Fluff Pulp	SAP	LDPE	PP	Elastic	Adhesives	Other
%	%	%	%	%	%	%
42.77	27.63	7.74	15.25	0.53	2.99	3.09

It takes 82,000 tons of plastic and 1.3 million tons of wood pulp, or a quarter-million trees, to manufacture the disposable diapers that cover the bottoms of 90 percent of the babies born in the US.The synthetics used per disposable diaper consumes one cup of crude oil. 286 lbs, of plastic synthetic, 200-400 kg of fluff pulp,50 pounds of petroleum and 20 pounds of chlorine is required for disposable diaper per baby per year.Disposable diapers consume 3.4 billion gallons of oil and over 250,000 trees annually.

Cloth diaper consumes only 5kg of cotton per baby per year thereby reducing the consumption of non-renewable resources to a considerable extent. Cloth diapers are also made of bamboo, hemp which is a greener option as concern is raised for the use of pesticides during the growth of cotton crop. Even if the disposable diapers are completely replaced with reusable diapers the impact on the cotton industry will be minimum.

Water consumption

Wood pulp production for disposable diapers consumes massive amount of water and minimum amount of recycled paper as stated by CDC (Cotton Diaper Coalition). The manufacture and use of disposable diapers amounts to 2.3 times more water wasted than cloth diapers (The Real Diaper Association, The Landbank Consultancy for The Women's Environmental Network). It creates 4% of municipal waste water load when all the consumers relies on single use diapers whereas its only 0.5% when all the consumers relies on reusable diapers.

Economic impact

A baby before potty training until age of 2.5 years, will use only 15 - 25 reusable diapers. But in case of disposable diapers, baby will consume 5000 - 7500 numbers before potty training. A survey says that, it cost $4917 for disposable diapers whereas only $2370 for reusable diapers in a family of 3 kids per year which shows about 48% savings by using reusable diapers in the first year. The same amount should be spent for disposable diapers in the second year whereas only laundry charges remain in the second year for reusable diapers which is a huge saving.

Health issues

Infertility

Disposable diapers contain Tributyl-tin (TBT) - a toxic pollutant known to cause hormonal problems in humans and animals. A case study conducted for 48 healthy male babies of 0 - 55 month old were probed for temperature change in the scrotum by wearing disposable diapers for two days and cloth diapers for another two days. Temperature was measured during waking and sleeping hours; and rectal temperature was also measured for comparison. Study shows that disposable diaper increases the scrotum temperature as it uses less permeable membranes than reusable cloth diapers. In 13boys, cooling testicular mechanism failed altogether and in remaining babies showed impaired normal testicular cooling mechanisms. Increase in scrotum temperature increases the male infertility as it plays important role in normal testicular development and sperm health (Archives of Disease in Childhood). Disposable diapers will blunt or completely abolish the physiological testicular cooling mechanism important for normal spermatogenesis.

Infections

Disposable diapers give the dry feel but still act as source for proliferation of harmful bacteria. As the urine breaks down to ammonia and the bacteria feed on in and spread infections and other problems. The disposable diapers are not changed immediately after the baby passes urine and hence there is increased risk of urinary tract infections.

Respiratory problems

Lab mice were tested for respiratory problems with reusable and disposable diapers. It is concluded that disposable diapers caused respiratory problems such as caused asthma, reduced mid-expiratory airflow velocity, sensory irritation, and pulmonary irritation. The average superabsorbent polymer dust exposure is found between 0.02 and 0.81 mg/m^3 and nose bleeding is a common issue for the workers who work for the manufacturing of diapers.

Incontinence problems

Disposable diapers provide uninterrupted sleep for the babies during night as the skin contact layer always feels dry even after repeated urination. Babies wearing disposable diaper will not feel wetness and they remain oblivious from using toilets. They will not get up for the toilet during night which impart laziness and increases incontinence issues and delays them to get toilet trained. Such abnormal bladder control and incontinence problems make them to bed wet till their age of eight. Reusable diaper offers faster toilet training by avoiding such issues.

Skin Irritation

Rashes are one among the important problem caused due to the wearing of disposable diapers. As synthetic layers are used in the disposable diapers,babies exhibit excessive hydration and exposed to continuous friction which causes rashes. Children also remain in continuous contact with feces as parents are oblivious to it. Feces contain urease that converts urea from urine into ammonia leading to irritation and redness. Ammonia also acts as ground for further infection as it facilitates bacterial growth. The disposable diapers raise the pH level as baby remains in contact with feces and urine. The activity of faecal enzymes such as proteases and lipases, increases the hydration and permeability of the skin to irritants,causing minor irritation, rashes and sores. Certain dyes used in the diapers can also act as skin irritants and increase discomfort due to their continuous contact with the baby skin. The production process of the disposable diapers also incorporates few skin irritants such as Mercaptobenzothiazole (rubber chemical), P-tert-butyl-phenol-formaldehyde resin (glue), Cyclohexylthiophthalimide (found in rubber).

Carcinogenic, reproductive and immunity problems

Dioxins are the byproducts during the bleaching of the wood pulp which is used as core in the disposable diapers. It is carcinogenic, cause reproductive and other immunity related problems to the babies. Dioxins combine with other compound and form polychlorinated dibenzodioxin which is an environmental pollutant.

Conclusion

Cloth or reusable diapers offer superior breathability that helps in ventilation and evaporation of ammonia which is major cause for infections and rashes. Reusable diaperuse only renewable resources such as cotton, bamboo unlike disposable diapers which consumes crude oil, plastics,and trees.Reusable diapers offer ecofriendly production process unlike disposable diapers that generates toxic substances, like dioxin, chlorine, TBT during their production contributing to water and air pollution and global warming.

Retired reusable diapers can be used as rags, cleaners unlike disposable diaper which requires money for disposing it to the landfills and occupies huge space. Retired reusable diapers degrade easily even in the landfill environment unlike disposable diaper which takes more than 500 years for them to degrade. Reusable diapers do not act as breeding ground for the spread of infections unlike disposable diaper which pose contamination risk to ground water. Hence, reusable diapers are advised for adopting more sustainable practices and in turn contributing towards lower environment impact products and services.

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Sensitivity for E-Waste Amongst Indian Consumers

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Abstract

In this technological era, every Indian has come in touch with the electronic and electrical goods in some way or the other. This technology has enabled not just Indian citizen but the entire humanity in many fold- for communication, for work, for transactions, for data storage and so on. Most of the goods a person uses has embedded in it the "e-component" from handy MP3 players, mobile phones to Television and automobiles. Electronics and electrical have become essential and household commodities.

Speed and convenient nature of the technology has made Electronic and Electrical goods attractive on one side. On the other side of what makes it more attractive is the speed of advancements in the area supported by Industries eagerness to promote the same and consumers' enthusiasm to possess it. Life cycle of these technological goods is very short in nature compared to other kinds of goods.

The technology has no doubt enhanced the quality of living, but flipside of the same comes because of its hazardous nature after its end of life. Termed as WEEE - Waste Electronic and electrical equipment, these components have in it toxic heavy metals which harms the nature and human health. Environmentalists have cautioned about the harmful aspect of WEEE to various stakeholders at various forums. Developing countries like India has been taking baby steps towards mitigating the evils of WEEE in various ways. At the outset, one can see Government, Industry and Consumer as the main stakeholders to contribute positively towards this perennial issue.

This paper presents some of the hard facts directly captured from Indian consumers about Technological waste. The questionnaire based survey broadly aimed to find among Indian consumers: the level of environmental awareness, their concern, their purchasing practices, and also the usage and disposal habits.

It is found that Indian consumer is highly motivated towards buying "e-goods" but does not have enough knowledge about many environmental hazards because of using the same. The motivation to buy green products is hindered by its availability and accessibility. Price and Brand are top-of the mind issues amongst Indian consumers while purchase of any good. Energy saving habits tops the list during usage of the same. Disposal difficulties are a major drawback in India, where majority of the sample do not know the correct technique for disposal of WEEE. Lack of proper disposal agency is yet another main hindrance for disposing.

Keeping these facts, the paper suggests few remedial actions to face this serious issue and reverse the trend. The Government policies for e-waste and Industries approach in the form of product-stewardship will play a vital role in shaping the long-term scenario. Environmental aware-

ness amongst consumers, especially the awareness about the existence of "e-waste" recyclers who are thriving in their business at major Indian cities will help the common man to see the grave situation in a new light.

It is a submission that this work is only a first step towards a sustainable future. The necessity of more stakeholders like NGOs, investor etc. to join their hands towards this endeavour is very implicit.

A strong feeling says that it is best to practice "Ceiling on desires" at an individual level and with this as foundation it is best to look forward for "balanced growth" at a societal and global level.

Key words

Environment, Technology, Sustainable Development, Green Consumer, WEEE, e-waste, recyclers, Government Policy.

Introduction

Growth is inevitable for any nation to compete and survive in the globalized world and to nurture its own citizens. Over the years this growth has been largely coming at the cost of environment. Continuing this phenomenon will cause an irreparable damage to mother Earth. So at this juncture, the humanity is caught between growth and environment. The main players who can reverse this phenomenon are International agencies, National and Local Governments, Industries and consumers. Nature being the resource provider has to be given due respect in wake of rapid industrial development and man's quest to improve his standard of living.

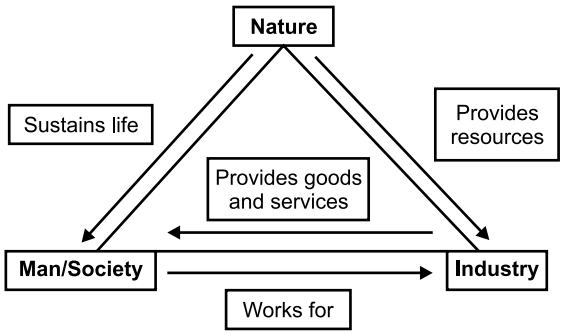


Figure 1 Relation between Nature, Man and Industry

Since last two decades, the footprints of the technology is seen and felt in every aspect of human life across the world. Technology penetration has a tremendous socio-economic impact in developing countries like India. It has revolutionized the areas of education, agriculture, banking, healthcare, delivery of Government schemes and business. The rural urban divide has hence reduced. It has helped to increase workforce productivity, create more avenues for business, and reduce costs of business, support innovation, increase trade and foreign investment.

Electronic industry is the largest and fastest growing manufacturing industry. The pace of adoption of technology has been beyond imagination with new electronic and electrical technol-

ogy surfacing almost daily. Popularly termed as EEE, electronic and electrical equipment is found in every household gadget be it Personal Computers, Refrigerators, Mobile phones, Network Devices, Television sets, Automobiles, laptops, tablets. Man has embraced these devices to be his part of life and it will continue to increase this dependability to conduct his daily life.

According to Manufacturers Association of Information Technology (MAIT), it is estimated that the sale of desktops and notebooks is expected to grow from 11 million in FY 2013 to 15 million in FY 2018 at a Compound Annual Growth Rate (CAGR) of 6 percent. It is estimated that the industry would engage 4, 23,500 people on average, contribute INR 2, 91,700 crore to Gross Domestic Product (GDP) and INR 1, 10,600 crore in taxes through direct, indirect and induced effects during FY 2014 to 2018. 250 million mobile phones are sold in India each year.[1] Table 1 gives a picture of market for few electronic goods in India. In the mobile segment, the total number of telephones in the country stands at 904.56 million, while the overall tele density has increased to 73.32% as of 31 October 2013.[2]

Table 1 The market of select electronic products in the year 2011-12 vs 2010-11 Source: IT industry performance Annual Report, by MAIT

	Total installs			Total Revenue (in Rs Crores)		
Product	April 10 – March 11	April 11– March 12	% Growth	April 10 – March 11	April 11– March 12	% Growth
Computers						
Desktop PCs	6,030,418	6,711,911	11%	13,014	13,527	4%
Notebooks	2,950,192	3,724,746	26%	9,440	10,318	9%
Netbooks	334,324	297,775	-11%	468	374	-20%
Servers	87,275	90,699	4%	1,574	1,637	4%
Printers						
Dot matrix	384,869	392785	2%	258	263	2%
Inkjet	1,355,504	1,187,706	-12%	203	176	-13%
Laser	1,386,408	1,381,771	0%	734	729	-1%
Line	4234	1735	-59%	50	20	-59%
Other Peripherals						
Key boards#	6,171,191	6,860,667	11%			
Monitors	6,163,108	6,842,850	11%			
UPS systems#	2,384,197	2,554,779	7%			
Networking Products						
Network Interface Card#	4,440,666	4,862,976	10%			
Hub#	155,899	178,600	15%			

This consumer oriented growth in technology has combined with it rapid product obsolescence. Replacement rates for common Electronic items are as show in the Table 2.

Discarding obsolete EEE like a normal municipal waste using same channel has worsened the situation of already burdened solid waste management groups. Electronic waste (e-waste) comprises waste electronics/electrical goods that are not fit for their originally intended use or

[1] http://www.independent.co.uk/life-style/gadgets-and-tech/features/the-indian-mobile-phone-market-an-alien-world-where-seveninch-tablets-are-big-sellers-8726573.html as accessed on 18th July 2014

[2] Highlights on Telecom Subscription Data as on 31 October 2013

have reached their end of life. According to WEEE directive issued by the EU Technical report series (2006)[3] ten categories of EEE used by consumers are included namely:

Table 1 Replacement Rate of Electronic items

Item	Replacement rate
Mobile Telephone	1 to 3 years
Personal Computers	2 years
Camera	3 to 5 years
Television	10 to 15 years
Refrigerator	10 to 15 years
Washing Machine	10 to 15 years
IT accessories	Very fast

Source: E-Waste Management in India[4]

1. Large household appliances (refrigerator, freezer, washing machine, cooking appliances, etc.)
2. Small household appliances (vacuum cleaners, watches, grinders, etc.)
3. IT and telecommunication equipment (PCs, printers, telephones, telephones, etc.)
4. Consumer equipment (TV, radio, video camera, amplifiers, etc.)
5. Lighting equipment (CFL, high intensity sodium lamp, etc.)
6. Electrical and electronic tools (drills, saws, sewing machine, etc.)
7. Toys, leisure, and sport equipment (computer/video games, electric trains, etc.)
8. Medical devices (with the exception of all implanted and infected products radiotherapy equipment, cardiology, dialysis, nuclear medicine, etc.)
9. Monitoring and control instruments (smoke detector, heating regulators, thermostat, etc.)
10. Automatic dispensers (for hot drinks, money, hot and cold bottles, etc.)

Situation of WEEE and its impact in India

Humanity in general has been going through various environmental concerns. Figure 1 gives the changing environmental concerns. E-waste is one of the concerns in 21st century.

In India, 1, 46,800 metric tons of e-waste was generated in the year 2005, according to a study conducted by the Central Pollution Control Board (2008). The study estimates the WEEE in India to reach 8 million tons by 2012. It is estimated that the total number of obsolete personal computers emanating each year from business and individual households in India will be around 1.38 million.

Sixty-five cities in India generate more than 60% of the total e-waste generated in India. Ten states generate 70% of the total e-waste generated in India. Top ten e-waste generating states in India

[3]http://ftp.jrc.es/EURdoc/eur22231en.pdf as accessed on 18th July 2014

[4]http://www.globalewastemanagement.com/contents/article/E-waste-India.pdf as accessed on 18th July 2014

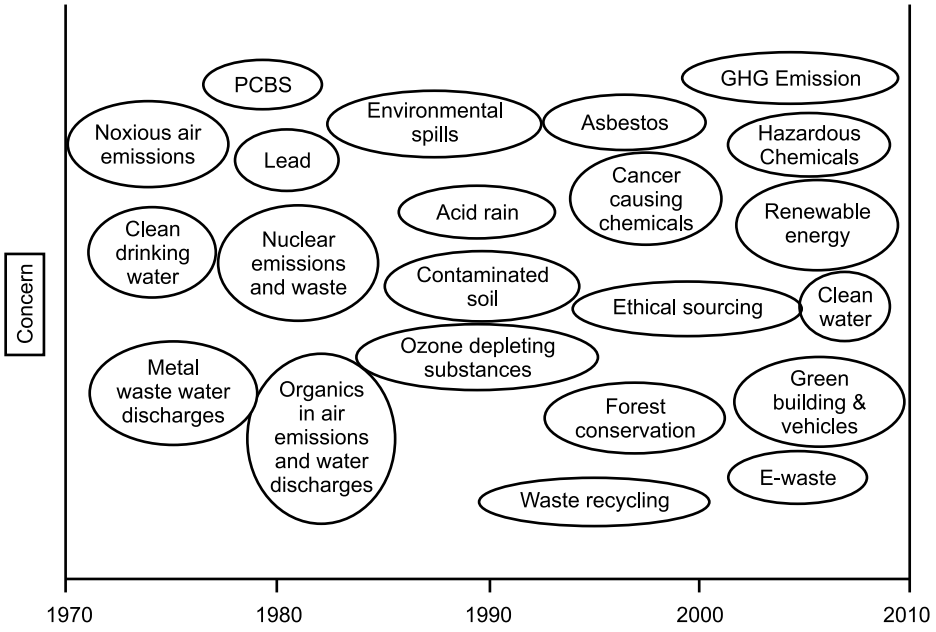


Figure 2 Changing environmental concerns

Source: Phyper & Maclean, 2009

1. Maharashtra
2. Tamil Nadu
3. Andhra Pradesh
4. Uttar Pradesh
5. West Bengal
6. Delhi
7. Karnataka
8. Gujarat
9. Madhya Pradesh
10. Punjab

Among top ten cities generating e-waste, Mumbai ranks first followed by Delhi, Bangalore, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat and Nagpur.

The results of a field survey conducted in the Chennai, a metropolitan city of India to assess the average usage and life of the personal computers (PCs), television (TV) and mobile phone showed that the average household usage of the PC ranges from 0.39 to 1.70 depending on the income class (Shobbana Ramesh and Kurian Joseph, 2006)[5]. In the case of TV it varied from 1.07 to 1.78 and for mobile phones it varied from 0.88 to 1.70. The low-income households use the PC for 5.94 years, TV for 8.16 years and the mobile phones for 2.34 years while, the upper income class uses the PC for 3.21 years, TV for 5.13 years and mobile phones for 1.63 years. Although the per-capita waste production in India is still relatively small, the total absolute volume of wastes generated will be huge. Further, it is growing at a faster rate. The growth rate of the mobile phones (80%) is very high compared to that of PC (20%) and TV (18%).[6] (Joseph, 2007)

[5]Shobana Ramesh and Kurian Joseph (2006). Electronic waste generation and management in an Indian city, Journal of Indian Association for Environmental Management, Vol. 33, No.2, pp 100-105

[6]Kurian Joseph, Sardinia 2007, Eleventh International Waste Management and Landfill Symposium

WEEE contain over 1000 different substances many of which are toxic and potentially hazardous to environment and human health, if these are not handled in an environmentally sound manner[7]. Adding to the woes of voluminous nature of E-waste is its toxicity and harmfulness to nature and mankind. The presence of elements like lead, mercury, arsenic, cadmium, selenium, and hexavalent chromium and flame retardants beyond threshold quantities makes e-waste dangerous one. These elements need to be handled carefully. Precious metals like silver, gold, platinum, palladium etc. Table 3 below gives a picture of possible hazardous materials in e-wastes.

Table 3 Hazardous Substances in e-waste

Component	Possible Hazardous Content
Metal	
Motor \ Compressor	
Cooling	ODS
Plastic	Phthalate plasticize, BFR
Insulation	Insulation ODS in foam, asbestos, refractory ceramic fiber
Glass	
CRT	Lead, Antimony, Mercury, Phosphors
LCD	Mercury
Rubber	Phthalate plasticizer, BFR
Wiring / Electrical	Phthalate plasticizer, Lead, BFR
Concrete	
Transformer	
Circuit Board	Lead, Beryllium, Antimony, BFR
Fluorescent Lamp	Mercury, Phosphorus, Flame Retardants
Incandescent Lamp	
Heating Element	
Thermostat	Mercury
BFR – containing plastic	BFRs
Batteries	Lead, Lithium, Cadmium, Mercury
CFC, HCFC, HFC, HC	Ozone depleting substances
External electric cables	BFRs, plasticizers
Electrolyte Capacitors (over L/D 25mm)	Glycol, other unknown substances

Table 4 E-Waste Toxins and affected body parts

Components	Constituents	Affected body parts
Printed circuit boards	Lead and cadmium	Nervous system, kidney, lever
Motherboards	Berillium	Lungs, skin
Cathode ray tubes (CRTs)	Lead oxide, barium and cadmium	Heart, lever, muscles
Switches and flat-screen monitors	Mercury	Brain, skin
Computer batteries	Cadmium	Kidney, lever
Capacitors and transformers	Polychlorinated biphenyls (PCBs)	
Printed circuit boards, plastic	Brominated flame-retardant casings cable	
Cable insulation/coating	Polyvinyl chloride (PVC)	Immune system
Plastic housing	Bromine	Endocrine

[7]Guidelines for Environmentally sound Management of E-Waste, 2008, Ministry of Environment and Forest, Central Pollution Control Board, New Delhi, March 2008

Importance of consumer as a stakeholder in sustainable development

Pollution of various kinds like air, water, noise have concerned consumers because these affect their health directly. Environmentalists in India have been actively campaigning against pollution causing industries (Kotler et al, 2007) Since late 1980s marketing of eco-friendly products gained attention from a broader audience and this phenomenon was primarily attributed to increased awareness of the ecological problem by the general public. These made companies believe that green as a strategy would promote efficient use of resources; reduce wastages and pollution which will enhance profits of the organizations [Preuss (2006)]. This is established as shown in Fig.3.

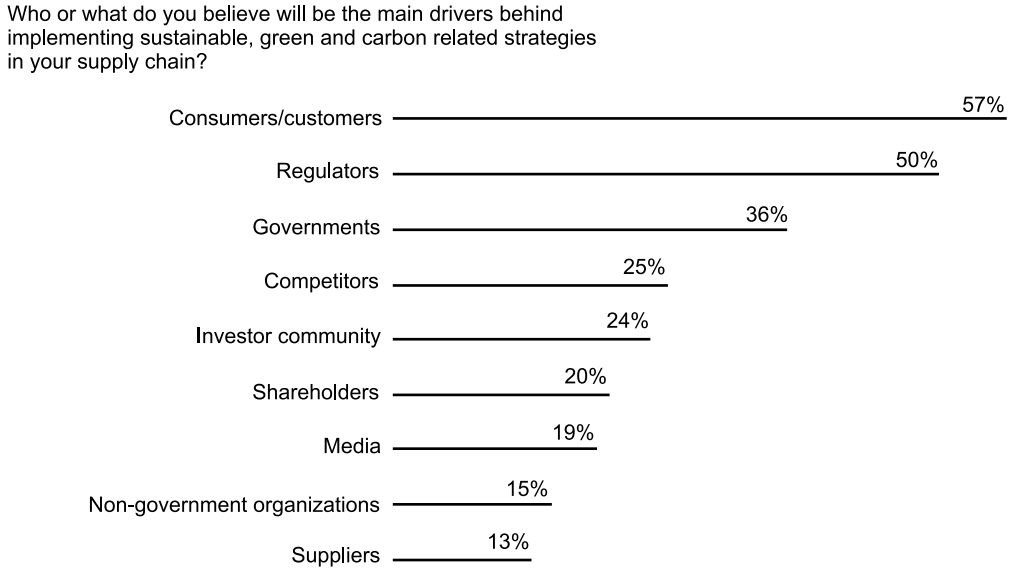


Figure 3 Drivers behind sustainability strategy Ernest and Young (2008)

Indians are known to be nature loving. In Indian culture worship nature in the form of tree, sun, moon, sky, rain, earth, fire, cow, snake, stone, and rivers is seen. This shows the unparalleled love and bond between the two.

Public concerns have translated into potent forces for the environment including green political power, and green consumerism. These forces, and institutional pressures from investors and employees (including management), have been major catalysts for the greening of business, which, in turn, has given rise to the concept of green marketing. [(Lampe and Gazda, 1995, pp. 299)]

Goleman (2009) writes, on consumer side, collective ecological goals have the following three rules-

1. Knowing the impact of what you are buying,
2. Favor improvements in the relation with nature,
3. Share what you learn- collaboration and the exchange of information are vital to amassing the essential ecological insights and for developing necessary database that allow us to act for the greater good.

Methodology

Web-based questionnaire survey to assess green and sustainable practices among Indian consumers had 38 questions divided into different sections namely degree of emotionality towards preserving environment, knowledge about environment, commitment towards greening, Purchase, usage and disposal behavior and finally demographics of respondents. This framework for the questionnaire was developed based on review of literature.

After hosting the questionnaire, awareness about the Questionnaire was spread based on snowball sampling like hosting it through social networking sites, e-mail, professional links like LinkedIn.

A total of 425 people visited the survey link on the web and around 375 attempted the questionnaire. Out of 275 completed responses 243 samples were found to be usable.

Participants were predominantly Urban, middle aged, graduates, salaried cutting across different industries.

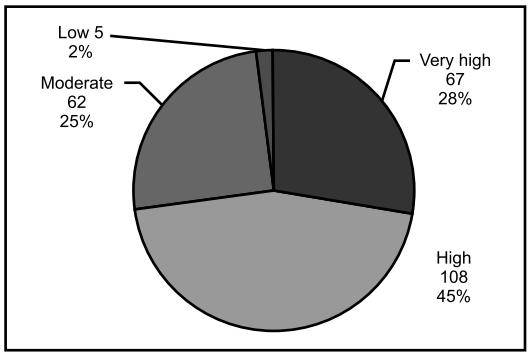


Figure 4 Interest in Environmental preservation

Results

Almost all the respondents had a high or very high interests in Environmental preservation as shown in Fig.4.

Respondents were asked to answer up to three of the given seven options, of what 'green' means to them. The responses are as shown in Fig.5.

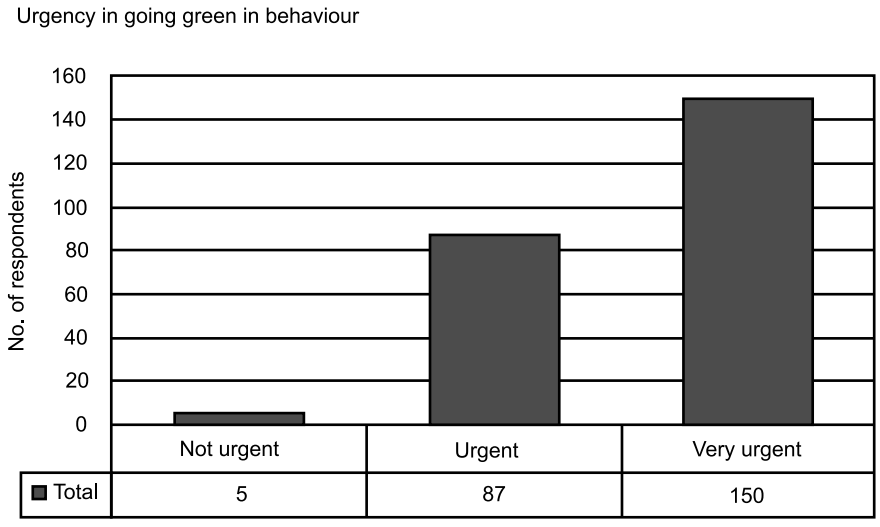


Figure 5 Urgency in going green in behavior

Nearly 97% of the respondents feel that they should be green in their behavior immediately or in near future i.e. corresponding to very urgent and urgent.

Nearly 70% of the sample population felt that the economic growth depletes natural resources.

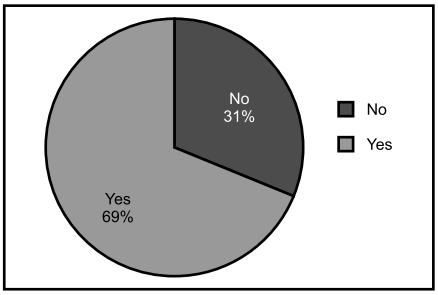


Figure 6 Does Economic growth depletes natural resources?

Out of these people who told "Yes":

- 96% people told that they were ready to use alternate means and conserve the resources.
- 86% of the people told that they will reduce their consumption.

In the next question, when asked about the technological advancements contributing to environmental improvement, 48% answered positively and 52% negatively.

52% of the respondents felt the technological advancements did not contribute to improvement in Environment.

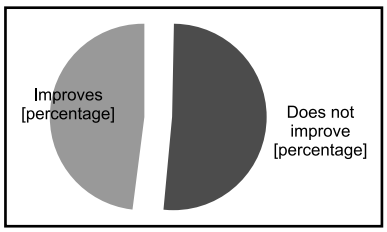


Figure 7 Contribution of technology for improvement of environment

Consumers' sample opined that they were ones who were very highly contributory to environmental related issues, followed by industries. The answers are as shown below in the Fig.8.

Following industries figured in the top five most harmful industries according to the participants of the survey. They are:

1. Chemical and fertilizers
2. Petroleum and natural gas
3. Mining
4. Automobile
5. Energy and power sector

- 96 participants gave rank 1 to Chemical industry of being most harmful.
- Next highest Rank was shared by Automobile and petroleum and natural gas.
- Pharmaceutical, Infrastructure and Electronic goods received medium ranking.
- Agriculture and retail industry were given least ranking by the respondents.

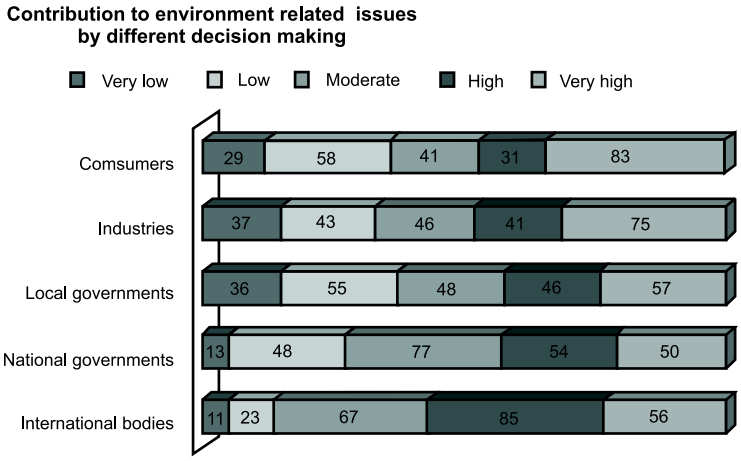
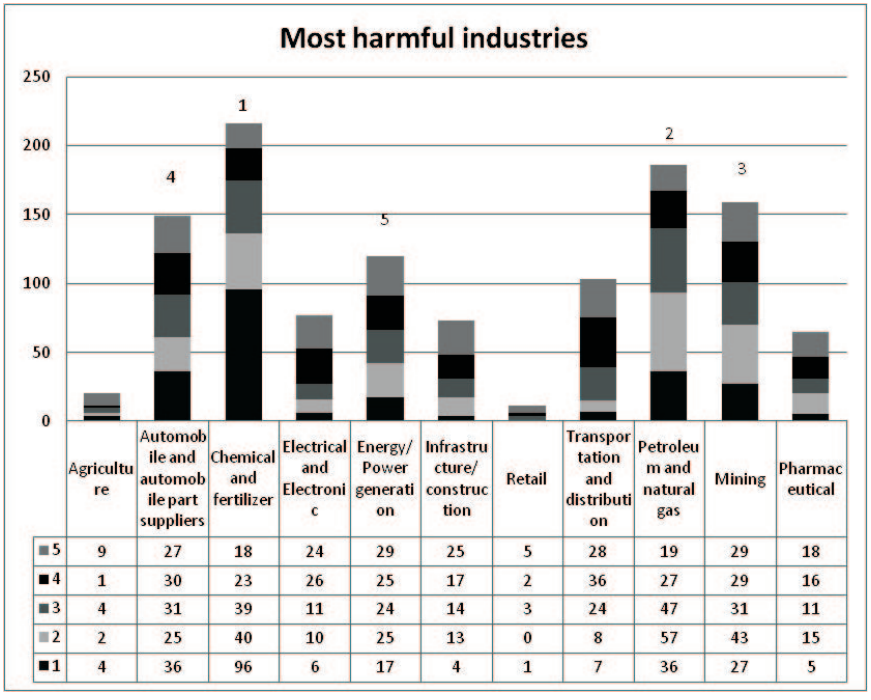


Figure 8 Contribution to environment related issues by different decision making bodies

The ranking of the industries is as shown in the Fig.9.



	Agriculture	Automobile and automobile part suppliers	Chemical and fertilizer	Electrical and Electronic	Energy/ Power generation	Infrastructure/ construction	Retail	Transportation and distribution	Petroleum and natural gas	Mining	Pharmaceutical
5	9	27	18	24	29	25	5	28	19	29	18
4	1	30	23	26	25	17	2	36	27	29	16
3	4	31	39	11	24	14	3	24	47	31	11
2	2	25	40	10	25	13	0	8	57	43	15
1	4	36	96	6	17	4	1	7	36	27	5

Figure 9 Most harmful industries

In a recently conducted survey (2009), it was found that performance is the main criteria in buying a product, much above its environmental friendliness.

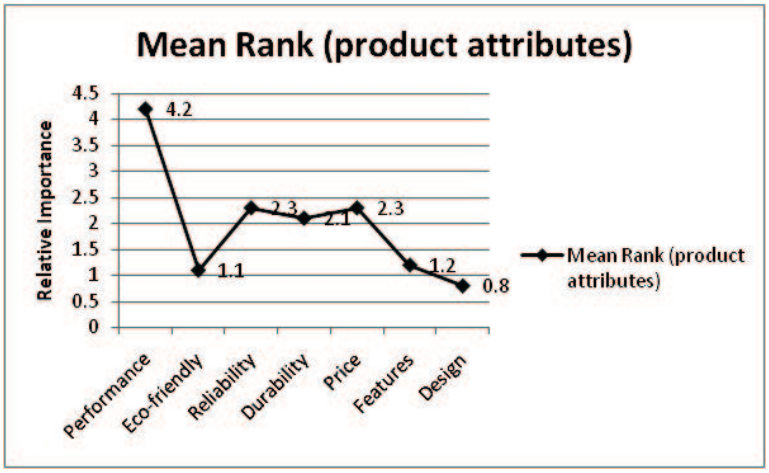


Figure 10 Mean Rank of Product attributes Anand Ram (2009)

In this survey, consumers were asked how frequently they see the following attributes while purchasing FMCG and durable:

1. Brand
2. Ingredients
3. Certifications given to the company
4. Product labels
5. Product Price
6. Environmental impact of the product during usage
7. Outlet/agency where you buy
8. Place of Manufacture
9. Safety and health aspects of the product

The frequency options were as follows:

- Never
- Rarely
- Sometimes
- Often
- Always

The results obtained for FMCG and durables are as shown in the Fig: 11 and Fig: 12.

When asked about the dearth of eco-friendly products in different categories, automobiles, electrical and electronic items, packaging material and cleaning agents were at the top-of -mind

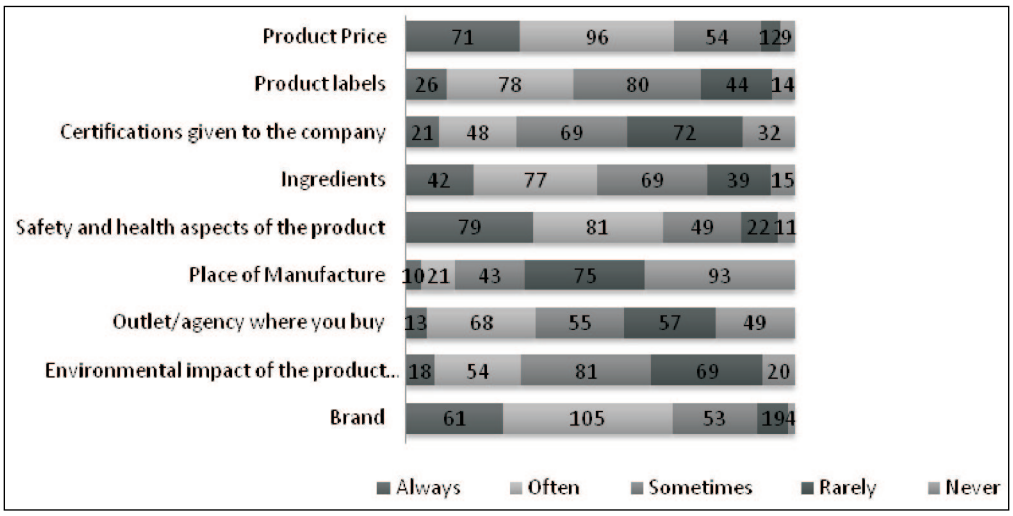


Figure 11 Preferred product attributes for purchase for FMCGs

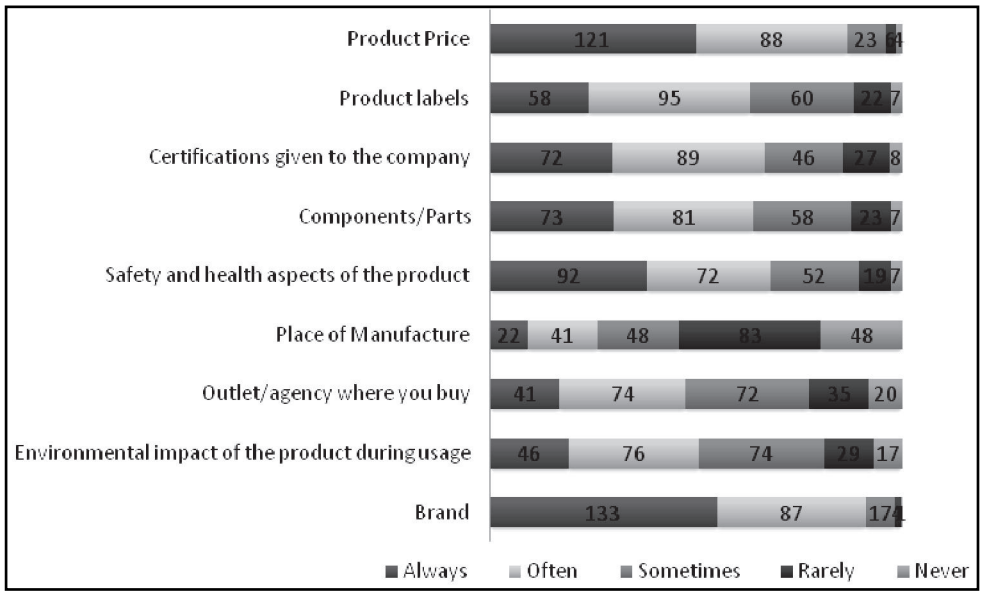


Figure 12 Preferred product attributes for purchase for Durables

for the respondents. This really shows that the corresponding industries should work on these product categories and make it eco-friendly.

The participants of the survey were asked about their green actions that they were ready to undertake in present and future. The results are as shown in Fig.14.

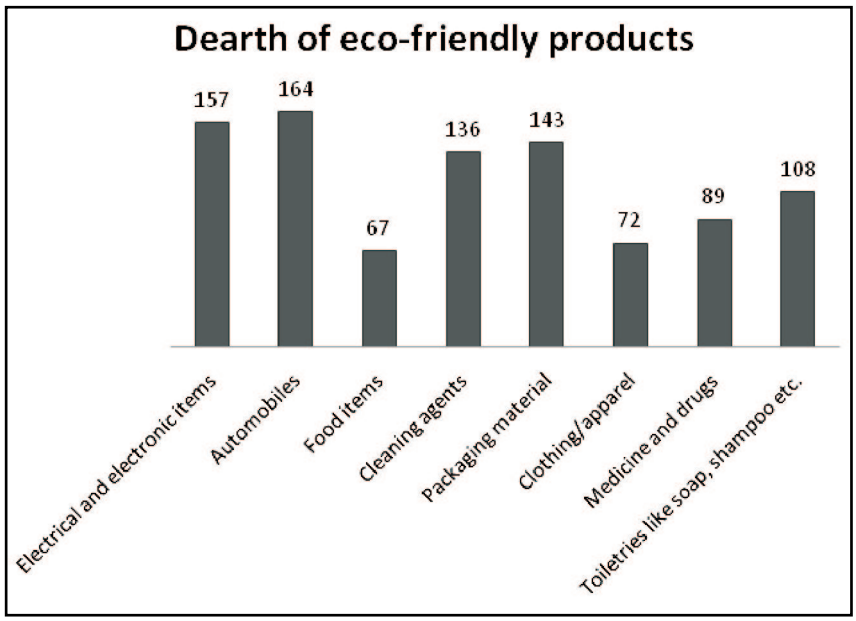


Figure 13 Dearth of eco-friendly products

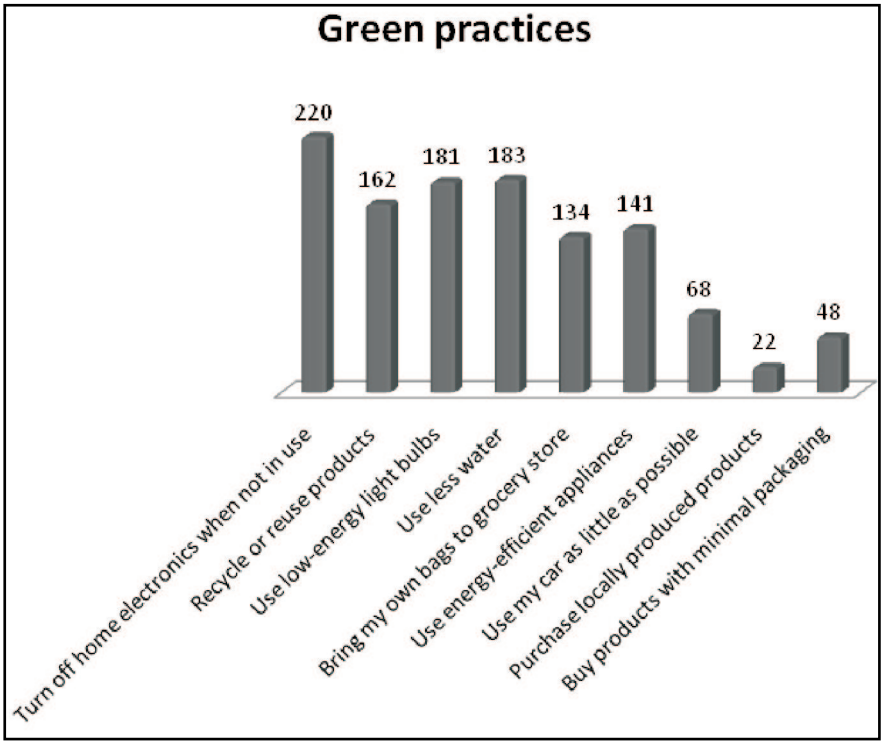


Figure 14 Green Practices

The following five actions appear to be most preferred:

1. Turning off home electronics
2. Using less water
3. Use of low energy bulbs
4. Recycle or reuse products
5. Use energy efficient appliances

When respondents were asked to rank the products' harmfulness at end-of its life, Plastics emerged at the top, followed by batteries and then electronic goods. The ranking is as shown in the Fig.15.

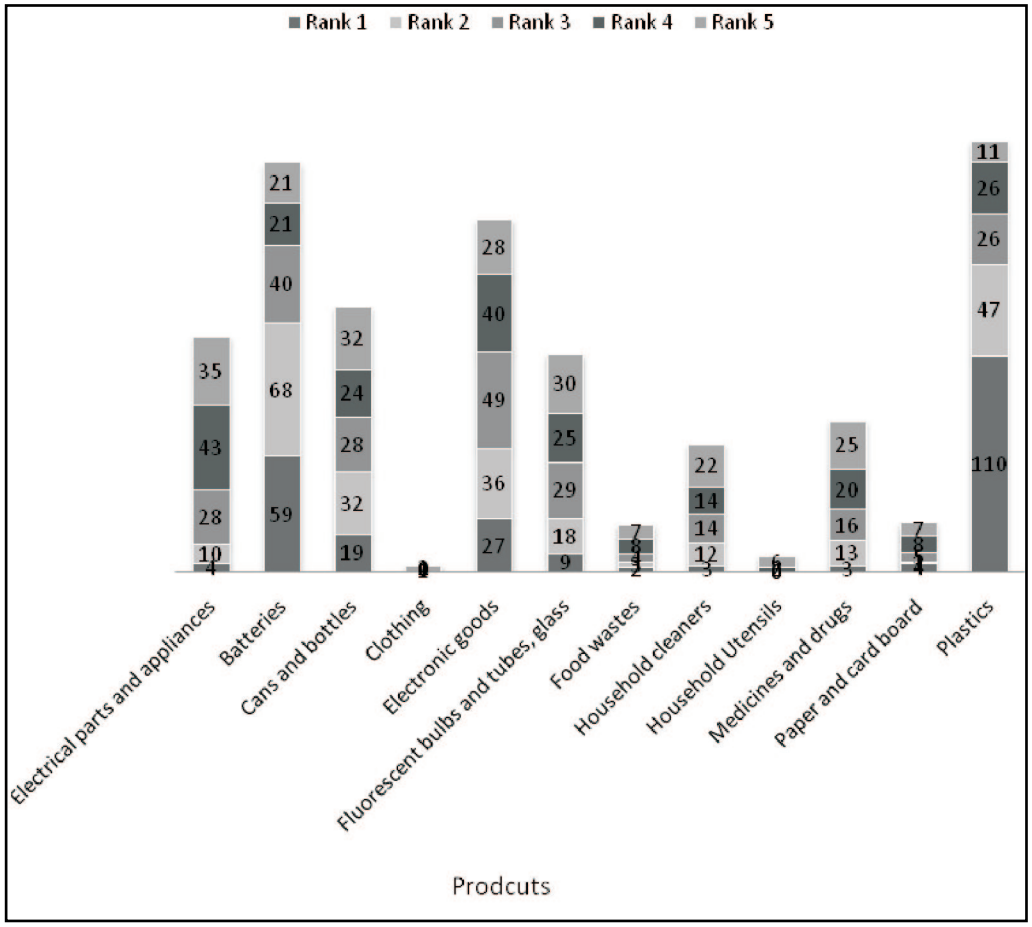


Figure 15 Most harmful product at end of life

There seemed to be a similar trend when participants were asked about their difficulty in segregating and disposing items safely at end-of-life of a product. Paper and cardboard has emerged as the easiest to dispose, followed by Clothing and food waste. The most difficult being plastics, followed by electronic and electrical goods. Medicines, cleaners and cans and bottles are observed to have medium difficulty while disposing.

The results are as shown in the Fig.16

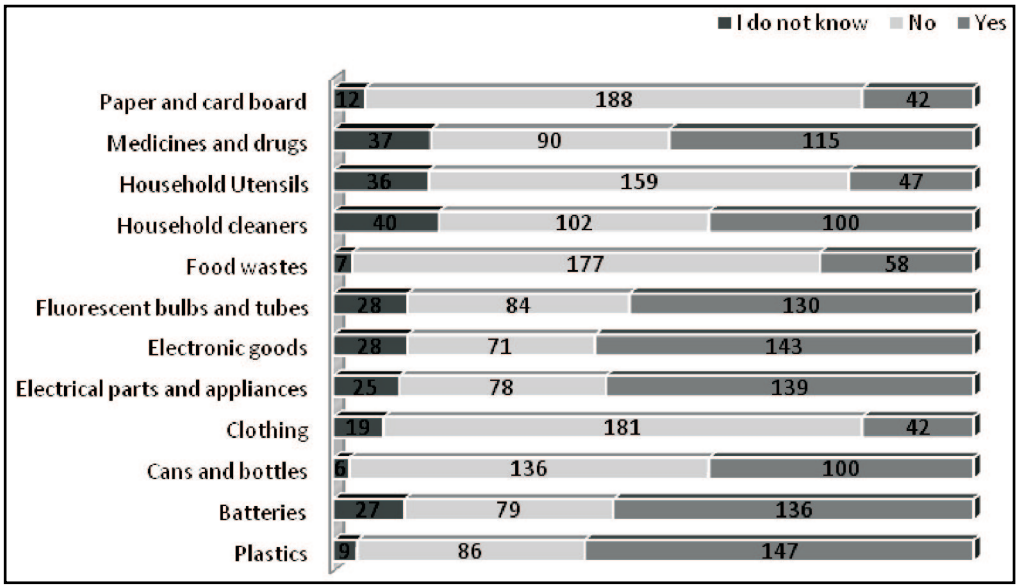


Figure 16 Difficulty in disposing

Respondents were asked how they dispose some of the house items discussed above. They were given the following options:

1. Put it in the common waste bin
2. Put it in a separate waste bin
3. Give back to the manufacturer/ local agent
4. Donate
5. Other means of disposal

It was found that, most of the respondents were disposing the items in wrong channels.

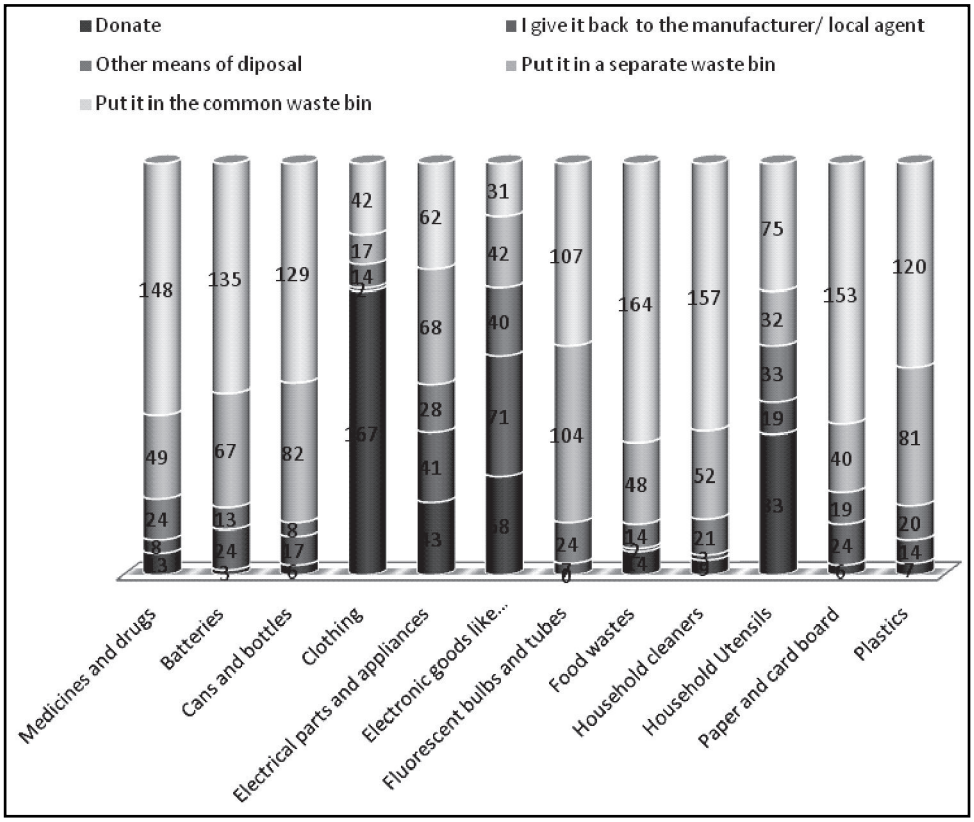


Figure 17 Disposable Methods of Household Items

Among the household wastes, the method of disposing WEEE is as shown:

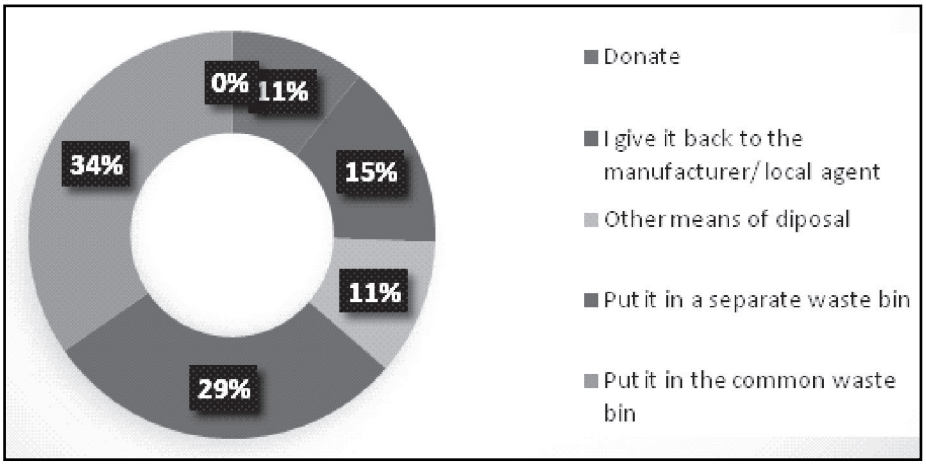


Figure 18 Disposal methods for WEEE

34% percent of the respondents put WEEE in a common waste bin and 29% put it in a separate waste bin.

When asked about their hindrances to dispose household items at the end-of-life, the following hindrance emerged as top three:

1. No proper channel to dispose
2. No proper information about the adequate disposal techniques from the company
3. Disposal agents are not easily available and they are expensive to access.

The Fig.19 show the results of this question.

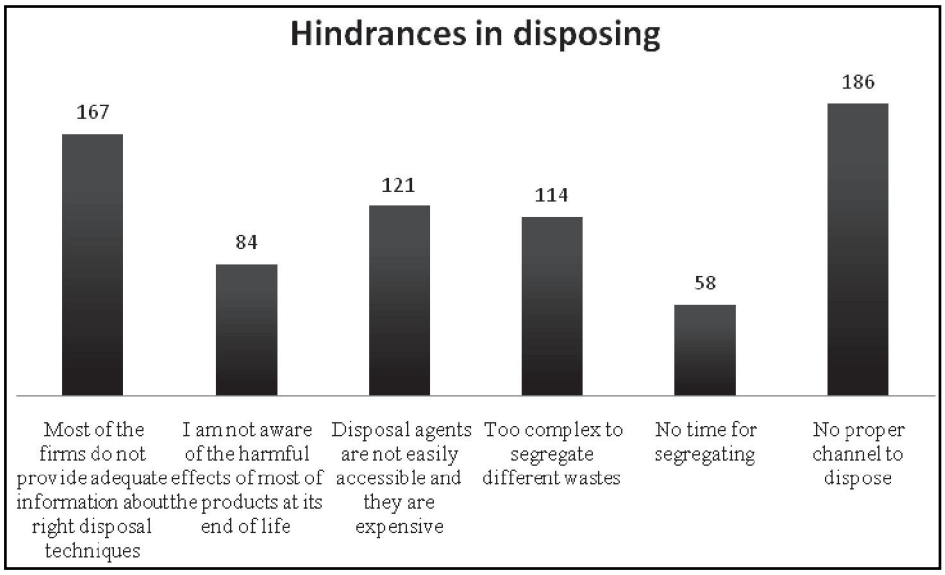


Figure 19 Hindrances in disposing

The key highlights of this study are:

- Brand, price and safety and health issues are the main criteria in buying both FMCG and durables
- Dearth of green items is seen in almost all items, expect for food
- Consumers prefer to do things like switching off lights, electrical items and saving water as an action to contribute positively to the environment
- There is major concern in disposal among participant and they attribute it to the lack of proper channels and information from firms.
- WEEE disposal is a major concern with majority among respondents treating it like a municipal waste.

Solutions to curb WEEE

Three stakeholders for Green practices play a vital role to put an end to all concerns ie the Consumer, industry and Government. From the study, it is evident that consumers' motivation towards

environment needs to be backed up by sound Government policies for the cause of sustainability.

Indian Government has two bodies to look after environmental aspect which is Ministry of Environment and Forest and Pollution control board. Efforts made by the Government towards WEEE can encourage entrepreneurs in this area. Notable developments in this area include the following points given by Environment Minister in Parliament on July 14^{th} 2014[8]:

- Assistance is provided for awareness and capacity building activities relating to e-waste management.
- Environment minister told Lok Sabha on July 16th 2014 that under the 'Creation of Management Structure for Hazardous Substances' scheme, government is also setting up integrated recycling facility for e-waste.
- Monitoring of compliance of authorization and registration conditions fall under the purview of state pollution control boards.

Integrated e-waste management policies can be framed which includes the following elements as shown in Fig.20.

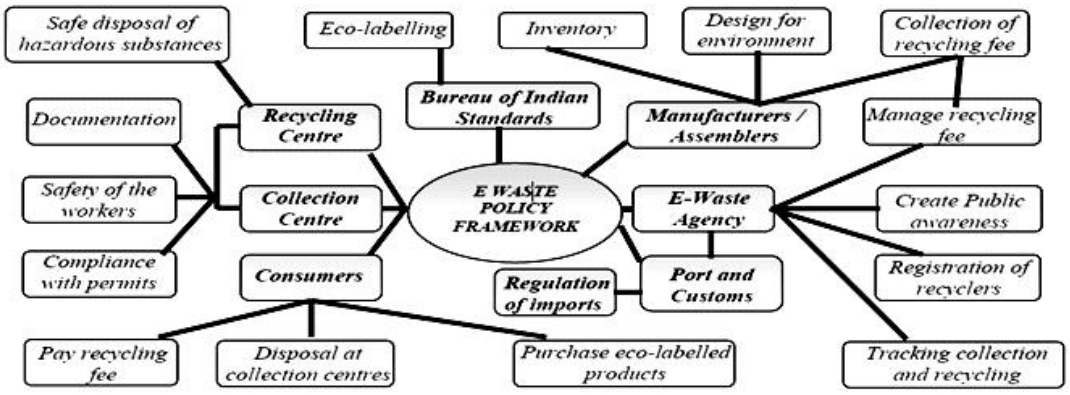


Figure 20 Elements of e-waste management for India

Treatment of E-waste at different levels can be considered as shown in the Fig.21. Involvement of consumers at Disposal stage by bringing awareness about e-waste harms and need to segregate can be beneficial.

Disposal agencies are also a huge potential for entrepreneurs and they can capitalize on the wastes produced by the big industries. They are only a few in numbers in a country like India catering only to a fraction of the disposed wastes. Reverse logistics is the need. Few players in this area spread across various cities in India include the following[9]:

- Attero India Pvt. Ltd.
- Cerebra Integrated Technologies Limited

[8]http://timesofindia.indiatimes.com/home/environment/developmental-issues/Government-offering-financial-help-for-e-waste-management/articleshow/38486908.cms as accessed on July 19th 2014

[9]http://finance.yahoo.com/news/research-markets-india-e-waste-143400469.html as accessed on July 19th 2014

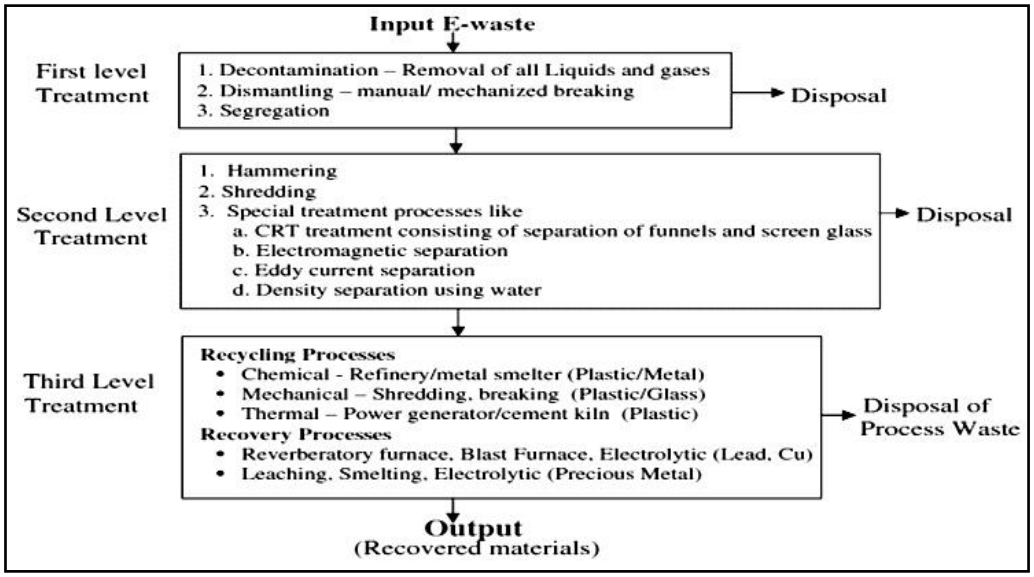


Figure 21 Three tire treatment processes for recovery/recycling E-Waste (Joseph, 2007)

- E-Parisaraa Pvt. Ltd.
- Earth Sense Recycle Pvt. Ltd.
- Ecoreco India Limited
- Global E-Waste Management India Pvt. Ltd.
- Greenscape Eco India Pvt. Ltd.
- Greentek Reman India Pvt. Ltd.
- Ramky Enviro Engineers Ltd.
- SIMS Recycling India Private Ltd.
- TES-AMM India Pvt. Ltd.

It is time for Indian Industries to play a proactive towards sustainability.

- Product stewardship should be encouraged and consumers must be informed using proper labelling and packing techniques.
- In India, environmental sustainability aspects are not yet embedded in the balance sheet, business scorecard and performance dashboards. There must be a standardized mechanism to measure the environmental performance. Also there must be sustainability targets each company must keep like growth targets and market share increase.
- Green R&D must be encouraged and they should keep in mind that performance of the product must be like conventional product or otherwise they must invest in convincing the consumers to buy the product through various strategies.
- Training of the employees must include sustainability aspects along with technical matter.

- In UN Global impact CEO survey both in 2010 and 2007, CEOs believe that consumers will drive the business approach to sustainability. Then it will be the employees, Government, regulators and so on. Top leadership should trickle down this opinion and they should embed environment friendliness in their employees also. The top management must be first convinced that Green is the way forward.
- Concept of Extended Producer Responsibility can be thought off in the Indian Context.

Limitations and Future Scope

- The web survey could gather responses from only 243 usable responses and the size and composition may not be accurately representing the actual population.
- All the response only came from users having internet access so it consider only a subset of population that has internet access
- The other limitations of web based questionnaire are inherent.

India being a populous nation, the waste generated is humungous and the need for waste management is big. A study can attempt to know the Role of Reverse logistics companies in India. There is a need to identify gaps and plans can be made as to venturing in this direction.

Conclusion

Mahatma Gandhi said "I do not believe that multiplication of wants and machinery contrived to supply them is taking the world a step nearer its goal..... I whole-heartedly detest this mad desire to destroy distance and time, to increase animal appetites and go to the end of the earth in search of their satisfaction. If modern civilization stands for all this, and I have understood it do so, I call it satanic."

Technology has brought with it some evils and e-waste is one of them. Keeping the current and future scenario in mind, key stakeholders consumers along with Government and Industry must work together to mitigate the negative effects of e-waste. Enthusiasm among consumers needs to be backed up with awareness of environment which should get converted to actions. Having right kind of disposal techniques of WEEE will be like targeting the tip of the ice berg. Purchasing and usage of EEE must be right. For that industries must provide the right kind of products. Supply chains which are green must be encouraged. Various stages from source to end must be checked for Product stewardship. Policies of the Government must clearly be reflected in Industrial actions and benefit the consumer who is in the end of value chain. At consumer level, municipal corporations must bring in facilities that provide easy disposal of e-waste. Entrepreneurs and Public private Partnership to curb e-waste is need of the hour. An integrated approach only can solve the problem of e-waste in India. The concept of Reduce, Reuse and Recycle should be encouraged. At an individual level it is best to practice "Ceiling on desires" and with this as foundation it is best to look forward for "balanced growth" at a societal and global level.

Only with a noble motive, philosophers say, great things can be attained. There can be no greater motive than to LOVE ALL SERVE ALL and HELP EVER and HURT NEVER. The best thing one can expect is to make this endeavor a step towards meeting these motives.

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Security, Privacy Awareness vs Adoption of Social Networks and Mobile Devices for Learning: Students' Preparedness

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Abstract

The application of social networks and mobile devices for learning can improve learning process drastically in Higher learning Institutions as it offers tools and capabilities that creates flexible and convenient learning environment. But the adoption of social networks and mobile devices for learning is constrained among other things by fear of security and privacy of information shared. In order to investigate student's preparedness on security and privacy awareness in adopting social networks and mobile devices for learning, a descriptive research approach was employed. A judgmental sampling technique was used to select participants of the study. Based on the results of questionnaire and interviews we found that, generally students in higher learning institutions in Tanzania are short security knowledge and skills necessary to adopt social networks and mobile device for learning and therefore not ready to apply the same for learning. We propose measures to be done in order to make adoption of social networks and mobile devices for learning a success.

Keywords

Learning, Social Networks, Mobile Devices, Security, Privacy, Adoption

Introduction

The inception of Web 2.0 and advancement in mobile technology capabilities has revolutionized the way information is generated and disseminated. Additionally, the ability to send and retrieve information anywhere, anytime has changed the way we work and live (O'Murchu, Breslin, & Decker, 2004). These capabilities are the key drivers for the growth of social networking sites around the globe attracting millions of users across all age groups and professions. Accessibility of information and data over the Internet-enabled mobile devices has encouraged many people, mostly the young, to join Social Networking Sites hence making these sites to be among the largest community of people sharing information almost in real time (Milrad & Spikol, 2007).

With increased utilization of mobile devices, improved Information and Communication Technologies (ICTs) infrastructure and decrease in Internet access costs, higher learning Institutions in Tanzania are in the right position to harness the power of Social Networking platforms and mobile

devices for learning and education delivery. This will help to define and transform new literacies in teaching and learning which will eventually offer students extra ICT skills and at the same time serve as a means for improving learning and education delivery (Lankshear & Knobel, 2006).

Additionally, many institutions have realized that the learning environment extends beyond classroom settings and are thus exploiting a variety of technological options (Vogel, Kennedy, Kuan, Kwok, & Lai, 2007). A recent development in delivery of learning using social networks in Tanzania is seen in efforts made by The Institute of Adult Education through the Ministry of Education to deliver learning through mobile devices and social networks platforms and a number of locally and informally introduced social networking platform (wikis, blogs, discussion forum) and mobile applications in higher learning institutions.

The application of social networks in learning among other things is held back by fear of privacy and security of information shared (Munguatosha, Muyinda, & Lubega, 2011). In order to improve privacy and information security practices promoting good end security behavior is imperative (Stanton, Stam, Mastrangelo, & Jolton, 2005). One key step achieve that is through information security awareness assessment. It is, therefore, the intention of this paper to gauge the preparedness of students in relation to information security and privacy awareness when using social networks platforms and mobile devices for learning.

Applications of Mobile Devices for Learning

The use of mobile phones for learning is not a new phenomenon. In 2000, Colella studied the use of PDA to stimulate the spread of computer viruses (Colella, 2000). In 2003, Riordan and Traxler investigated on supporting Computing and Information Technology (CIT) students identified as to be at risk due to poor literacy skills through Short Message Service (SMS). Furthermore, Attewell and Savill-Smith (Attewell & Savill-Smith, 2004) investigated on the application of mobile technologies for learning for young adults who are not in full-time education environment. Thorn and Houser (Thornton & Houser, 2005) researched on the use of mobile PDAs for English language learning in Japanese Universities while Levy and Kennedy (Levy & Kennedy, 2005) reported on the use of mobile SMS for learning Italian.

Generally speaking, throughout these studies, the application of mobile devices has proved successful in motivating learning, improving interactivity and self-learning practice. Vogel et al. (Vogel et al., 2007) state that, mobile devices such as PDAs and Smartphones are increasingly pervasive, especially in students' populations, making it easier to adapt them for learning in formal education.

Learning through mobile devices is made possible through numerous inbuilt capabilities. These capabilities include ability to host social software such as forums, blogs, Wikis, Moodle, RSS, Instant Messaging (IM), chats and podcasts. These capabilities when appropriately used can help create virtual classrooms that enable students to interact without appearing in a physical classroom.

Despite all the benefits offered by mobile devices in learning, these devices have some limitations that may affect learning and education delivery (Levy & Kennedy, 2005), (Lockyer & Patterson, 2008). Some of the issues include the presence of small screens that may cause some difficulties in learning, low image resolutions, input limitations, and memory as well as storage capacity.

Applications of Social Networks for Learning

The capability of using Social Networks as a pedagogical tool for learning is powered by its ability to allow sharing of information through user profiles, connecting to other users who are termed as contacts or friends, uploads, tagging, link other users to web- accessible contents and joining subsets of user groups based on common interests (Lockyer & Patterson, 2008).

In order to take full advantage of Social Networks, educators in several universities and higher learning institutions in developing countries have already started harnessing the power of Social Networks as a new learning platform (Bryant, 2006),(Minocha, 2009). For the academic industry, Social Networking Sites (SNS) provide teachers/lecturers with new opportunities to reach students and improve their learning (Teclehaimanot & Hickman, 2009).

In distance learning, for example, the presence of Social Networks is an important ingredient influencing education delivery (Gunawardena & McIsaac, 2004). Distance learning practitioners believe that interaction is a necessary component for a successfully learning experience. In this case, interactivity offered by Social Networks will definitely serve this purpose in fully. Throughout the transformational stage, subject lecturers are the key players in taking students from traditional classroom settings into virtual classroom by opening course groups, encouraging students to participate in electronic forums etc. The application of Social Networks for learning is witnessed in works of Lockyer and Patterson (Lockyer & Patterson, 2008) who conducted an investigation on integrating social networking technologies in education delivery. McLaughlin and Lee (McLoughlin & Lee, 2007) investigated the affordability of Web 2.0 and social software and the choices and constraints they offer to tertiary teachers and learners. Bryant on the other hand ,discussed his experience in utilization of social software tools in supporting student collaboration at Dickinson college (Bryant, 2006).

Security and privacy concerns in social networks

The security and privacy of information of social networks users is in jeopardy of being accessed and used by unauthorized users. Majority of social networks allow third-party applications to access and use information of social networks users without their permission (Gross & Acquisti, 2005). Generally this practice is risking privacy of information of social networks users. Apart of that, many social networks do not enforce privacy settings or guarantee privacy of information of its users. User profiles of most of these social networks are by default visible to the public (Tuunainen, Pitknen, & Hovi, 2009). This puts new users and unskilled people into a trap of disclosing their information into wrong hands unknowingly. Several studies have addressed the issue of security and privacy concerns of information circulating in social networks. For example, (Strater & Richter, 2007) examined privacy and disclosure of information in a social networking community while (Zhou & Pei, 2008) developed a practical approach to preserve privacy in social networks against neighborhood attacks. (Korolova, Motwani, Nabar, & Xu, 2008) provided both theoretical and practical analysis of vulnerability of social networks against the link of privacy attacks. (Luo, Xie, & Hengartner, 2009) proposed an architecture called face Cloak that protects user's privacy by shielding user's personal information from the site and from unauthorized users.(Goettke & Christiana, 2007) studied privacy in online social networking sites, while (Tuunainen et al., 2009) researched on user's awareness of privacy on online social networking sites. (Gross & Acquisti,

2005) and (Young & Quan-Haase, 2009) studied information disclosure and internet privacy issues on social networking sites.

Research Approach

This study was conducted in higher learning institutions in Tanzania to investigate student's preparedness in security and privacy awareness aspects on adoption of social networks and mobile devices for learning. Participating higher learning Institutions were randomly selected from the lists of registered higher learning institutions from NACTE and TCU databases. Table 1 shows list of participating Institutions from both sides of Tanzania.

Population of the study consisted of undergraduate students only. Respondents from the study population were determined using judgmental sampling approach were by a researcher choose key informants that will suite the study. Since this study is aimed at investigating student's security and privacy awareness when using social networks for learning therefore descriptive research approach was employed. This approach is suitable when collecting information about people's attitude, habits or any variety of education or social issue (Orodho & Kombo, 2002).

Data collection instruments used was interview and questionnaire. Myers suggest that interview is an excellent choice when gathering data related to people issues (Myers, 2013) therefore was deemed as appropriate for this study.

Table 1 List of participating Institutions

S.No.	Institution
1	The Institute of Finance Management
2	University of Dar es Salaam
3	Sokoine University of Agriculture
4	Dar es Salaam Institute of Technology
5	Zanzibar State University 6 University of Bagamoyo

Research design and data collection procedure

Interview questions and questionnaire were crafted to gauge student's security awareness through their actions when using social networks and mobile devices for learning. Specifically, interview questions and questionnaires focused on familiarity of possible threats, Awareness of f improper operation of social networks and reporting of security incidences, awareness on measures in handling personal sensitive information, cautious use social networks, cautious installation and upgrading of mobile applications. Interviews were arranged beforehand through official letters. All interviews were conducted in respective higher learning institutions. Questionnaires were hand delivered to respondents by the researcher and collected after one week.

Data analysis plan and execution

This study gathered both qualitative and quantitative data, therefore qualitative and quantitative data analysis methods were used. Qualitative data was sorted, grouped and coded to establish patterns and relationships to form five themes. The following themes were formed:

- Familiarity with possible online threats
- Awareness of outcomes of improper operation of social networks and reporting of security incidences
- Measures in handling personal sensitive information
- Precautions during accessing social networks
- Precautions during installation or upgrading of mobile apps

Findings

Findings of the study were presented based on the above identified themes.

Familiarity with possible online threats

Students were asked a series of questions to gauge their familiarity with possible online threats when using social networks. Knowledge about possible online threats is essential weapon that should be possessed by any internet user. Therefore it is essential that students should be familiar with possible threats in order to counter them. Our findings reveal that knowledge about online threats is not adequate among respondents (R1,R3,R4,R6,R7,R8,R11,R13,R16,R17,R18,R19,R20, R21,R22,R23,R24,R26,R27, R29,R30,R31,R32,R33,R34,R35,R36,R37,R38,R39,R41,R43,R45, R46,R47,R48,R49,R50,R51,R52,R53 and R54).According to their response, the only possible online threat is virus. R4 was mostly concerned about the quality of internet and showed that is not concerned about other online threats apart from viruses.

'[..] when I log in into a social network or an online forum, my focus is to get access to the content that I am looking for. I know about viruses... but it is very difficult to enter my smart phone because I have never heard somebody been invaded by a virus in a mobile phone. [...]' (Respondent R4)

However, respondents whose background is ICT, to some extent were knowledgeable about online threats. Most of them managed to mention possible online threats but were short of knowledge when it comes to methods and means to thwart them (R2,R5,R9,R10, R12,R14,R15,R25,R28, R40,R42 and R44).

Awareness of f improper operation of social networks and reporting of security incidences

Awareness of the outcome of improper operation of social networks and reporting of security incidences can help internet users to act precautionary when online. We gauged knowledge of respondents on range of aspects associated with improper operation of social networks and reporting of security incidences. We asked them about what is allowed to be posted, what measures should be taken when somebody illegitimately get access to your password, username, full profile information including real name, date of birth, phone number, email, location, work place etc. We found that, most of respondents were unaware of what actions are improper when accessing social networks (R1,R2,R4,R7,R8,R10,R11,R12,R13,R15,R17,R18,R21,R22,R23,R26,R27,R30,R33,R36, R40,R41,R43,R45,R46,R49,R50,R53) They indicated that they don't bother about their actions when using social networks. Some of respondents did admit that they had posted nasty comments

in social networks (R17, R46). Posting of nasty comments or abuse anybody is an offence. With regards to measures taken in reporting security related incidences, 83% admitted that they have never reported any security incidences and are not aware of means to do that. Few who reported security incidences, did it in unconvincing way (R15 and R43). As R15 epitomized,

'When I found out that my social network account has been compromised, I will do the same like what I used to do with email accounts, open a new account and inform others that I have changed my email account' (Respondent R15)

Measures in handling personal sensitive information

The study found that most of respondents are not knowledgeable enough in handling personal sensitive information when using social networks. Specifically we found 93% of respondents have their personal information filled in their Social Network profiles and out of that 93%, 66.7% respondents' information can be publicly accessed can be publicly accessible . This is similar to other studies on information privacy in social networks (Gross & Acquisti, 2005) and (Tufekci, 2008) , which also showed that most of respondents discloses their information on Social Networks. Personal information that is publicly accessible can be used by stalkers to victimize, bully, or used in other forms of crimes.
Table 2 shows the respondents' types of information disclosed on various social networking sites.

Table 2 Disclosure of information on social networks

Profile Information	Respondents (in %)
Real name	79.7
Date of Birth	77.2
Email	84.2
Phone number	97.5
Work place	39.2
Political view	14.2
Religion	9.4
Location	31.2

Information security and privacy policies play a vital role in safeguarding user's data when using computers or accessing the internet. Due to importance of security and privacy policies, we asked respondents a range of questions to determine the extent of their knowledge about it. We found that majority of respondents had enough understanding of the mentioned policies. This was clearly indicated by respondent R7, R8, R9, and R63.

'[...] these policies provide a road on map what to do and how to do it in order to keep you safe when browsing [...] (Respondent R9).

Although most of respondents say they are aware of privacy and security policies available in social networking sites, in contrary we noticed that most of them did not bother to change the default privacy setting of their social networking accounts as directed in security policies.(Cranor, Guduru, & Arjula, 2006) suggest that this may be caused by user's fear of making bad configuration of their privacy settings, confusion since most of them are difficult to understand and its process may be taking a lot of time.

Precautions during accessing social networks

Using internet services requires cautiousness attitude and prior knowledge of outcomes of internet user's actions. Therefore it is imperative that internet users should be act cautiously when accessing social networks because internet is a lawless zone, a playground of many undesirable activities and paradise of all sorts of criminals (Quirchmayr, 1997).To assess cautious behavior of respondents when accessing social network we asked respondents to list out measures taken by them to protect their personal information, the study found that, 88.9% of respondents use strong password to protect their account information, 48.6% restrict access to their profile and only 15.3% use up-to-date web browser as precautionary measure to keep their information secure. Response indicates that, respondents were highly prone to attacks and their behavior while working online is not good enough for them to use social networks as a learning platform and at the same time protecting themselves. The only possible counter measure to take is provision of information security awareness campaigns.

Precautions during installation or upgrading of mobile apps

The application of smart phones, PDA's and tablets for learning is increasing among students in higher learning institutions worldwide. Most of new generation smart phones, PDA's and tablets have inbuilt capability to host mobile apps. Mobile apps provide fast, easy collaboration among participants. With increasing number of mobile application that does not require internet connection to access them, the likely hood of students to use them for learning off campus is high.

Using and managing mobile apps is a challenge among mobile device users. Among challenges mobile device users face is management of upgrades, patches and fixes for the mobile apps. We therefore assessed their actions during management of mobile apps. We found that some respondents reported of difficulties in identifying and differentiating credible mobile apps for learning as exemplified by R29:

'We find it difficult in identifying the right and credible source mobile app for learning and most of the time when I get a message to upgrade any of mobile apps in my smart phone, I do comply because I don't want to get deprived of service' (Respondent R29).

To stay safe users should consider a parent company as a credible source of mobile apps. For example most of android apps are hosted in Google play app store which do not allow users to download mobile apps upgrades, fixes from third party market places, the same to App store. To be listed in App store a submitted application has to undergo a formal review process (Felt & Wagner, 2012) which to some extent guarantee security and credibility of the mobile app. Further, users should consider protecting their smart phones, PDA's and tablets by installing anti viruses.

Discussion

In this section we discuss results of the study. Results are discussed in three different perspectives. First, we describe our observations from responses, second, we explain issues that may explain the observed situation and third we provide suggestions where possible.

Results indicate most of students in higher learning Institutions are not well equipped with knowledge of possible online threats and skills to combat the threats when using the internet and in particular when accessing social networks. There is a gap in knowledge on measures in handling personal sensitive information and cautious behavior when accessing social networks and

installation or upgrading mobile apps. Most of the responses from the students can be explained based on personal traits and others can be a product of group based-values. Since respondents are from Higher learning Institutions part of results presented have reflection on the environment of the respondents.

With respect to knowledge lack of knowledge of possible online threats and skills to combat the threats when using social networks this can be explained as a product of inadequate security awareness training among the respondents. ICT is a new phenomenon and a new tool in education set up in Tanzania Higher learning Institutions which enroll most of the students with little knowledge of ICT or poor ICT background. Further, ICT was introduced as a subject recently and taught in few selected schools due lack of ICT facilities and qualified trainers (Swarts & Wachira, 2010). Other issues that may explain the lack of knowledge of possible online threats and skills to combat the threats are outdated curriculums, lack of well trained teachers both in primary and secondary schools (Vesisenaho, Kemppainen, Islas, Tedre, & Sutinen, 2006).

Social networks provide opportunity for users to post instantly, anywhere anytime users opinions, comments, media or notes. This opportunity when utilized correctly by students may enhance student's ability to grasp concepts learnt in classes. Possession of proper skills to use the social networks and mobile devices is therefore important to students (Koloseni & Omary, 2011). Students should also be aware of legal issues regarding usage of social networks and use appropriate channels to report security incidences. For example, knowledge of what should be posted and what isn't is crucial when working online. In this study we found that most of the students have limited knowledge of what is permitted and what is forbidden to be posted in social networks, with some of respondents admitted in interviews that in one point or another they have posted nasty comments in social networks.

Tanzania has neither specific laws on cyber security nor CERT which are key elements that governs cyber- crime investigation, prosecution, reporting and prevention of security incidences. This makes it difficult to combat cyber-crimes (Cassim, 2011). Although there is no laws governing cyber security and CERT, institutional information security policies and guidelines can used guide students on general usage of social networks. Development of cyber laws and establishment of national CERT will create a promising and conducive environment for students to use social networks for learning.

On measures used by students to handle sensitive information, we found that 93% of respondents have their personal information filled in their Social Network profiles and out of that 93%, 66.7% respondents' information can be publicly accessed by anyone. (Gross & Acquisti, 2005) describe this situation as lack of privacy concerns among users of Social Networks. Lack of privacy concerns is further confirmed through interviews whereby respondents ignored to change privacy settings of their accounts as required by privacy and security policies in social networks. Most of social network are developed and loaded with privacy and security settings in order to ensure users privacy and security. It is the discretion of the user to apply them or not to apply. Such kind of end user limitations should be addressed by cultivating an atmosphere of acting proactively to security incidences (Styles & Tryfonas, 2008) As far as online learning using social networks and mobile devices is concerned observance to privacy and security policies is inevitable.

Whilst accessing social networks for learning using mobile devices, students should make sure mobile devices are running up to date antivirus, browser and important OS security patches. Besnard and Arief suggests that most of security threats can be prevented by simply applying

and running up to date security patches(Besnard & Arief, 2004), this imply that using up to date antivirus and security patches can help to create a conducive environment for learning through social networks and mobile devices. In this study we revealed that most of the users are not taking precautionary measures before accessing social networks. This behavior jeopardizes their involvement in online learning through social networks.

Conclusion

The study aimed at assessing student's preparedness in terms of security and privacy awareness when using social networks and mobile devices for learning in Higher learning institutions in Tanzania. In particular we investigated student's familiarity of possible threats, awareness of f improper operation of social networks and reporting of security incidences, awareness on measures in handling personal sensitive information, cautious use social networks, cautious installation and upgrading of mobile applications.

Based on the results of the study we conclude that, students in higher learning institutions they lack basic skills and knowledge on using social networks and mobile devices for learning and therefore not ready to engage themselves in using social networks and mobile devices for learning. Generally the study found that most of the students will be prone to different attacks. These attacks may eventually turn a social network into a very horrible place for learning to students and therefore discourage students and academic institutions to adopt Social Networks as an alternative pedagogical tool for learning. In addition to that, loss of privacy may cause economic losses and destruction of social image of individuals in the society (Tuunainen et al., 2009). Furthermore, loss of privacy may jeopardize physical security of social networking users as well. For example information obtained by unauthorized access (such location, real name, gender, work place, phone number, political view etc.) may be used for stalking, political parties campaigning, conmen and sexual predators just to mention a few.

E- Learning similar to traditional learning environment (classroom setting) needs to conducive enough to enable smooth learning to students. Unlike traditional learning environment, in e-learning environment, it is difficult to ensure security and privacy of information as these two factors depend on both technology and human factors. Principally, students are supposed to be the fore-runners in safeguarding their information on social networking sites.

However, in order to make this a success, higher learning institutions need to conduct information security and privacy awareness campaigns and incorporate information security awareness as a topic or sub topic in order prepare students on basic issues to adhere to when using social networks and mobile devices for learning. Lastly, to ensure privacy and security to students, higher learning institutions should lay down policies and regulations to ensure proper usage of Social Networks and mobile devices for learning.

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Technology Drivers in Financial Services for Promoting Financial Inclusion in Rural India

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'Technology is a gift of God. After the gift of life, it is perhaps the greatest of God's gifts"
- Freeman Dyson

Introduction

Finance is the life blood of any economy. Financial services are like the arteries which deliver this vital resource to all the stakeholders in an economy. The governance mantra of speed and scale will find fulfillment and realize its efficaciousness only when the economy is vibrant and healthy. A strong financial services sector is thus an essential cog in this economic juggernaut, which eases its movement forward with nimble footedness. The financial services sector also acts as a barometric indicator of the country's economic health.

The humane and the social need of individuals to be carried along in the same stride along with a progressive economy cannot be ignored. There cannot be a healthy society without truthful economics. The poor or the Bottom of the Pyramid category also wish to save, create wealth and ensure uninterrupted cash flows to meet important personal needs and family exigencies. They too wish to entrain the bandwagon of prosperity and multiply their incomes.

The growth of the Indian economy, with the unleashing of next generation reforms cannot happen without considering inclusive growth as a compelling driving force. The INCLUSIX index for financial inclusion gives India a score of 42.8 on a scale of 100, thus excluding a good number of its citizens from mainstream financial activity. This dangerously precludes a sizeable population from access to basic financial services; leave alone high end and hybrid services. This indicates a concentration of wealth; and a widening of the gap between the financial haves and have-nots. It will lead to lopsided development and exclusion of the poor and marginalized sections from participating in the celebration of enjoying the fruits of a growing economy.

The elixir called Technology

If ICT - Information and Communications Technology is harnessed and leveraged to ensure that financial services are delivered to the needy at a fraction of cost, it is a win-win situation for the service provider and the customer. The benefits are large enough to be shared by a large number of beneficiaries.

Integration of Technology	Service provider	Customer
High	Profits Increase	Income Increases
Low	Costs reduce	Cost of transacting reduces

(The Grid shows the relationship between use of technology, cost savings and profits)

Why is technology in nancial services not gaining penetration in rural areas?

1. Lack of literacy/knowledge: Lack of basic education makes it difficult for the end users to read, write and transact. Many are only used to acknowledging with LTIs, they do not know how to sign and stake their claim with the bank. Similarly, they have not heard of latest technology nor are they exposed to use of technology.
2. High reliance on cash as a means to service financial needs: Be it payment of utility bills or payments for purchases or payments for savings and investments or even receipts and remittances, cash is a preferred mode, because of its physical availability. Its physical presence engenders a (false) sense of security in the personal lives of people. According to an FII (Financial Inclusion Insights) survey a majority of the poor people transacts with cash because it is easier that way, it is more accessible, regular petty payments can be made with cash and cash payments are incentivized with discounts and low rates.
3. Many rely on their closely knit network of friends, relatives and acquaintances to meet their financial security needs.
4. Gender Bias: In non-urban, rural and tribal populations and those with conventional mindsets, the female member is not given financial independence in terms of earning power and decision making with respect to spending and saving. When handling cash itself is a far cry and financial services are not encouraged; where is the question of access to technology in financial services?
5. Lack of trust in the new order delivery of financial services: The question most prominent in the mind of the individual is - “Will my hard earned money reach the actual beneficiary safely and in time?” “Will my money be safe as it passes through the ‘virtual’ corridor?”
6. Concern for safety wins the race against speed and convenience. For many, doing business in a traditional bank branch like set up is a far safer option than using technology though it provides speed and convenience.
7. The Digital finance eco-system is not well developed: The supporting environment in terms of technology, skills, knowledge and incentivization is not structurally strong and well developed.
8. Savings amounts are far too less and disposable incomes are negligible. In many cases income is lesser than expenses, such that a shift to technology will not be attractive. When a poor man receives a wage or remuneration, the amount is small and is urgently needed for expenditure. In such emergency situations, cash in hand is worth a million.
9. Dispersion of population: Since the rural population in most countries is widely and sparsely dispersed, it is a humongous task to reach financial services to the last mile literally.

The Use of Technology in promoting nancial services has several advantages. Some of the important bene ts are:

1. **Reach:** Technology can help reach the remotest corners of the huge mainland. Also, the people residing in inhospitable terrains can access various financial services with the help of technology.

2. **Cost:** This involves the cost of communication and the cost of delivery of service. These costs are minimized with the use of an email or an SMS or an online messaging/chat service. Also, dematerialization, digitization and storage of financial information will slash transmission and delivery costs. According to a Mc Kinsey study, cost reductions average around 36% with digital metamorphosis and building up digital channel capabilities. The cost of servicing a customer is the highest at a branch followed by ATMs, online and mobile phones.
3. **Time and Convenience:** A technological medium will be always available to the customer 24x7. ATMs, Internet, mobile phones etc. can be used at any time in the day. An SMS is an easy and convenient way of conducting transactions through mobile phones.
4. **Security:** Hard cash is more risky and increases the cost of providing security. The cost of handling cash is an avoidable expenditure.
5. **Efficiency:** Online transactions reduce the cost of handling physical instruments and cash. Also, the transmittal of debits and credits is much faster and in real time as compared to the process of clearing etc., in case of financial instruments. It also prevents leakages which occur in traditional systems involved in cash movements.

Technology in delivery of nancial services: Progress over the years in India

Ever since the first credit card was launched in India in 1980, progress has been steady, but tardy, in terms of usage of technology for delivering financial services. The milestones crossed are worth noting.

1980 - Launch of first credit card
1987 - Launch of ATM concept by HSBC bank
1997 - Launch of internet banking
2000 - Start of Core Banking revolution (CBS)
2005 - NEFT Payments launch by RBI
2006 - System of Business Correspondents introduced
2008 - Incorporation of NPCI
2008 - Regulations for mobile banking in place
2010 - Immediate Payment system launched
2012 - DBT system introduced by Government
2014 - RBI allows setting up of Payments Bank and Small Banks

The Technology Growth Cycle with respect to delivery of Financial Services in India

Stage 01 - Introduction Stage: Mobile banking and payments are in the introduction stage of the growth cycle, with less than 0.3% of the population having ever used mobile money payment systems. (Source: finclusion.org) According to the website www.finclusion.org, 74.7% of those surveyed did not have a mobile money account. Many people still use basic models of mobile phones with no special features and there is a lack of penetration of smart phones.

Stage 02 - Growth Stage: ATMs, Internet Banking, Cards and Business Correspondents. India ranks 164th in the world with only 12.5% of its population using internet, though, in absolute terms it has the third largest population of internet users. The penetration of internet is low and

only about 10% of account holders (only 47% of the population has bank accounts) use e-banking. As of April 2014, there are 162543 bank ATMs, 1 million (1076289) POS equipment, 192 million credit cards issued and 3.9 billion debit cards outstanding. All put together these technologies have created transactions of over Rs.1,47,399 million through credit cards and Rs.18,30,310 million through debit cards during the month. (www.rbi.org). Thus we find that India, with the second largest population in the world, and an economy with a turnover grossing more than $1 trillion, the potential for growth in this segment is mind boggling.

Stage 03 - Maturity: Bank Branches

Branch banking in India has reached the maturity stage. It will not take too many years before branch banking enters the Decline Stage, given the strides made by financial services technology. Technology is very quick in its movement from incubation stage to penetration and usage. Over the past few decades, financial intermediation in India has passed through three crucial phases, improving access to financial services:

Phase 01: Bank/FI Intermediation, where access was mainly provided by banks;

Phase 02: Assisted Access through Business Correspondents and

Phase 03: Direct Access with the help of mobile banking and Aadhar based access.

The last phase is technology critical and technology dependent. This will help Financial Services in India to reach out to the last man at the last mile. Some innovative measures to enhance financial inclusion, interest and involvement include:

1. **Using Aadhar as a basis:** Aadhar of the UIDAI, can help in user identification. This helps in targeting and identifying the right beneficiary/user quickly. This is particularly helpful in G2P (Government to Person) financial services. The Aadhar number acts as a single reference number for all transactions and can thus speed up services.
2. **IMPS:** The Immediate Payment System, designed by the NPCI is a mobile based payment platform, which can securely make transfers using MPIN and MMIDs. The IMPS system involves anytime, anywhere, instant transfer of money. The IMPS has the potential to enable last mile delivery of financial services helping the final beneficiaries to easily access financial services. This is because it is a mobile phone based service.
3. **White Label ATMs:** WLAs will increase accessibility to financial services from remotest locations. Basic services like withdrawals and deposits can be done with ease and quickness. An increasing population which remains unconnected to financial services will find it convenient if WLAs are available for conducting basic transactions. Many Value Added Services (VAS) can also be provided by WLAs. VAS include bill payment, loan application, insurance application, premium payments, claim filing etc.
4. **e-Service Centres:** These government run centres can act as a nodal point for making available at the doorstep of every man in every village, government subsidies and benefits electronically apart from delivering financial services like tax and insurance payments, money transfers etc.

Critical Success factors for promotion of technology led Financial Services

Implementing ICT and other technologies to drive efficient delivery of financial services does not and cannot occur in a vacuum. There are several factors which will impinge on successful

implementation of a well designed technological strategy. Technology led initiatives to extend financial services in the large number of under serviced pockets in rural hinterlands will succeed only if the following points are borne in mind:

1. Educating the rural population in adapting to technology like a fish takes to water. For many, technology is a ghost because of their lack of understanding. If genuine efforts are made to educate the rural users, they will warm up to its usage and will clearly perceive its benefits and understand that technology will aid them as a friend. Popularizing usage of technology among the younger generation can easily create the much needed impact.
2. Developing a cost-effective sustainable technological model is essential. The cost of investment in any technology can be recovered only if the number of users/transactions is high. This will reduce the cost per transaction. A lower cost of implementation and maintenance will motivate businesses and other agencies to invest in technology to deliver financial services.
3. A good understanding must be achieved with the government and local environment in which the population is located. Sometimes, the local governments and leaders may hinder the delivery of financial services for reasons which can be trivial. The service provider must ensure that the requirements of the government and the local population are met.
4. Time and Speed are two key factors that can ensure greater adaptability. People will be willing to adapt to technologies, if they are assured of timely and efficient services. Thus, Time and Speed play a key role in highlighting the USP of technology.
5. Security is a major apprehension among the small and marginal income groups. They are not willing to put their small savings at risk by engaging with a 'non-living' entity, which they may not be able to hold accountable. And also, apart from providing fool proof security, the vendors of financial services must ensure speedy and firm resolution of disputes/grievances arising out of mal-functioning and such other risks.

Implementation of technology in delivery of Financial Services will be driven by the four Ps of

(a) Product Personalization
(b) Privacy and security
(c) Promptness
(d) Profits

In fact, these four Ps are off-shoots from the main **P** of a **'Paper-free'** service. **'Paper-free'** refers to virtual, digital and electronic or Internet based monetary transactions. The storage of data and transfer of data bits between participants in the 'loop' is done virtually. The key word is virtualization. Paper documentation, paper instruments and cash are minimal. Today, money is not just paper currency. The value of money is shifting from (paper) 'bales' to 'bytes'.

The **first P** means **Personalization** of financial products and services where each individual can seek out the best fit product/service based on his need and capacity. The value added services also have to be streamlined according to personal need and convenience. Technology can help

the individual choose his financial menu, from a wide range of a la carte offerings and customize products to his needs and timing.

The **second P** of **Privacy** indicates protection of personal financial information. This can be extended to include security of data and information. With cyber attacks increasing, personal financial data can become extremely vulnerable to misuse. Personal information- both general and financial - has to be secured from illegal information hawkers and cyber pirates. This requires a stable system of cyber verification and other checks and controls.

The **third P** speaks of **Promptitude** in delivery of services i.e. Speed in delivery combined with efficiency, which can act as a driver for competitiveness. This calls for innovation in delivery modes. Time and speed can act as key drivers towards adoption of technology.

The **last P** called **Profits** states that technology must ensure adequate returns for the individual in an environment of low cost delivery and low cost access. The service provider also can reap the dividends of low transaction costs and thereby improve profitability.

Other factors driving Technologies in Financial Services: The 3 big Ds of Deregulation, Digitization and Delivery

Deregulation: Free Markets produce best results when competition brings out the latent potential among the players in the form of cost reduction and value added services. In return customers are served with value for their money. In a deregulated environment, where the government acts more as a facilitator, the best of technology can be used to provide better services at lower costs.

Digitization: The transition from physical 'bales' to virtual 'bytes' has tremendous impact on the cost, time and speed of delivery of services. Earlier, all documentation was physically preserved in paper format, leading to usage of 'bales' of paper for this purpose. The stock markets are a case in point. With the concept of dematerialization setting in, all data is stored in the form of virtual 'bytes' and there is a distinct benefit in terms of cost and efficiency. Transactions and settlements can be squared off online with greater ease.

Delivery: In financial services, the way a product is delivered to the customer is very important. For the customer to adapt to technology, he must see real benefits in terms of cost and convenience; time and speed. If he finds online delivery systems and electronic delivery systems to be more beneficial, he will quickly switch over to these non-traditional systems. Technology must be used to deliver value to the customer.

Concept of Digital Financial Inclusion

Universal Financial Inclusion, of the last man at the last mile is an overarching objective, towards which our nation is moving slowly but surely. The best means towards this end is through promoting technology adaptation. This will result in a quantum jump when basic financial services are available at the door step of every individual. Value added and other financial services like loan portfolios, pension schemes, stocks and mutual funds can also be provided. Apart from this, e-receipts from government and e-payments towards utility services will complete the circle. Thus, a digitally included community will also be financially included.

Suggestions

Technology is like a wave that submerges those without strong roots in its onward surge. It brings along with it Speed, Scale and Innovation. The challenge lies in finding ways and means to engage with an emerging and aspirational digitally savvy young generation that is setting up new rules for choice and preference. Internet can change the way financial services are delivered as it shrinks geographical distance, dissipates time barriers, converges economic levels, reduces costs, promotes relationships and loyalty and enhances convenience. Some of the technological marvels that can be tapped into, to provide the best of services at a nominal cost and bring about financial inclusion and metamorphose the delivery of financial services especially in rural areas are listed below:

1. **Cloud Computing:** The Cloud provides a platform for doing business with agility, whereby businesses can enter and exit into markets with ease. Investment in systems hardware and software can be streamlined. The key drivers include cost savings, time to market advantages and agility. Security in a cloud environment continues to be a major area of concern. As the years go by with transactions growing in volume and value, the best available option will be cloud based services.
2. **Mobile based services:** As of 2012-13, mobile banking alone has contributed to around Rs. 60 bn worth transactions by over 22.50 million users, in India. With 873 million mobile phone users in India (of which 350 million are in rural areas), there is a huge untapped potential waiting to be utilized. Mobile telephony has grown in leaps and bounds over the last two decades in India. What is needed is a secure platform for identity verification (M-PIN), transaction authorization (OTP) and data encryption. Also, the registration process should not be cumbersome. The m-banking application should be loaded on to all mobile handsets by default. Registration, activation and seeding to the customer's bank account should happen seamlessly. The IMPS is a mobile payment service platform promoted by the government for enabling real time payments.
3. **Social Media:** India is currently enjoying a demographic dividend, with a large 'young' population. With a burgeoning youth population, the scope for using social media for driving financial services is very promising. Interaction on social media is multi-directional, dynamic and in real time. Financial service providers can easily connect to their customers and vice versa, with low cost and less delay. Social media can be used to

   - resolve customer grievances and soothe frayed nerves
   - engage with customers and to 'crowdsource' ideas for improvement
   - collect and collate customer feedback for improving products and processes

   In order to effectively use social media, concerns regarding security must be addressed. Also, the use of social media among the older generation and the illiterate population has not gathered momentum.
4. **Machine to Man (M2M) interfaces:** Reducing the human interface can speed up transaction time and reduce costs. A typical example of this is when ordinary functional services like deposits, withdrawals, transfers, enquiries etc., can be done through machine interface; mechanically or online. The human cost is reduced, the transaction waiting time is reduced,

the barriers of time and space are avoided - all this leads to cost savings for the service provider and the customer. For instance, in a small town near Bangalore, the overcrowded bank branches, nowadays are seeing lesser congestion (resulting in speedier service and lower costs) because of machines being installed for cash withdrawal, deposits, pass book updation and balance enquiry.

5. **Data Analytics and Big Data:** Data Analytics is about intelligent business, reshaping the offer, such that it best fits the right customer, creating unique value and long term preference. The data bits that are received as part of customer information, eventually will grow into a treasure trove. Analyzing this data for niche targeting of customers and gaining competitive advantage is a wise business strategy. Financial services companies need to use this resource of 'data' to build products and services that suit customer needs. This will help in more wisely using the scarce resources available.
6. **Small Banks and Payment Banks:** The RBI has recently released guidelines and created a framework for setting up differentiated banks. Differentiated and niche banking can help cater to meet the credit and remittance needs of small businesses, unorganized sector, low income households, farmers and migrant workforce through high technology-low cost operations. This will enable high volume-low value transactions in a secured technology driven environment.
7. **Incentivizing Digitisation:** One of the most crucial elements in this process is incentivizing digitization. Instead of offering incentives for cash settlements, internet based or electronic transactions need to be properly incentivized. This can be done by paying marginally more interest to digital account holders and may be even providing tax breaks for digital payments and savings transactions. This will motivate people to happily take to technology.

Limitations and Conclusion

This paper has been written based on study of literature from various other reports, articles and studies conducted on the topic. There is no primary empirical data or evidence collected. The focus of the paper is on delivering financial services in rural and unbanked areas with the help of technology. The study clearly delineates the need and advantages of using technology, mainly ICT, in delivering financial services. Importantly, it brings out crucial factors that affect the implementation and usage of technology in delivery of financial services, and stresses on the fact that implementing technology to deliver financial services cannot occur in a vacuum. All participants in the financial eco-system need to pitch in their efforts towards building a sustainable model. In this context, the 4 Ps and 3 Ds which drive technology in delivery of financial services need to be carefully understood.

In conclusion, it can be said that technology is like a double edged sword. It can create wealth and skills or if misused it can 'kill' the very spirit that engendered its growth and survival. The stake holders, especially the government and businesses, need to always be alert to the challenges of poverty and exclusion that can be set right with the right mix of technology and policy. At the same time, issues of privacy, security and cyber crimes pose an eternal threat to the survival of such a robust system.

The ancient Indian prayer ***"Sarve Janaah Sukhino Bhavantu" "May all beings enjoy prosperity"*** aptly draws the curtains to this topic.

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Application of Technology in Retail Industry

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Introduction

Technology is like a catalyst. It enhances the efficiency of any activity or process where it is applied in the correct manner. Tehchnology has had a strong presence in business from times untold. The magnitude of advancement has been different in different places.

Need for Technology

During olden days the neighbourhood retailer used to know his customers along with his family members by their first name the contactwas very personal and frequent. Thus the retailer was like a member of the family.

Besides this, the number of alternatives available in each product was minimal .thus selection was not a problem. Most importantly with the limited range of products and number of brands a customer never felt like personally exploring the possibilities for a better product/brand or may be a better bargain.

Application of Technology in Retail Industry

Technology can be applied or rather is being applied to different departments or retailing it will be good if we study the departments' one and then see the technology applications

Technology Application in Merchandising

Merchandising includes planning, sourcing, placementof orders, stocking, warehousing etc. let us examine the application of technology in each of these functions:

A) Sourcing

Before sourcing, the retailer has to decide on the number of categories he will maintain and the depth of product/brand range in each category. After that, short listing and selection of vendors has to be done. Finally planning of detailed orders is required.

B) Stocking/Warehousing

Here the technological element is maintaining data of stock received. Necessary changes are made on regular basis as per the consumption at the store. A retailer decides upon the re-ordering level based on consumption and delivery lead time.

Technology Application in Store Management

It includes human resource management, finance and accounting, store displays, security and miscellaneous issues. Technology has contributed in each sphere depending upon the scope. From the HRM perspective, man power planning is now done with the help of the systems software is available which shows the total position of the available staff. It can also shuffle personal based on the programming done.

Marketing and Customer Relationship Management

Every store would like to promote itself they have been employing all novel methods to ensure and enhance the footfall into the store. Most importantly every retailer strives to have a number of loyal customers such customers not only remain loyal to the store but also tend to influence their peers store selection towards the specific store.Now a days all the big retail stores use available software to store data about customers and their purchases. This is then classified to find the most valuable customers and their purchases, frequently visiting customers, most highly demanded categories, colours and varieties etc.

Data Warehousing and Date Mining

Information technology is being used to collect information on customer profile. Purchases, timing of purchases, frequency of purchases etc. Date warehousing refers to compiling of above information related to customer purchasing behaviour an example of how data can be used to draw inferences and take decisions is illustrated by two simple cases below:

Customer Interfacing Systems

Point of sale systems use scanners and bar coding to identify an item, use pre-stored data to calculate the cost and generate the total bill for a client. Tunnel scanning is a new concept where the consumer pushes the full shopping cart through an electronic gate to the point of sale. In a matter of seconds, the items in the cart are hit with laser beams and scanned. All that the consumer has to do is to pay for the goods.

Payment

Payment through credit cards has become quite widespread and this enables a fast and easy payment process. Electronic cheque conversions a recent development in this area, processes a cheque electronically by transmitting transaction information to the retailer and consumer's bank. Rather than manually process a cheque, the retailer avoids it and hands it back to the consumer along with a receipt, having digitally captured and stored the image of the cheque, which makes the process very fast.

Internet

Internet is also rapidly evolving as a customer interface, removing the need of a consumer physically visiting the store.

Factors Influenceing Technology Selection

Since every store wants to have a modern image, at times they make an erroneous decision regarding technology adoption. Since each store is not equal on all business parameters, thus technology adoption has to be dealt on a case to case basis. Certain factors must be dept in mind by the retail store owner before going to any technology.

A) Is there a need for technology adoption at all ?

Any technological products need high investment, trained personnel and periodical updation. A retailer should first look into the return on investment considering recurring cost and initial investment.

Can the job in focus be done manually or with some cheap technological substitute? For instance, for recording simple day to day retail activities of a small retail store, large investment in customised software is not necessary. Any general software is sufficient.

B) Volume of the Business

Most important factor is what sort of volumes the retailer is operating with. Larger volumes do necessitate technological interventions. Here it is very important to note that large volume is a relative term. The biggest store in a small town can be much smaller than a medium sized store in a metropolitan city. Large volumes of business justify investment in technology.

C) Nature of the Products Dealt With

Each retailer deals with a set of products for instance Westside and pantaloons deal with trendy apparels and hence form part of fashion industry. Since fashion is very temporary in nature, they have to take aid of technology to gather data about latest fashion trends in India and abroad. This helps them to have a proper hold on the production planning and control.

D) Availability of Financial Resources

Investment in technology involves large financial outlays. A retailer should have sufficient resources to invest in technology. Such investments should not be made from working capital or else retailer may not sufficient funds to purchase required stock and run day to day operations.

Technolgial Trends in Retailing

A) Point of sales (POS) software

Point of sales (POS) software refers to software used to capture information at the point of sales. Efficient POS software has become necessary for achieving competitive edge. To stay competitive, a retailer needs to develop ability to buy better, turn inventory faster and market smarter. POS

ensures all these. The system works on the principle that key to survival is profits and key to profits is awareness of what is happening at the point of sales.

B) Electronic Retailing

Although it is not latest as far as international retailing is concerned, however in Inda it is still I an early stage. In electronic retailing the internet is used as a platform by he retailer to communicate with the customer and offer products and services on sale. In India ebay, Bazee.com, times internet, Rediff etc. some of the examples of e-tailing. However now a days large chain retailers are having their own websities like bigbazar.com, my westside.com website etc. to enhance their sales by electronic retailing.

C) Interactive Projection Displays

Interactive rear projection displays allows the viewer to control the contents to display on the screen with a touch. It can be used to promote services or offering within the shop window. This actually facilitates window shopping. They are run on touch screen technology.

D) Attention Seeking Display Units

Attention Seeking Display units can be installed within the store or even outside. Their main aim is to seek attention from the passers-by. These illuminated and uniquely designed units carry the promotion messages as well as vital information about some specified products.

E) Vending Machines

Vending machines have been recently installed in selected railway stations for vending platform tickets. Milk vending machines also exists. Presently opportunities are being explored in this area with more emphasis on new features and users.

F) Radio Frequency identification (RFID)

This is a wireless technology which is presently revolutionizing the retail information system. A basic RFID system will have a transceiver, an antenna and a RFID tag also called as asmart tag. The antenna emits radio signals which active the smart tag, following which the transceiver decodes the data from tag into the computer. This has been used for tracking. RFID has been very successful in accurate tracking. However, due to very high price of RFID, its large scale adoption as not yet been possible.

Recations While Handling Technology in Retailing

1. A retail store before adopting any new technology should spend time in studying the utility and effectiveness of the application.
2. Any technology transfer without proper training support and updating is useless. While moving a new technology, a retail organisation must be very clear on these issues.

3. It is an always in the interest of the retail organisation to have its own data processing or technology using staff.
4. At any point, retail organisation should not assign the handing of processes which are technology oriented only to one or two personal.
5. In post WTO era, issues related to copyrights and title of technology is very critical.
6. As a part of disaster plan a crisis management plan should be in place to tackle situations arising out of system failure or snags in the software.
7. While acquiring any technology one important aspect is its price. This is also a decisive factor for acquisition.
8. In traditional organisations existing for long periods, older people resist the implantation and introduction of any technological products.

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Application of AHP in Valuing Importance of Skill Based Training Program's e-Learning Environment Factors

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Abstract

Industries capitalize lots of their effort in developing an academy background to support their products so that the technology users feel comfortable and secure in the knowledge that they have an expert around them always. There are many engineering industries initiating certification, training programs, crash courses, but how far these are mature enough to provide expertise and skill-level is a question mark. A framework is necessary to evaluate/measure the maturity level of these programs. Skill Based Training Program Maturity Model (SBTP-eLE-MM) is a framework that describes the key elements of managing and developing a systematic approach to train students to acquire a better skill level in the professional IT training programs they have enrolled. This paper describes Construction of SBTP-eLE Model through literature study for finding the Indicators, Pilot study, survey data collection, and grouping indicators to factor by factor analysis using SPSS-16. Expert study for maturity level acceptance and application of statistical method Analytical Hierarchy Process (AHP) to quantify the maturity stages and to calculate the overall maturity of the SBTP-eLE environment are discussed. AHP method further helps to determine the importance of the SBTP-eLE Maturity Model factors. This could help the educators to concentrate more in the development and improvement aspects.

Keywords

Maturity Model, Ranking, Skill Based Training, eLearning, AHP

Introduction

Training has been associated with technical and vocational colleges, on-the-job training, and in some countries, vocational programs within secondary schooling [1]. In an American Compensation Association survey of 97 skill-based pay programs, over 75% judged productivity, employee performance, and quality of goods or services to be better than organizations with traditional compensation systems [2]. Compared to traditional instructor-led training, computer-delivered training

classically offers learners more control over their instruction. In learner-controlled environments, learner choices regarding practice level, time on task, and attention are expected to be critical determinants of training effectiveness [3]. Developing an environment, which could engage a student and reach the learning outcomes of the course designed needs proper planning and a structured approach. A proper system developed in an institution or academy which is delivering the skill training will be a best practice than the individual practices [4]. Knowing the factors which are important and acceptable by an expert /end user could help in creating a system with the high level learner's acceptance.

This paper provides detailed information on the Skill-Based Training Program's e-learning Environment [SBTP-eLE], research methodology adapted in the construction of proposed evaluative maturity framework, construction of SBTP-eLE Model through literature study for finding the Indicators, Pilot study, survey data collection, and grouping indicators to factor by factor analysis using SPSS-16. Expert study for maturity level acceptance and application of statistical method Analytical Hierarchy Process (AHP) to quantify the maturity stages and to calculate the overall maturity of the SBTP-eLE environment are discussed.

SBTP-eLE Indicators

Instructional theory terms a variety of methods of instruction. It is also described as different ways of facilitating human learning and development. These instruction theories give strategies when to use–and not use–each of those methods. It is about how to help people learn better [5]. According to Robert Gagne's theory of Instruction developed during 1985, outcomes are classified as cognitive, attitude and motor skills. He has argued that the systematic way of learning occurs when the events followed during the learning process[6].

This section attempts to describe the literature review, which was widely done to identify the indicators that were included in the research framework, research articles from reputed peer-reviewed journals, conferences and other research repositories were identified after broad search on basis of appropriate keywords. The shortlisted articles were then acquired through their respective databases provided by Manipal University, Karpagam University and University of Salfordand resources, provided by professors from known universities and researchers. More than two hundred research articles were reviewed carefully, and analyzed to identify 33 indicators. These indicators were used to construct the research framework. The identified indicators were:

Table 1 Indicators from the Pilot study [7]

S.No.	Variable Name	References	Application
1.	Study Material Availability	[8], [9],	Study Material should be available online/offline 24/7.
2.	Varied Study Material	[10], [11],	Study material organized in different formats to suit the various learning styles of students, should be made available.
3.	Repeatable Instruction Delivery	[12], [13],	Students should be able to repeat the instruction delivered as many number of time as they desire until they get clear with the concept taught in the class, by means of recorded video, Power Point Presentation, and lecture audio.

S.No.	Variable Name	References	Application
4.	Compatibility of Platforms	[14], [15],	Learning material should be compatible to all platforms and environment so that students will be able to study without any hassle.
5.	Multimedia Based Learning	[10], [16],	Students Understand better when the course content is presented with multimedia support, such as audio, video, animation, and presentations. This helps a student to retain the subject matter over a longer period.
6.	Structured Learning Content	[17],[18],	Learning is more focused and outcome based when student's learning content is prepared with a structured approach.
7.	Skill Supportive Material	[17], [19],	Lab Manuals and Worksheets will help learners to study and do experiments by themselves.
8.	Reference Material	[20], [21],	Facility for Reference Material should be given in the learning environment to support the student to study beyond the recommended outcome, or for better understanding.
9.	Face-To-Face Course Delivery	[22],[23],	Instructor Lead Classes will help students to clear their doubts and clarifications with no delay.
10.	Simulation Based Learning	[24],[25],	Simulation tools help a student to prepare, perform better, and learn conveniently before the real environment.
11.	Demonstration Based Learning	[21], [17],	Demonstrations support better understanding of the concept/tool/operation.
12.	Problem Solving	[26], [27]	Problem based learning material helps the students understand the real world issues and to find the solutions.
13.	Non-Interactive Remote Class	[28],[29],	Broadcasting of Instruction or teaching session helps the student remain updated with classroom progress without actually attending it.
14.	Collaborative Learning	[30], [31],	Collaborative Learning helps learners to discuss among the group members about a problem, situation, or concept and understand better.
15.	Customized Learning Environment	[32], [33],	Customizing Learning Environment helps the learner organize the learning content, resources, tools, and learning environment according to his/her choice.
16.	Conference Learning	[34], [35],	Audio/Video Conferencing facility allows the learners to interact with instructor and participate in a remote interactive session.
17.	Peer Interactivity	[36],[37],	Peer Interaction allows the students to interact with their class members, to discuss and clear their doubts.
18.	Expert Counseling	[38], [39],	Expert Interaction facility should allow students to reach to a technical expert(s) apart from faculty, by posting a message or sending a request.
19.	Student-Faculty Communication	[40],[41],	Student and faculty interaction should be available for synchronous (chat) communication and asynchronous (mail) communication.
20.	Online Submissions	[42],[43],	Students should be given facility to do Online Submission of assignments/projects/case study reports; this will allow them to learn in a time bound learning environment, facilitating flexibility of submission mode.
21.	Practice Assessments	[44], [45],	Students will be able to evaluate themselves and feel comfortable by giving Practice Assessments before they appear for final exam.

S.No.	Variable Name	References	Application
22.	Skill Based Assessments	[46], [47],	Students should give a Skill-based Exam (Practical) to complete the course.
23.	Descriptive/Objective Type Assessments	[48], [49],	Online exam (Objective type) / Offline (Descriptive type) exam helps students to prepare in different capacities of the course.
24.	On Field Assignment	[50], [51],	Students should be given Fieldwork / Project work-based assignments, as this will increase their involvement in the course.
25.	Prior Intimation About Exam	[52], [53],	Announcement of Assessment should be sent to students prior to assessment day so that students will prepare themselves.
26.	Results With Description	[54], [55],	Assessment Results should be announced immediately after exam for the students to identify and work on their weak areas in relevant modules/chapters.
27.	Course Progress Status	[56], [57],	Course Progress Status should be shown on the learner's dashboard to let him/her know about their topic, module, chapter and accomplishments.
28.	Performance Report/Grade Book	[58], [59],	Students should be given access to see their performance scorecard as a Progress Report to know their level. This will support the student to plan their study strategy.
29.	Course Feed Back	[60], [61],	Students should give the Course Feedback to complete the course. It will help educators to improve the course and also work on other issues.
30.	Award/Appreciation On Completion	[62], [63],	Student should be given Certificates / Awards /Appreciation letters and at the end of the course to make them feel more confident on their skills and qualification.
31.	Intimation About Opportunities	[19], [64],	Publishing about the New Opportunities inspires students to develop their skill sets further.
32.	Provision of Internship	[65], [66],	Provision for Internship allotments encourages students to learn better with an objective.
33.	Intimation Of Course Updates	[19], [67],	Intimation about the new courses and new versions should be announced.

From a regress literature study these indicators were identified. The next section explains the research methods used and the result of the same.

Research Methodology

This section focuses on the Research Methodology followed in this research work. The Semi structured interview, Traditional Questionnaire, Web Questionnaire, Pilot Study, Expert Opinion Study, and Case Study methods have been used to collect data on basis of indicators identified after a rigorous Literature Review. Various statistical methods have been used in the research. Reliability analysis, factor analysis and Analytical Hierarchy Process (AHP), and Statistical Software such as SPSS have been used for the statistical analysis. Expert Opinions Study were cited through the use of Semi-structured interview conducted during Pilot Study as well as Expert opinion study. Convenience sampling of non-probability based techniques has been used. In this research, two types of surveys were conceded, one is web-based online survey and the other one is a traditional survey conducted in a controlled environment. Data Tabulation and Analysis for this research consisted of tabulating and testing the qualitative and quantitative data collected through the two types of questionnaire surveys. The Questionnaire was distributed approximately to 370 participants and 299 participants' data were considered. 20 responses were discarded since they were

incomplete. Approximately, 50 participants never responded to online survey (requested through mail to participate). Data collected through traditional survey was tabulated using Microsoft Excel spreadsheet software. The web survey was created and hosted through online survey provider http://www.surveyexpression.com. The data collected through the web survey was exported to the Microsoft Excel format and merged with the tabulated data from traditional survey. Tabulated data was imported in Statistical Analysis software - Statistical Package for the Social Sciences (SPSS-16) for conducting various analytic processes in this research. Tabulated data, analyzed using statistical research methods, is explained below. Reliability of the all indicator is recorded Assessment Strategies

I. Reliability Analysis

Using reliability analysis, researcher can determine the extent to which the items in the questionnaire are related to each other. Internal Consistency of Questionnaire Scale was computed using Cronbach's Alpha method. Further, Alpha (Cronbach) value checks this model as a model of internal consistency, based on the average inter-item correlation [68]. Alpha was developed by Lee Cronbach in 1951 to provide a measure of the internal consistency of a test or scale; it is expressed as a number between 0 and 1. The Cronbach's Alpha (α) coefficient for the five (5) scale based questions= 0.819, which can be considered as good value. This value gives weight to the reliability of the questionnaire scale.

II. Factor Analysis

Factor analysis attempts to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables. Factor analysis is often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. Factor Analysis was used to describe the variability among the indicators initially identified through Literature Review, refined after Pilot Study, and tested using questionnaire survey [69]. Factor analysis was conducted on the 33 variables which were mounted on a 5-Point Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree). The following table was generated after subjecting the data to exploratory factor analysis able As seen in the below summary table 2, the 7 factors are formed with number of variables per factor ranging from a minimum of 3 variables (Factor 7) per factor to a maximum of 7 variable per factor (Factor 1). The observation also found the respective factor loadings for each variable. The range of the factor loadings is from minimum = 0.422 to maximum = 0.744. These are good readings, as factor loading $>$. 40 is considered acceptable.

As a result of factor analysis, Indicators are grouped and names are given as per their characteristics. 33 indicators have been grouped in to 7 small factor groups. proper names have been identified for the factors as per their group indictors characteristics.

Factor 1 : Interactive Learning in SBTP-eLE

Interactive learning is a more hands-on, real-world process of relaying information in learning environment. With interactive learning, students are invited to participate in the conversation through technology, or through role-playing group exercises in class. This type of learning increases the

participation in the learning activity, and makes learners feel they are doing something related to the session rather than sitting quiet and listening.

Table 2 Factor Analysis and Reliability Analysis Summary Table

Factor	ID	Indicatores	Factor Loading	Cronbach's
Factor 1 Interactive Learning	Q15	Customized Learning Environment	0.684	0.839
	Q19	Student-faculty communication	0.670	
	Q17	Peer Interactivity	0.652	
	Q14	Collaborative Learning	0.652	
	Q18	Expert Counseling	0.578	
	Q20	Online submissions	0.563	
	Q16	Conference learning	0.532	
Factor 2 Learning Indicators	Q28	Performance Report/Grade Book	0.716	0.824
	Q27	Course Progress Status	0.697	
	Q26	Results with description	0.689	
	Q25	Prior intimation about exams	0.643	
	Q29	Course Feedback	0.506	
Factor 3 Motivational Learning	Q32	Provision of Internship	0.744	0.786
	Q31	Intimation about Opportunities	0.691	
	Q30	Award/Appreciation on completion	0.644	
	Q33	Intimation of Course updates	0.610	
Factor 4 Learning Methods	Q11	Demonstration-based learning	0.556	0.769
	Q13	Non-interactive remote class	0.538	
	Q10	Simulation-based learning	0.506	
	Q12	Problem solving	0.473	
	Q9	Face-to-face course delivery	0.430	
Factor 5 Resource-Based Learning	Q2	Varied study material	0.709	0.720
	Q1	Study Material Availability	0.673	
	Q4	Compatibility of platforms	0.668	
	Q3	Repeatable Instruction Delivery	0.638	
	Q5	Multimedia-based learning	0.484	
Factor 6 Assesment Strategies	Q22	Skill-based Assessments	0.664	0.726
	Q24	On-Field Assignments	0.572	
	Q21	Practice Assessments	0.554	
	Q23	Descriptive/Objective type assessments	0.422	
Factor 7 Learning Material	Q7	Skill supportive material	0.733	0.648
	Q8	Reference material	0.629	
	Q6	Structured learning content	0.562	

Factor 2 : Learning Indicators in SBTP-eLE

Learning Indicators are the provisions on the learning environment to show the day-to-day development of knowledge during the learning period (course of time). They have the ability to identify the fundamental knowledge and skills around which to guide instruction. This is measured by various activities on the learning environment. They are capable of showing their scores, skill level, results information, exam details, and feedback to improve the performance of both learner, and instructors' perspective.

Factor 3 : Motivational Learning in SBTP-eLE

Motivational learning is the ability of the eLearning program environment to keep learners interested in learning, and in the particular course, by means of providing different opportunities, new experiences, expertise, certificates and awards for their achievements. Also to recondition for their accomplishments and encouraging them to participate and take part further, by keeping them updated about the program and activities of the e-learning program.

Factor 4 : Learning Methods in SBTP-eLE

Learning methods are the way, eLearning environment facilitate the students to learn the particular skill-based program. It is about the different types of teaching methods in other ways, different ways, a learner learns the skill concepts to strengthen their expertise or knowledge. In general, the support provided to the learner by the learning environment to achieve their goals by developing approaches to teaching that influence, motivate and inspire students to learn.

Factor 5 : Resource Based Learning in SBTP-eLE

This factor focuses on the course resources and other supportive learning material for main study and additional references. Material availability is one of the most important requirements of a Learner to know what to study, what to refer, and how to revise to understand better. All these requirements could be fulfilled based on the study material of the particular program. A well designed course material helps students to focus better, and learn the desired skill within the stipulated duration.

Factor 6 : Assesment Strategies in SBTP-eLE

Assessment strategies are the key element in the learning environment to measure the students' knowledge and their performance. There are different types of assessments conducted in the eLearning environment. This factor focuses on what types of assessment could help the learner improve his or her skill level.

Factor 7 : Learning Material in SBTP-eLE

The availability of skill supportive material such as lab manual, step by-step guide to carry out a skill task. Provision for further references when additional clarification or examples are required on a particular topic.

III. Application of Analytic Hierarchy Process (AHP)

Analytic Hierarchy Process technique was used to measure the importance of factors. Expert opinion study was conducted to formalize various levels in the maturity framework with respect to the indicators in each factor, as well as the importance of factors themselves. AHP consist of the following processes which includes

- identifying and organizing decision objectives, criteria, constraints and alternatives into a hierarchy;

- evaluating pair-wise comparisons between the relevant elements at each level of the hierarchy; and
- the synthesis using the solution algorithm of the results of the pair-wise comparisons over all the levels.

The Analytic Hierarchy Process (AHP) is a theory of measurement through pair-wise comparisons, The comparisons are made using a scale of absolute judgments that represent how much more one element dominates another with respect to a given attribute.

AHP Expert Opinion Study - AHP Analysis of Factor Indicators

This section briefs the mathematical and theoretical understanding from the teaching material of Prof. Konstantinos, an IT Professor, International Hellenic University, which has been prepared based on the Saaty's method - AHP Analysis. The Analytic Hierarchy Process is due to Saaty, and quite often is referred to as the Saaty method. The comparison matrix defined by Saaty, employs 1-9 scales. The 1-9 scales are illustrated with the following comparison matrix (1) [70].
Comparison Matrices

$$\mathrm{A} = \begin{bmatrix} a_{11} & a_{12} & ... & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \tag{1}$$

Calculation of the Priority Weights

$$\omega_i = \frac{v_i}{\sum_{i=0}^{n} v_i} \tag{2}$$

Where, $v_i = \sum_{j=1}^{n} a_{ij} \qquad \sum_{j=1}^{n} \omega_i = 1$

Consistency test

Calculation of the maximum Eigen value λ_{max} of the judgment matrix;

$$\lambda_{\max=} \frac{1}{n} \sum_{j=1}^{n} \frac{(AW)_i}{W_i} \tag{3}$$

Where A is the judgment matrix; n is the number of rows of the judgment matrix; W is the Eigen vector of the judgment matrix.
Consistency index

$$I_c = \frac{\lambda_{\max} - n}{n-1} \tag{4}$$

Consistency Ratio

$$CR = \frac{CI}{RI} \tag{5}$$

RI is the Random Index number, the average consistency index of index of randomly generated pair-wise comparison matrix of similar size - as per the Saaty calculation procedure of Consistency

Ratio (CR). In this study 3 experts were involved and the 4th expert was involved to get the opinion of expert's opinion's openion and that was used in the research model.

Factor 1 - Interactive Learning of SBTP-eLE.

$$\text{Exp1}=\begin{array}{c} \\ Q_{15} \\ Q_{19} \\ Q_{17} \\ Q_{14} \\ Q_{18} \\ Q_{20} \\ Q_{16} \end{array}\begin{array}{c} \begin{array}{ccccccc} Q_{15} & Q_{19} & Q_{17} & Q_{14} & Q_{18} & Q_{20} & Q_{16} \end{array} \\ \begin{bmatrix} 1 & 1/2 & 1/5 & 1/9 & 1/7 & 1/7 & 1/8 \\ 2 & 1 & 1/2 & 1/9 & 1/5 & 1/9 & 1/9 \\ 5 & 2 & 1 & 1/9 & 1/9 & 1/9 & 1/9 \\ 9 & 9 & 9 & 1 & 1 & 1 & 1 \\ 7 & 5 & 9 & 1 & 1 & 1/2 & 1/3 \\ 7 & 9 & 9 & 1 & 2 & 1 & 1 \\ 8 & 9 & 9 & 1 & 3 & 1 & 1 \end{bmatrix} \end{array} \qquad \text{Exp1}=\begin{array}{c} \\ Q_{15} \\ Q_{19} \\ Q_{17} \\ Q_{14} \\ Q_{18} \\ Q_{20} \\ Q_{16} \end{array}\begin{array}{c} \begin{array}{ccccccc} Q_{15} & Q_{19} & Q_{17} & Q_{14} & Q_{18} & Q_{20} & Q_{16} \end{array} \\ \begin{bmatrix} 1 & 1/2 & 1/5 & 1/9 & 1/7 & 1/7 & 1/8 \\ 2 & 1 & 1/2 & 1/9 & 1/5 & 1/9 & 1/9 \\ 5 & 2 & 1 & 1/9 & 1/9 & 1/9 & 1/9 \\ 9 & 9 & 9 & 1 & 1 & 1 & 1 \\ 7 & 5 & 9 & 1 & 1 & 1/2 & 1/3 \\ 7 & 9 & 9 & 1 & 2 & 1 & 1 \\ 8 & 9 & 9 & 1 & 3 & 1 & 1 \end{bmatrix} \end{array}$$

$$\text{Exp3}=\begin{array}{c} \\ Q_{15} \\ Q_{19} \\ Q_{17} \\ Q_{14} \\ Q_{18} \\ Q_{20} \\ Q_{16} \end{array}\begin{array}{c} \begin{array}{ccccccc} Q_{15} & Q_{19} & Q_{17} & Q_{14} & Q_{18} & Q_{20} & Q_{16} \end{array} \\ \begin{bmatrix} 1 & 1/2 & 1/2 & 1/5 & 1/8 & 1/8 & 1/9 \\ 2 & 1 & 1 & 1/3 & 1/2 & 1/2 & 1/6 \\ 2 & 1 & 1 & 1/9 & 1/2 & 1/5 & 1/8 \\ 5 & 3 & 9 & 1 & 2 & 4 & 1 \\ 8 & 2 & 2 & 1/2 & 1 & 2 & 1/4 \\ 8 & 2 & 5 & 1/4 & 1/2 & 1 & 1/8 \\ 9 & 6 & 8 & 1 & 4 & 8 & 1 \end{bmatrix} \end{array}$$

The procedures was followed for the remaining factors Factor 2 to Factor 7 and separately conducted for All factors.

AHP for All 7 Factors of SBTP-eLE:

$$\text{Exp 3}=\begin{array}{c} \\ F_1 \\ F_2 \\ F_3 \\ F_4 \\ F_5 \\ F_6 \\ F_7 \end{array}\begin{array}{c} \begin{array}{ccccccc} F_1 & F_2 & F_3 & F_4 & F_5 & F_6 & F_7 \end{array} \\ \begin{bmatrix} 1 & 5 & 7 & 2 & 1 & 4 & 4 \\ 1/5 & 1 & 1 & 1/3 & 1/2 & 2 & 1/4 \\ 1/7 & 1 & 1 & 1/8 & 1/5 & 1/2 & 1/6 \\ 1/2 & 3 & 8 & 1 & 2 & 7 & 1/2 \\ 1 & 2 & 5 & 1/2 & 1 & 3 & 1/3 \\ 1/4 & 1/2 & 2 & 1/7 & 1/3 & 1 & 1/7 \\ 1/4 & 4 & 6 & 2 & 3 & 7 & 1 \end{bmatrix} \end{array}$$

The final AHP Expert opinion study was conducted during May - June 2013 with the fourth SBTP-eLE practitioner. Studies with three SBTP-eLE practitioners were then discussed with the fourth expert. The fourth practitioner expressed satisfaction over the indicator / factor importance levels established by Expert-I Hence, the following matrixes depict the final importance levels validated through the AHP Expert Opinion Study.

Table 3: Ranking Factor1- Interactive Learning's Indicators of SBTP-eLE using AHP method

Indicator	Q15	Q19	Q17	Q14	Q18	Q20	Q16	Eigen Vector	Consistency Index	Consistency Ratio	Rank
Q15	1	0.500	0.200	0.111	0.143	0.143	0.125	0.023460999			**1**
Q19	2.000	1	0.500	0.111	0.200	0.111	0.111	0.030610303			**2**
Q17	5.000	2.000	1	0.111	0.111	0.111	0.111	0.044667082			**3**
Q14	9.000	9.000	9.000	1	1	1	1	0.233918304	0.091039590	0.068969386	**7**
Q18	7.000	5.000	9.000	1	1	1	1	0.210495717			**4**
Q20	7.000	9.000	9.000	1	2.000	1	1	0.226592296			**5**
Q16	8	9.000	9.000	1	3.000	1	1	0.230255300			**6**

As the Consistency Ratio* (CR) < 0.1 hence the judgement for factor Interactive Learning of SBTP-eLE are perfectly consistent.

Table 4: Ranking Factor2- Learning Indicator's using AHP method

Indicator	Q28	Q27	Q26	Q25	Q29	Eigen Vector	Consistency Index	Consistency Ratio	Rank
Q28	1	1	0.200	1	7.000	0.146125916			2
Q27	1	1	0.500	1	7.000	0.176832659			4
Q26	5.000	2.000	1	7.000	9.000	0.495947597	0.089395619	0.079817517	5
Q25	1	1	0.143	1	9.000	0.152398225			3
Q29	0.143	0.143	0.111	0.111	1	0.028695603			1

As the Consistency Ratio* (CR) < 0.1 hence the judgement for factor Learning Indicators of SBTP-eLE are perfectly consistent.

Similarly it is repeated for 7 factors and separately conducted for all factors.

Table 5: Ranking of All SBTP-eLE Factors using AHP method

Indicator	F1	F2	F3	F4	F5	F6	F7	Eigen Vector	Consistency Index	Consistency Ratio	Rank
F1	1	8	8	1	2.000	9.000	1	0.256494218			7
F2	0.125	1	5.000	0.143	0.333	5.000	0.111	0.063704682			3
F3	0.125	0.200	1	0.125	0.111	2.000	0.143	0.028396336			2
F4	1	7.000	8	1	1	7.000	1	0.218635903	0.094606616	0.071671679	5
F5	0.500	3.000	9.000	1	1	5.000	1	0.176207471			4
F6	0.111	0.200	0.500	0.143	0.200	1	0.111	0.024056902			1
F7	1	9.000	7.000	1	1	9.000	1	0.232504487			6

As the Consistency Ratio* (CR) < 0.1 hence the judgement for all factors of SBTP-eLE are perfectly consistent.

Importance Levels are nominated from highest to Lowest in decreasing order importance.

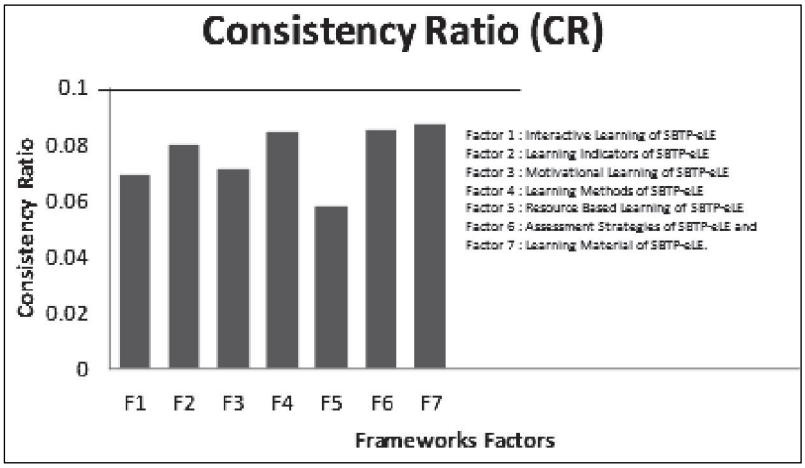

Figure 1 Calculations - Consistency Ratio (CR) for 7 factor groups

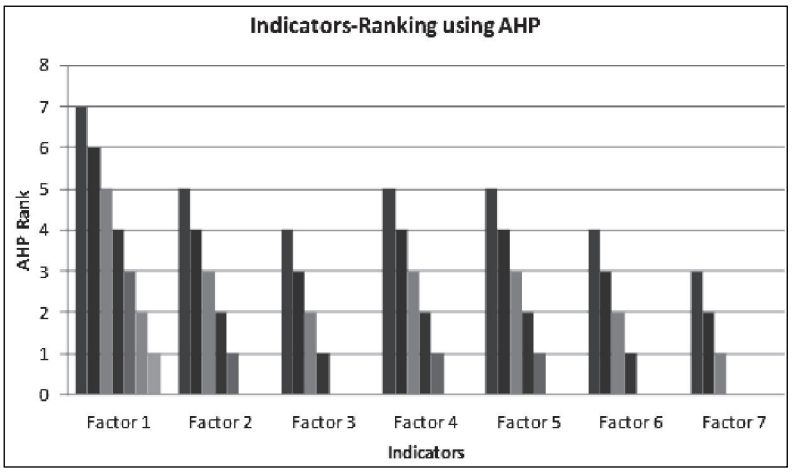

Figure 2 SBTP-eLE Indicators Ranking using AHP

Factor 1 – Interactive Learning
Student-faculty communication 7
Peer Interactivity 6
Collaborative Learning 5
Expert Counseling 4
Customized Learning Environment 3
Conference learning 2
Online submissions 1
Factor 2 – Learning Indicators
Results with description 5
Performance Report/Grade Book 4
Course Progress Status 3
Prior intimation about exams 2
Course Feedback 1
Factor 3 – Motivational Learning
Award/Appreciation on completion 4
Provision of Internship 3
Intimation about Opportunities 2
Intimation of Course updates 1
Factor 4 – Learning Methods
Demonstration based learning 5
Face-to-face course delivery 4
Non-interactive remote class 3
Simulation based learning 2
Problem solving 1

Factor 5 – Resource Based Learning
Study Material Availability 5
Repeatable Instruction Delivery 4
Compatibility of platforms 3
Multimedia based learning 2
Varied study material 1
Factor 6 – Assessment Strategies
Practice Assessments 4
Descriptive/Objective type assessments 3
On Field Assignment 2
Skill based Assessments 1
Factor 7 – Learning Material
Structured learning content 3
Skill supportive material 2
Reference material 1
All Factor Ranking
Factor 3-Motivational Learning 7
Factor 4-Learning Methods 6
Factor 7-Learning Material 5
Factor 1-Interactive Learning 4
Factor 2-Learning Indicators 3
Factor 5-Resource Based Learning 2
Factor 6-Assessment Strategies 1

Discussions

SBTP-eLE research findings increasing acceptance from users perspectives. This research work was undertaken to gain a deeper understanding of issues facing users in SBTP-eLE learning. This

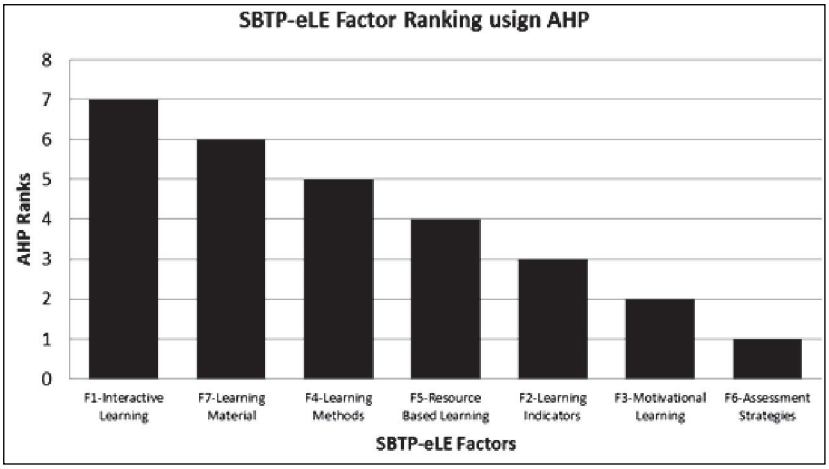

Figure 3 Ranking of Indicators individually and All Factors using AHP method

research has identified 33 research indicators that relate to the user perspectives on SBTP-eLE environment. This research has identified 7 factors groupings of given set of research indicators. These factors could provide important perceptions on any given SBTP-eLE environment. The AHP rakings could be used as weights while calculation the maturity of the learning environment.

Conclusions

The seven factor groupings derived by this research could provide very important parameters to study and improve SBTP-eLE environments. This research has demonstrated the use of Analytic Hierarchy Process (AHP) to identify relative importance of research indicators and factors. The research has provided a unique understanding of the relative importance of factors among factor groups - Interactive learning and Learning Indicators are more important aspects of SBTP-eLE as compared to other factors listed in this work. The final expert interaction in this study was instrumental in the application of the Analytic Hierarchy Process (AHP) to research framework. It was required to endorse the importance levels/ranks of each indicator included in each of the statistically derived factor groups as well as the importance levels/ranks of each of the factor groups themselves. Hence expert studies were conducted wherein the findings from interactions with two experts were validated through professional opinion of the fourth expert. The experience of true SBTP-eLE practitioners cannot be replaced by any research paper and nor can any research article can effectively extract that experience. In other words, there is no alternative to such discussions with the mentioned 33 indicators.

Future Research

SBTP-eLE practitioners are broadly classified into two categories - SBTP-eLE users/learners and SBTP-eLE developers. SBTP-eLE developers are the individuals who are responsible to develop the learning. The research framework has not included any perspectives of SBTP-ELE developers and concentrates completely on SBTP-ELE users. This is the most notable limitation of the Research Framework.

Acknolowdgement

The author wishes to acknowledge the Expert Examiners of this Research Study Dr Padmavathi Ganapathi, Professor and Head, Department of Computer Science, Avinashilingam Institute of Home Science and Higher Education for Women, Coimbatore, and Dr C R Hema, Dean, Faculty of Engineering, Karpagam University, Coimbatore for their constant advice, input and encouragement in accomplishing the research phases.

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The Quality Flavor in Software Project Management

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Abstract

Software Quality Assurance is gaining lot of importance in Software Industry and is identified as the key to consistently successful delivery. There is a lot of thrust from the management of the organizations as well as customers to implement right and effective processes and practices in software projects. Many organizations are adopting industry accepted standards and models like ISO 9001 and CMMI to benchmark and improve their processes. Software Quality Assurance is a proactive focusing on the principle 'doing it right first time'. The Software Quality Assurance function focuses on improvements at project level and organizational level by standardizing the processes, indicators and activities, implement and continuously improving upon them. These will ultimately lead to the long term success of the business.

Key Words

Processes, Software Quality Assurance, CMMI, ISO

Introduction to Software Quality Assurance (SQA)

Success of the organization relies on the growth as well as the continuous sustenance in the business. For software organizations, the success depends on the repeatability and reproducibility of a successful software delivery. The confidence of a representative while speaking to a customer depends on how well can the organizations delivers a given commitment. This depends on the confidence of the organization on software processes, which ensures the successful drive through the challenging software development scenario. Software Quality Assurance is the proactive activity of developing robust software processes; implementation of these and sustaining and maintaining it.

Software Quality Assurance is an emerging domain in Software Industry which includes the broad spectrum of process development, process implementation, its sustenance and continuous improvement. This is one function that provides the organization confidence while discussing with the customers on the continued delivery of good quality product, on time, every time.

Software Quality Assurance is proactive activity which requires everyone in the software project organization. Everyone has to play whole heartedly their role in the implementation of software process. Though SQA is a professional field requiring specialized skills and knowledge, this function requires whole hearted support from everyone in the organization.

Various Activities in Software Quality Assurance:

- Process Definition - This includes defining non-existing process or modifying the existing process in line with the operational changes or based on benchmarking with standard industry best practices and models. In software organizations, process definition will be handled by a specialized team, and will generally be smaller in size.
- Process Implementation - This is the big chunk of the SQA function. The implementation and maintenance are carried out by software project teams with the support of specialized quality assurance professionals. The implementation involves lot of handholding, pursuing and support. This is the most challenging part of the SQA function as this role requires lot of interpersonal and communication skills.
- Process Monitoring: Process Monitoring is performed by specialized group of statically inclined people who will define the various measures, define baselines as well as track them. They track the 'health indicators' (metrics) of the software projects and report this to the top management.
- Process Feed Back: Feedback on the maturity of the process and its effectiveness of implementation are provided by specialized professionals who audit software processes. They verify the compliance of the projects with respect to the defined quality management system, identify the gaps in definition and implementation, and thereby support the organization in its continuous improvement activities.

Review of Related Literature

Brooks (1995) points that software quality has become important in recent days due to increased security concerns arising from software vulnerabilities and observes that the business community also watches closely on software malfunctions. He also reports a survey where 97% of the 800 managers surveyed reported software flaws in their systems in the past year. More than 90% blamed faulty software for lost revenue or higher costs. Abdulrahman Alshamlan (2005) suggests that the development of the new applications and systems with intangibility and complexity will increase the importance of measuring the quality of software. He concludes that standards like ISO 9000 series concern with the certification of development process and governing quality systems.

According to Jorgensen (1999) software quality is identified by a set of quality factors. Cotterell M and Hughes B (1998) say that quality management systems (QMS) are a set of quality factors that are created to ensure standardizations. Easwar Nyshadham and Janaki Krishnamurthy (2012) say that it is common that software development projects fail to meet project objectives such as schedule, quality and budget with alarming regularity and observes that out of these three objectives, software quality is difficult to define in tangible terms. Stavrinoudis et al (2005) points that addressing quality issues later in the software development cycle is lot more expensive than addressing them early.

Moses (2009) suggests that standards such as ISO 9001 emphasize that user opinions has to be integrated into quality measurements and the subjective nature of quality measures need attention. The book 'The Guide to The CSQA Common Body of Knowledge V 6.1 Hand Book' from QAI says meeting requirements is a producer's view of quality. The book further say that requirements must be defined in a measurable format, so as to determine whether they have been

met. Rajiv Banker , Hsihui Chang and Surya Janakiraman (2004) state that to survive and to face competition in the age of information, companies must use measurement systems derived based on their strategies and capabilities.

Mohammad Ahmed (2011) proposes a different dimension by stating that project's quality is managed by evaluating the accuracy of the results in line with the quality policy and objectives and adds that quality is managed by implementing quality at every level of the project, which is supported employing tools for evaluating the quality and managing it through every process.

He further states that quality is planned by identifying the requirements of quality and developing clear and written procedures as well as tools and techniques to achieve them. He identifies that quality assurance is performed by managing quality tools and techniques to ensure effective implementation of quality plans with the aim of continuous improvement. He also says that quality is monitored and controlled by evaluating the results against quality plans and appropriate actions are taken to ensure compliance with the plans.

Ben-Menachem (1996) identifies that competitiveness of the organization is largely dependent on their abilities to use software as a competitive weapon. What is making the competitive landscape more complex is the kind of pressures organizations are facing in terms of time to market, new features, cost and, of course, quality and reliability.

Importance of Software Quality Assurance

QAI, in their hand book for CSQA body of knowledge identifies two quality gaps: The Producer's gap and the consumer's gap. The producer gap is the difference between what is specified versus what is delivered). The customer gap is the difference between what the producers actually delivered versus what the customer wanted.

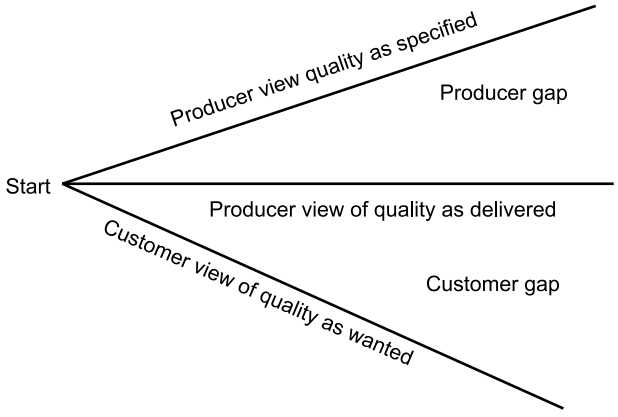

Figure 1 Two Quality Gaps

Closing these gaps is the responsibility of the quality function. The quality function must first improve the processes to the point where the producer can develop the products according to requirements received and its own internal standards. This helps enables the software project to provide its customers consistency in what it can produce.

Closing the second gap requires the quality function to understand the true needs of the customer. They have to modify the processes such that it can reduce the customer gap, and thus help the organization to produce products and services required by the customer.

Most Organizations have the software Quality Assurance function built based on the famous Dr. Shewhart's PDCA cycle. The processes are developed, implemented and modified continuously to ensure the continuous improvement of productivity and efficiency. The goals set for projects are reviewed and the organization supports its implementation through its robust and updated process.

Developing and implementation of a process library covering all areas of a software project is a painful asset building activity. When the organization starts from the scratch, it has to depend on industry standards, best practices and peer organizations for support. However, merely copying a process will not help in succeeding. It needs a strong commitment, attitude and support and dedication from senior most level of management in the organization. Because of this reason, most organizations keep software quality function as an independent organization.

Figure 2 PDCA Cycle

The ISO 9001 Standard

Many QA standards and models exist with a large number of choices. The ISO 9001 developed by the International organization for Standardization calls for requirements for a quality management system and its implementation. The key notion is that they provide guidelines for conducting audits, testing activities, and for process improvement.

Expected requirements in ISO 9001are organized into various clauses and sub clauses. There are 8 major clauses to be adhered, and the main clauses span from clause 4 to clause 8.In clause 7, the standard defines requirements related to developing and delivering the product. There are planning requirements, and requirements related to determining the customer's needs. There are requirements for design and development activities, and requirements related to acquisition-when components of the product are purchased. There are requirements related to delivering/providing the product. And there are requirements related to the control of monitoring and measuring devices.

The CMMI Model

The Capability Maturity Model Integration (CMMI) is a process enhancement model created by Software Engineering Institute (SEI) with evolutionary maturity levels implanted in it. It works based on the basis principle of close correlation among quality of software product and quality of the software development process.

The CMMI approach classifies the maturity of the software organization and practices into five levels describing an evolutionary process from chaos to discipline:

The five levels can be briefly described as:

1. **Initial:** The software process is characterized as ad hoc, and occasionally even chaotic. Few processes are defined, and success depends on individual effort and heroics.
2. **Repeatable:** Basic project management processes are established to track cost, schedule, and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.

3. **De ned:** The software process for both management and engineering activities is documented, standardized, and integrated into a standard software process for the organization. Projects use an approved, tailored version of the organization's standard software process for developing and maintaining software.
4. **Managed:** Detailed measures of the software process and product quality are collected, analyzed, and used to control the process. Both the software process and products are quantitatively understood and controlled.
5. **Optimizing:** Continual process improvement is enabled by quantitative feedback from the process and from piloting innovative ideas and technologies.

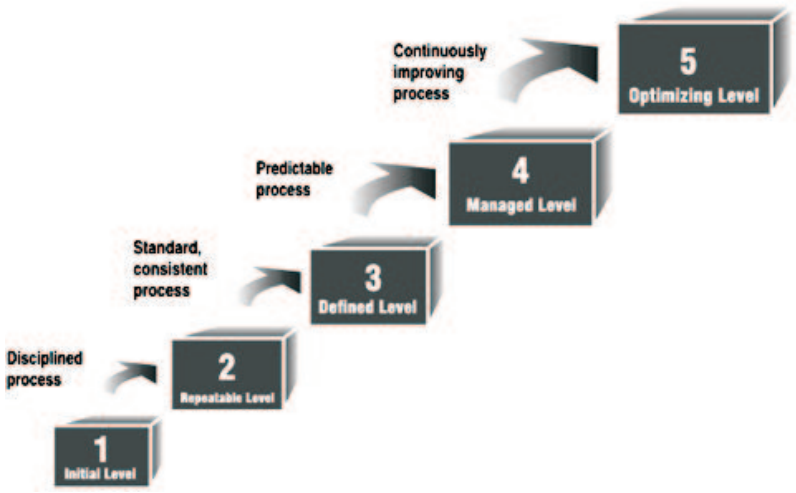

Figure 3 CMMI Levels

Trends in Software Quality Assurance

Software quality assurance is currently identified as a specialized function like software project management that requires its own sets of competencies. Some of them include good communication and interpersonal skills, influencing and selling skills, observation and an eye for detail. A good QA person needs to possess a good skill to read numbers, easily communicate across various levels of management and push projects towards quality and success. Because of these reasons, organizations hire specialized people with special skills, competencies and attitudes.

Many organizations focus on automation of the SQA function and invest heavily in tools and techniques that help to develop processes and implement the same. Larger and complex organizations either buy tools from vendors or develop their own tools. They treat these as strategic investment that will support in the continuous growth of the organization.

Organizations also focus on improving their own 'competency' by getting certified to various standards and models like ISO 9001, CMMI, ASPICE, ISO 27001 etc. More and more customers are treating these certifications as 'entry points' to the budding process, which indirectly helps to improve the quality assurance practices in the organization.

More and more organizations are outsourcing quality assurance practices and this has become a focus of strategic consultancy for many IT organizations. The extend of outsourcing varies from mere support of project level activates to the full spectrum of process development, implementation and maintenance.

Software Quality Assurance as Element of Strategic Success

Software Quality Assurance has gained lot of strategic importance and many organizations are investing on recruiting right professionals and spend effort and budget on continuous improvement programs and external certifications. Organizations have realized that consistency of successful delivery depends on the strength of the processes and practices in the organization, which in turn is an integral part of software quality assurance.

Organizations are setting project level quality and performance goals derived from the business goals focusing on the quality, cost and defect reduction, as the cost saving and revenue increase will depend on the increase in productivity and reduction of defects.

The importance of quality has been accepted to the extent that quality teams will be reporting directly to the senior most level of management in many organizations. This gives the quality team adequate freedom in independently evaluate, analyze and report issues and implement solutions.

Quality teams are getting involved right from the beginning of the projects, so that they can support in the definition of the right processes as following the right process is the key to successful project delivery.

Conclusion

SQA function supports dynamic and challenging area of software development, controlled by many tangible and intangible elements. One cannot manage a project and take it to success only based on the experience. It requires lot of effort in streamlining the processes and lot of attention in institutionalize them. Continued success is assured only by a well defined matured process and an effective usage of it. Matured processes also ensure uniformity of approach and reduces operational and non-value adding costs. In a highly competitive market environment, the long term success of the organization depends on the extent to which it succeeds in cost reduction; improve the operational efficiency and productivity and reduce the turnaround time for delivery. Achieving these goals depends on the efficiency and effectiveness of the Software Quality Assurance function, which will support the organization to move from one level to the next level of performance improvement.

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Sustainable Production of Sugarcane Crop Utilizing Papermill Effluent and Solid Wastes

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Introduction

Sustainable crop production provides opportunities for optimizing crop production per unit area, taking into consideration the range of sustainability aspects includint potential and real social, political, economical and environmental impacts. Recent trends would indicate that the incorporation of scientific principles of ecosystem management into farming practices can enhance crop production (yield).

The pulp and paper industry is one of the largest consumers of water. Nearly 80% of fresh water used in the pulp and paper mill is discharged as effluent containing organic and inorganic pollutants requiring treatment and disposal. The treated paper mill effluent application to lands is considered to be an innovative approach for its disposal. By this, the effluent is not only kept out of the surface waters, but also implies in recycling where pollutant becomes the nutrients for plant growth, thus reducing the pollution problems.

Disposal of solid wastes is a major problem for most paper industries. Burning and land filling are the most common methods of disposal. During the last decade, there has been increasing concern regarding the disposal of wastes at landfill sites due to increased landfill costs and difficulties in acquiring new landfill sites. But due to the high content of organic matter in pulp and paper mill solid wastes, composting and land application as organic manure substitute are attractive alternatives to disposal.

The fly ash, press mud, bio sludge and lime sludge are some of the solid wastes /by products generated from paper mill which have nutrient elements, manurial and ameliorative potentials that can be profitably exploited for sustainable agriculture.

The Seshasayee Paper and Boards Limited (SPB), Erode, Tamilnadu is a pioneer in using bagasse, a residue left after extraction of sugar from sugarcane, for the manufacture of paper. SPB promoted a sugar mill, namely Ponni Sugars (Erode) Ltd., and recycle in an eco-friendly way the sugarcane residue (bagasse) for paper making. Apart from the treated effluent, which is discharged into nearly 1500 acres of land, huge amounts of solid wastes viz., Bio sludge (2.3 t d^{-1}), Fly ash (2-3 t d^{-1}), lime sludge (60-80 t d^{-1}) are also generated from different sections of this paper mill, which have lot of potential for reuse in agriculture.

Hence, detailed investigations were undertaken to assess the efficiency of utilizing paper mill effluent and solid wastes for crop production.

Materials and methods

The present investigation was carried out in the Department of Environmental Sciences, Tamil Nadu Agricultural University, Coimbatore and in the farmer's fields at Pappampalayam, Erode during 2003-2005.

Field location

The experiment was also laid out in Mr. Ravigangadharan's field at Pappampalayam, Erode.

Crop and variety

The sugarcane variety CO 86032 was used for this study. It is a cross selection between CO 62198 and COC 671

Experimental details

The field experiment was laid out in split plot design with three replications

Treatment details

1. **Main plot treatments - Irrigation sources**

   I_1 - Well water irrigation

   I_2 - Treated effluent irrigation
2. **Subplot treatments - Solid wastes**

   T_1 - Control (100% NPK)

   T_2 - Biosludge 12.5 t ha-1 75% NPK

   T_3 - Pressmud 12.5 t ha-1 + 75% NPK

   T_4 - Flyash 20 t ha-1 + Biosludge 6 t ha-1 + 75% NPK

Results and Discussion

Impact of effluent irrigation on yield

The effluent irrigation increased the cane yield by 5.78% compared to well water irrigation. The number of millable canes was 5.53% higher under effluent irrigation than under well water irrigation which could be due to the favourable influence of the effluent and the ameliorating effect of the amendments on the effluent irrigation.

Impact of solid wastes on yield

Among the treatments, the treatment (T4) which received Fly ash 20 t ha-1 + Bio sludge 6 t ha-1 + 75% NPK, under effluent irrigation (I2) registered the highest yield nearly 30.9 per cent over that of I1T1 (receiving 100% NPK under well water irrigation). The increase in yield of millable

canes could be due to the enrichment of soil by the addition of fly ash which contained appreciable amounts of plant nutrients coupled with the nutrient from the combined use of effluent along with amendments which enhanced the soil fertility. The above findings are in line with those of Reddy et al. (1981), Pushpavalli (1990) and Hameed Sulaiman and Udayasoorian (1998). Fertilizer being a high-cost input, it has been clearly brought out that with a 25% saving of fertilizer cost, an additional yield increase of 30.9% could be achieved by the combined incorporation of fly ash and bio sludge. Press mud 12.5 t ha^{-1} + 75% NPK increased cane yield by 20.0% followed by bio sludge + 75% NPK which contributed to 15.3% higher yield than 100% NPK alone, both the treatments also ensured 25% saving in the fertilizer cost.

Similarly, all the yield parameters such as stem girth, number of internodes, height of millable canes, germination and tillering capacity were also higher under effluent irrigation and Fly ash + Bio sludge application followed by press mud and then by bio sludge alone compared to 100% NPK.

Soil Organic Carbon

The increase being 6.8 per cent in the effluent irrigated plots compared to well water irrigated plots. The increase in organic carbon content of the treated effluent irrigated soil might be due to the addition of suspended and dissolved solids present in the effluent. The organic carbon content revealed significant differences and the highest content was recorded in the treatment receiving the solid by product Fly ash + Bio sludge both in effluent irrigated and well water irrigated plots which was 45% and 40% over T1 respectively. This was in agreement with the findings of several workers (Rajannan and Oblisami, 1979; Somashekar *et al*., 1984; Kannan and Oblisami, 1990; Dhevagi, 1996; Sagaya Alfred, 1998).

Available nutrients

All the available nutrients in treated effluent irrigated soil recorded a significant change over well water irrigated soil. Treatment receiving treated effluent irrigation resulted in higher quantities of available nutrients. The available N content of the soil under effluent irrigation increased to the tune of 5.52 per cent of the harvest time compared to that under well water irrigation).The findings were in tandem with those of Dhevagi et al. (2000). Rajannan and Oblisami (1979) who reported that paper factory effluent irrigation increased the available nutrient status of red and black soils.

Highest availability of available N in the soils receiving Fly ash + Bio sludge combination of solid wastes clearly indicated the efficient mineralization and utilization of inorganics in the presence of organics. This corroborates with the findings of Bache Byron and Heathote (1969) who reported that application of organic materials increased the organic carbon and available nitrogen in soils.

The available phosphorus content in the soil was the highest in the plots receiving effluent irrigation and press mud 12.5 t ha^{-1} + 75% NPK (I2T3) which recorded 2.2 fold higher available phosphorus than I_1T_1. This was due to the presence of about 2.20 per cent and 0.74 per cent of phosphorus present in press mud and bio sludge respectively. Singh and Yadav (1986) observed a significant increase in residual phosphorus in soil due to addition of press mud. Hence, press mud application to soils having high P fixing capacity could be viable option to enhance the soil available P status.

The available potassium content in the soil with respect to I_2T_4 (effluent irrigated plot receiving 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK) was higher to the tune of 35.7 per cent compared to I1T1 (well water irrigation receiving 100% NPK alone). In general, the fly ash was found to be a cheap and good source of plant nutrients. The results were in tandem with the findings of Birajder *et al*. (2000) and Sahoo and Kar (1998). The inference of Fly ash being a source of nutrients especially available N, P and K the present study was corroborated with the findings of Anjali Deshmukh *et al*. (1999).

Conclusion

The paper mills produce huge quantities of effluent and solid wastes. The efficient utilization of these wastes in an eco-friendly way, is the need of the hour. In the present investigation the treated effluent and solid wastes from the paper mill are agro cycled for the production of sugarcane through the conduct of field experiments.The effluent irrigation increased the cane yield by 5.78% compared to well water irrigation. The number of millable canes were 5.53% higher under effluent irrigation than under well water irrigation.Among the treatments, I_2T_4 which received Fly ash 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK, under effluent irrigation registered the highest yield of 30.9 per cent over I1T1 (receiving 100% NPK under well water irrigation). Fertilizer being a high-cost input, it has been clearly brought out that with a 25% saving of fertilizer cost, an additional yield increase of 30.9% could be achieved by the combined incorporation of fly ash and bio sludge.

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Tables

1. **Physico chemical characteristics of the secondary treated paper mill effluent**

S.No.	Parameters	Units	Range of values
1.	Color	CU	150
2.	pH	-	7.1-7.6
3.	EC	dSm^{-1}	0.9-1.3
4.	TSS	mg L^{-1}	20-30
5.	TDS	mg L^{-1}	680-710
6.	BOD	mg L^{-1}	10-14
7.	Calcium	mg L^{-1}	196-216
8.	Magnesium	mg L^{-1}	90-146
9.	Sodium	mg L^{-1}	123-137
10.	Potassium	mg L^{-1}	18-19
11.	Chloride	mg L^{-1}	170.4
12.	Sulphate	mg L^{-1}	124-132
13.	Carbonate	mg L^{-1}	0
14.	Bicarbonate	mg L^{-1}	98-146
15.	Soluble sodium	%	19-24
16.	Ammoniacal nitrogen	mg L^{-1}	28-30

2. **Characteristics of the solid wastes from paper mill used in the experiments**

S.No.	Characteristics	Press mud	Fly ash	Bio sludge	Lime sludge
1.	pH	7.11	8.32	7.24	11.31
2.	EC (dS m^{-1})	1.53	3.03	2.14	4.01
3.	Organic Carbon (%)	23.5	4.17	20.64	0.97
4.	Total N (%)	1.03	0.48	1.41	0.01
5.	Total P (%)	2.20	0.28	0.74	0.02
6.	Total K (%)	0.87	0.93	1.21	0.79
7.	Calcium (%)	1.61	1.54	2.98	12.75
8.	Magnesium (%)	0.39	0.39	1.12	2.28
9.	Sodium (%)	0.035	0.041	0.13	0.21
10.	C:N ratio	22.8	8.69	14.6	97.0

3. **Initial characteristics of Sugarcane experimental field**

S.No.	Parameters	Value
1.	pH	7.52
2.	EC (dS m^{-1})	0.80
3.	Total N(%)	0.32
4.	Total P (%)	0.41
5.	Soil Available N (kg ha^{-1})	184
6.	Soil Available P (kg ha^{-1})	10.4
7.	Organic Carbon (%)	0.48
8.	Exchangeable Ca [c mol (p^{+}) kg^{-1}]	7.58
9.	Exchangeable Mg [c mol (p^{+}) kg^{-1}]	3.30
10.	Exchangeable Na [c mol (p^{+}) kg^{-1}]	1.83
11.	Exchangeable K [c mol (p^{+}) kg^{-1}]	1.12

4. **Yield parameters of sugarcane at harvest as influenced by effluent irrigation and solid wastes application at harvest**

Treatments	Stem girth (cm)	Number of internodes	Internodal distance (cm)	Number of millable canes	Height of millable canes (cm)	Yield (kg / plot)
I_1T_1	7.3	19.0	9.3	130.0	225.1	275.0
T_2	8.8	20.0	10.2	165.0	232.5	315.0
T_3	9.2	21.0	11.5	170.0	250.2	318.0
T_4	10.0	21.0	13.4	185.0	258.1	322.0
Mean	**8.8**	**20.3**	**11.1**	**162.5**	**241.5**	**307.5**
I_2T_1	8.3	20.0	10.5	135.0	238.3	294.0
T_2	9.0	22.0	12.3	168.0	246.8	317.0
T_3	9.3	24.0	14.4	185.0	257.3	330.0
T_4	10.3	24.0	15.3	198.0	265.7	360.0
Mean	9.2	22.5	13.1	171.5	252.0	325.3

I_1 - Well water irrigation
T_1 - Control (100% NPK)
T_3 - Press mud 12.5 t ha^{-1} + 75% NPK

I_2 - Effluent irrigation
T_2 - Bio sludge 12.5 t ha^{-1} + 75% NPK
T_4 - Fly ash 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK)

5. **Soil organic carbon (%) as influenced by effluent irrigation and solid wastes application under sugarcane crop**

Treatments	30 D	60 D	90 D	170 D	240 D	300 D	Harvest	Mean
I_1T_1	0.51	0.56	0.59	0.61	0.63	0.65	0.65	0.60
T_2	0.60	0.65	0.68	0.74	0.78	0.81	0.83	0.73
T_3	0.65	0.70	0.74	0.77	0.82	0.85	0.87	0.77
T_4	0.71	0.77	0.79	0.85	0.89	0.92	0.94	0.84
Mean	**0.62**	**0.67**	**0.70**	**0.74**	**0.78**	**0.81**	**0.82**	**0.73**
I_2T_1	0.56	0.61	0.63	0.68	0.71	0.73	0.75	0.67
T_2	0.63	0.69	0.74	0.77	0.82	0.85	0.87	0.77
T_3	0.67	0.74	0.78	0.83	0.88	0.90	0.91	0.82
T_4	0.74	0.79	0.84	0.88	0.92	0.94	0.95	0.87
Mean	**0.65**	**0.71**	**0.75**	**0.79**	**0.83**	**0.86**	**0.87**	**0.78**

I_1 - Well water irrigation I_2 - Effluent irrigation

T_1 - Control (100% NPK)

T_2 - Bio sludge 12.5 t ha^{-1} + 75% NPK

T_3 - Press mud 12.5 t ha^{-1} + 75% NPK

T_4 - Fly ash 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK)

6. Soil available nitrogen (kg ha^{-1}) as influenced by effluent irrigation and solid wastes application under sugarcane crop

Treatments	30 D	60 D	90 D	170 D	240 D	300 D	Harvest	Mean
I_1T_1	188	185	182	182	168	165	160	176
T_2	192	187	187	183	172	170	165	179
T_3	193	191	191	188	177	172	168	183
T_4	196	195	195	193	181	177	173	187
Mean	**192**	**190**	**189**	**187**	**175**	**171**	**167**	**181**
I_2T_1	194	192	192	189	180	175	171	185
T_2	196	194	194	191	185	179	174	188
T_3	201	199	199	195	189	183	179	192
T_4	207	206	206	204	197	194	190	201
Mean	**200**	**198**	**198**	**195**	**188**	**183**	**179**	**191**

I_1 - Well water irrigation I_2 - Effluent irrigation

T_1 - Control (100% NPK)

T_2 - Bio sludge 12.5 t ha^{-1} + 75% NPK

T_3 - Press mud 12.5 t ha^{-1} + 75% NPK

T_4 - Fly ash 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK)

7. **Soil available phosphorus (kg ha^{-1}) as influenced by effluent irrigation and solid wastes application under sugarcane crop**

Treatments	30 D	60 D	90 D	170 D	240 D	300 D	Harvest	Mean
I_1T_1	10.7	10.3	9.8	9.3	8.9	8.4	6.8	9.2
T_2	13.5	12.9	12.1	11.6	11.1	10.4	8.9	11.5
T_3	20.7	20.3	19.8	19.2	18.7	18.5	16.8	19.1
T_4	18.5	18.2	17.8	17.4	16.8	16.3	14.7	17.1
Mean	**15.9**	**15.4**	**14.9**	**14.4**	**13.9**	**13.4**	**11.8**	**14.2**
I_2T_1	10.9	10.4	10.1	9.7	9.2	8.7	6.8	9.4
T_2	14.6	14.3	13.8	13.3	12.7	12.5	10.8	13.1
T_3A	21.3	21.1	20.8	20.3	20.1	19.9	18.2	20.2
T_4	19.7	19.3	18.8	18.2	17.8	17.5	16.1	18.2
Mean	**16.6**	**16.3**	**15.9**	**15.4**	**15.0**	**14.7**	**13.0**	**15.2**

I_1 - Well water irrigation I_2 - Effluent irrigation

T_1 - Control (100% NPK)

T_2 - Bio sludge 12.5 t ha^{-1} + 75% NPK

T_3 - Press mud 12.5 t ha^{-1} + 75% NPK

T_4 - Fly ash 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK)

8. **Soil available potassium (kg ha^{-1}) as influenced by effluent irrigation and solid wastes application under sugarcane crop**

Treatments	30 D	60 D	90 D	170 D	240 D	300 D	Harvest	Mean
I_1T_1	321	315	310	299	287	281	279	299
T_2	398	392	381	374	368	359	349	374
T_3	371	364	352	347	341	333	328	348
T_4	413	409	401	394	387	382	374	394
Mean	**376**	**370**	**361**	**354**	**346**	**339**	**333**	**354**
I_2T_1	345	320	323	312	302	295	287	312
T_2	416	407	398	387	379	368	363	388
T_3	378	369	359	356	348	341	337	355
T_4	434	428	417	407	392	383	379	406
Mean	**393**	**381**	**374**	**366**	**355**	**347**	**342**	**365**

I_1 - Well water irrigation I_2 - Effluent irrigation

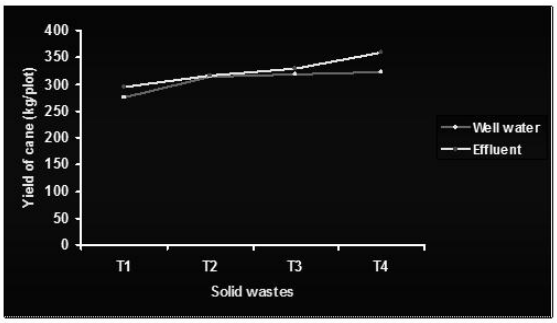
T_1 - Control (100% NPK)

T_2 - Bio sludge 12.5 t ha^{-1} + 75% NPK

T_3 - Press mud 12.5 t ha^{-1} + 75% NPK

T_4 - Fly ash 20 t ha^{-1} + Bio sludge 6 t ha^{-1} + 75% NPK)

9. **Yield of sugarcane as influenced by sources of irrigation and solid wastes**



T_1 – Control (100% NPK)

T_2 – Biosludge 12.5 t ha^{-1} + 75% NPK

T_3 – Pressmud 12.5 t ha^{-1} + 75% NPK

T_4 – Flyash 20 t ha^{-1} + Biosludge 6 t ha^{-1}

Usage and Perception of Students Towards Social Media Technology (SMT) and its Influence on Higher Education

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Abstract

Technology and specifically internet has revolutionized the pace of accessing information, gaining and exchanging knowledge and realizing personal learning goals in a real time basis. Social Networking is a recent phenomenon that has taken over the web, allowing more connectivity and interaction between web users. The social networking sites are gaining lot of popularity these days with almost all educated youth using one or the other such site. Students use the social media to their advantage in different ways. But sparing their time on social networking without any purpose becomes counterproductive. In this context there exists a question whether social networking is productive or not. A descriptive research study was conducted among 306 students of technical education in Coimbatore city to analyse the usage pattern and their perception towards Social Media. Further an attempt is made to analyze the influence of social networking sites among the engineering students. The research study reveals that students use social media predominantly for sharing of information rather than learning. Furthermore Social Media Technology has a positive influence in establishing collaboration between learners and teachers.

Keywords

Social Media Technology, Students Perception, Higher Education

Introduction

Social media technology has emerged as the most popular online activity worldwide. Social media technology refers to highly interactive mobile and web-based platforms through which individuals share, discuss and modify user generated content as part of a collaboration process of content creation. There are number of Social networking sites available online for quick transfer of individual ideas and views. The social networking sites are gaining lot of popularity these days with almost all educated youth using one or the other such site. Students use the social media to their advantage in different ways. By using internet for academic purposes, students learn much more than they learn in the classroom. Their ability to access, analyses and share information improves

dramatically .But spending more time on social networking without any purpose becomes counter-productive. In this context there exists a question whether social networking is productive or not. So an attempt is made to analyze the influence of social networking sites among the engineering students.

Review of Literature

Social networking has increased the rate and quality of collaboration for students. They are better able to communicate meeting times or share information quickly, which can increase productivity and help them learn how to work well in groups. (Kabilan, Ahmad, & Abidin, 2010). By encouraging engagement with social media, students can develop connections with peers, establish a virtual connection (Jackson, 2011; Kuh, 1993; Liu, Liu, Chen, Lin & Chen, 2011; Nelson Laird & Kuh, 2005; Yu, Tian, Vogel, & Kwok, 2010). Social media provides an opportunity for students to expand their learning environment since only a portion of student learning occurs within the confines of a classroom (Chen & Bryer, 2012; Friesen & Lowe, 2012; Wodzicki, Schwmmlein, & Moskaliuk, 2012).

Mohamed Haneefa. K. and Sumitha.E.(2011) in his research study entitled, "Perception and Use of Social Networking Sites by the students of Calicut University" concluded that the results of the study shows that a majority of the students were aware of social networking sites and these sites for friendly communication. However, a good number of students use these sites for academic purpose also. It should be noted that social networking sites can be used as an interactive platform for academic communication and can be a source of information, knowledge and help. Orkut is the most used social networking sites by the students of Calicut University. Although, there are also many resources and services available through these sites, there also many concerns, security and privacy are the topmost concerns while using these sites. However, a majority of the students still used their real names, photos and biographical information in their profiles.

Jason Tham and Niaz Ahmed (2011) in his research study titled, "The Usage and Implications of social Networking: A Survey of College Students " observed that this study found that female college students spent more time on social networking sites than male students. Significant correlations were found between age and gender and the influence of social networking sites on users' personal development. Data also revealed that students' perceptions of the influence of social networking sites were consistent with the actual effects are revealed findings. This research has explored the issue of social networks and its implications in terms of only a few variables.

Satya. S (2012) in her research study entitled, "Leisure, Social Networking and Mass Media: The Evolving Confluence" concluded that the leisure habits are changing with the change in time and Technology development. With the advent of social networking sites through the World Wide Web, the earlier typologies of leisure activity is undergoing a rapid change. The social networking sites are an active supplement to the traditional mass media platform. Social networking is not only cost effective, but is also changing the way news is created. Social networking is growing rapidly, surpassing the conventional growth of traditional mass media. Because the networking groups are focused and share common causes, the depth and follow-up in this media prove effective. Social networking sites are emerging as a mass media to reckon with. Through a case compiled by Terri Willard (2009), it is evident that sustainable development is a process that can be put in place by people in the social networking sites.

Adam Mahamat Helou, Zor Zariah Ab.Rahim and Oye. N (2012) in his research study entitled, "Students' Perception on Social Networking Sites Influence on Academic Performance" concluded that this study attempts to obtain students' perceptions on how social networking sites impact their academic performance. These objectives are firstly, to identify the reason of using social networking sites among the students, secondly to investigate students' perception on social networking sites influence on academic performance. The various approaches adopted by students in making sure that the use of social networking sites influences either positively or negatively on their academic achievement. Most of the younger students are engage in the use of social networking sites mainly for socializing activities rather than for academic purpose. However, most of the students do feel that the social networking sites have more positive impact on their academic performance.

Ajit Kumar Dash (2013) in his research study entitled, "Use of Online Social Networking Sites by College Students and its implications for marketing: A case study in Tripura", observed that the college students are well aware about different Social Networking Sites (SNS).further, their use and popularity is increasing. Social networking sites are serving as a very good medium to connect students. Students view advertisements online. Therefore, marketing with the help of these sites can play an important role for online marketing. However, since the user groups are educated and their size and mutual participation is increasing day by day, It is necessary to ensure product quality.

Manjunatha. S (2013) in his research study titled, "The Usage of Social Networking Sites among the College Students in India", observed that the primary objective of the research undertaken has been to shed light on the evolution of the dominance of social networking sites among the Indian college students. Previous research in spheres of social networking sites and its impact on college students in different global and demographic context provided an extensive secondary source base for the study. As with many technologies, adoption of the internet especially for its social uses has seen its highest levels of usage among college students in India. The majority of current college students have had access to the internet. A perceive social networking sites often much quicker and more convenient way to interact. That they are aware of the danger and risk involved in these sites is a positive indicator that Indian college students are not only techno-savvy and socially active through social networking sites but they also possess social consciousness.

Students who used social media felt more emotionally connected to their peers because they felt as though they had people to talk to if they had a problem or if they needed help (Tomai et al., 2010) Further, these peer connections encouraged participation by students who initially felt intimidated by in-class discussions (Arnold & Paulus, 2010; Junco et al., 2011; Rambe, 2008).A study by CourseSmart, a leading e textbook company based in California reports that 4 out of 10 students could not go more than 10 minutes without checking one of their mobile devices (Denny Carter 2013).

The study by Tariq et al. (2012) describes the usage of social media by the teenagers as the media which grabs the total attention and concentration of the students and diverts them towards non educational, unethical and inappropriate actions such as useless chatting, time killing by random searching and not doing their jobs. This virtual life of a student distracts his thoughts from education towards other activities and by living inside fantasy world student slowly starts to hate educated life and studies (Klovdahl, Potterat, Woodhouse, 1994). The popularity of social media, and the speed at which information is published, has created a lax attitude towards proper spelling

and grammar. (Karan Chopra,2013). This reduces the student's ability to effectively write without relying on a computer's spell check feature.

Statement of the Problem

Most of the higher educational institutions provide Wi-Fi connections, 24-hours internet facility and well-equipped computer lab for their students to access information inside the campus. Apart from this, students access internet using their own computers or laptops with personal connections. Besides, these facilities there are private internet cafes, where students can easily use the internet and smart phones also contribute for the easy access to internet. Access to these facilities and technology has increased the rate of collaboration and development among student community. Social networking sites allow students to improve their relationships and make new friends. It also helps to share and spread information quickly among friends and also helps to learn new technologies, become more familiar with computers and electronic devices. Extensive usage of social networking technology helps them throughout their lives. Despite these uses there are other problems such as more reliability of the students on social media for getting information, reduced learning and retaining capacity, distracts the focus of attention on academics, reduces their communication skills and socializing with others, reduce the language skills and writing skills and get attracted towards other online activities and missing out their academics. This paper attempts to analyse the usage pattern, problems faced, and the relationship and influence of usage of SMT among engineering students.

Objectives of the Study

- To know the pattern of usage of SNS by engineering students.
- To identify the problems faced by the engineering students due to the usage of SNS.
- To find whether there is any significant relationship among gender, age, place of residence and usage of SNS.
- To analyse the influence of SNS among the engineering students on their education.

Methodology

Area of Study

Coimbatore city is selected for the study as it is considered as the education hub where more than 50 engineering colleges are in the city and is also convenient for the researcher to collect the data.

Source of Data

Primary data have been used for the study. The primary data are collected from the engineering college students of Coimbatore city using a questionnaire.

Period of Study

The primary data is collected through questionnaire during May - June 2014.

Sample Design

Data have been collected using non-probability convenience sampling method. Population of the study consists of engineering college students of Coimbatore city. Questionnaire was served to 350 engineering college students in Coimbatore city for collecting data. The researcher was able to collect 306 filled in questionnaire which consists of the sample size for this study.

Data Analysis

The data analysis was carried out using Statistical Package for Social Sciences (SPSS). The techniques used for analysis were percentage analysis, Rank analysis, Chi-square analysis and Analysis of Variance (ANOVA).

Analysis and Interpretation

Demographic Characteristics of the Respondents

Table 1 describes the demographic profile of the respondents using percentage analysis.

It is seen from Table 1 that Majority(57%) of the respondents are male and 43% are female. 51% of the respondents belong to the age group of 18-20 years, 31% above 20 years and 18% belong to the age group of below 18 years. Majority (46%) of the respondents belongs to urban area, 32% resides in semi urban area and 22% are from rural area. Among the 306 respondents, (43%) of the respondents prefer browsing at their home, 31% prefer browsing at the institution and 26% at the browsing centre.

Table 1 Demographic characteristics of the respondents

S.No.	Factors		Number of respondents	Percentage
1.	Gender	Male	175	57
		Female	131	43
		Total	306	100
2.	Age	Below 18 years	56	18
		18 years-20 years	157	51
		Above 20 years	93	31
		Total	306	100
3.	Area of residence	Urban	141	46
		Semi urban	98	32
		Rural	67	22
		Total	306	100
4.	Convenient browsing place	At home	132	43
		Institution	94	31
		Browsing centre	80	26
		Total	306	100

The main purpose of browsing for 36% of the respondents is to gather information, 27% for entertainment, 25% for time pass and 12% to socialize with others. 45% of the respondents have

S.No.	Factors		Number of respondents	Percentage
5.	Main purpose of browsing	Information gathering	109	36
		Time pass	78	25
		Entertainment	81	27
		Socializing with others	38	12
6.	Number of account in various SNS	1	96	31
		2	136	45
		More than 2	74	24
		Total	306	100
7.	Duration of usage of SNS	Less than 1year	68	22
		1-2 years	159	52
		More than 2 years	79	26
		Total	306	100
8.	Number of contacts Less than	100	98	32
		100 - 200	168	55
		More than 200	40	13
		Total	306	100
9.	Frequency of usage of SNS	Daily	149	49
		Weekly few times	117	38
		Occasionally	40	13
		Total	306	100
10.	Opinion about the information provided in SNS	Secured	187	61
		Not secured	119	39
		Total	306	100

two accounts on SNS, 31% have single account and 24% have more than two accounts. 52% of the respondents use SNS for 1-2 years, 26% for more than 2 years and 22% of the respondents use SNS less than 1 year. Among the 306 respondents 55% of the respondents have 100-200 friends in SNS, 32% of the respondents have less than 100 friends and 13% of them have more than 200 friends in SNS. Majority (43%) of the respondents visit SNS daily, whereas 38% of them visit few times in a week and 13% of them visit occasionally. Majority (61%) of the respondents felt that the personal information provided in the SNS is secured and the rest 39% of them felt it is not secured.

Factors Considered in the Study

It is understood from Table 2 that 93% of the respondents reported that the reason for using SNS is to get connected with friends, whereas 61% of them to share information and views, 47% for time pass and 28% to find new contacts. It can also be seen that among the 306 respondents who share their personal information in SNS majority (94%) of the respondents provide e-mail address,

55% of the respondents shared their Photographs, 32% of the respondents provided their mobile numbers and 63% of respondents provided all the three. It is evident from the table that 84 % of the respondents use SNS more for sharing information related to entertainment, 54% related to personal, 38% about health and 34% about education.

Table 2 Descriptive statistics of the factors considered in the study

S.No.	Factors		Number of respondents	Percentage
1.	Reason for using SNS	Get Connected with friends	285	93
		Time pass	143	47
		Find new contacts	85	28
		Share information and views	186	61
2.	Personal information provided	E-mail address	287	94
		Mobile numbers	97	32
		Photographs	167	55
		All the above	194	63
3.	More usage of SNS	For Health related matters	116	38
		For Entertainment	256	84
		For Education	105	34
		For Personal	164	54

Relationship Between Demographic Pro le and Other Factors

Chi-square analysis was used to find the association between the demographic profile and the factors considered in the study. The following hypotheses were framed and tested.

Gender

Relationship between Gender and the factors

H1: There is no significant association between gender and the factors, frequency of usage of SNS, Reason for using SNS, Personal information provided and More usage of SNS

Table 3 Gender and factors considered in the study - Chi-square results

Factors	Chi-square value	Pearson Value	Significant/Not significant
Frequency of usage of SNS	4.643	0.001	Significant
Reason for using SNS	7.534	0.003	Significant
Personal information provided	13.457	0.002	Significant
More usage of SNS	8.684	0.012	Significant

(Significant P Value < 0.05; Not Significant P Value > 0.05)

It is evident from the table 3 the Chi-square result shows that there is a significant association between gender and frequency of usage of SNS, reason for using SNS, Personal information provided and More usage of SNS. Hence hypothesis H1 is rejected.

Age

Relationship between age and the factors

H2: There is no significant association between age and the factors frequency of usage of SNS, Reason for using SNS, Personal information provided and More usage of SNS

Table 4 Age and factors considered in the study - Chi-square results

Factors	Chi-square value	Pearson Value	Significant/Not significant
Frequency of usage of SNS	9.658	0.002	Significant
Reason for using SNS	15.398	0.000	Significant
Personal information provided	10.031	0.014	Significant
More usage of SNS	18.081	0.018	Significant

(Significant P Value < 0.05; Not Significant P Value > 0.05)

It is evident from the table 4 the Chi-square result shows that there is a significant association between age and frequency of usage of SNS, reason for using SNS, Personal information provided and More usage of SNS. Hence hypothesis H2 is rejected.

Area of Residence

Relationship between area of residence and the factors

H3: There is no significant association between Area of residence and the factors frequency of usage of SNS, Reason for using SNS, Personal information provided and More usage of SNS

Table 5 Area of residence and factors considered in the study - Chi-square results

Factors	Chi-square value	Pearson Value	Significant/Not significant
Frequency of usage of SNS	7.658	0.000	Significant
Reason for using SNS	14.679	0.002	Significant
Personal information provided	9.548	0.001	Significant
More usage of SNS	16.097	0.000	Significant

(Significant P Value < 0.05; Not Significant P Value > 0.05)

It is evident from the table 5 the Chi-square result shows that there is a significant association between area of residence and frequency of usage of SNS, reason for using SNS, Personal information provided and More usage of SNS. Hence hypothesis H3 is rejected.

Problems Faced by Students While Using SNS

The below table shows the average rank and final rank of respondents with regard to the problems faced by them while using SNS based on Gender,

Table 6 Average rank - problems faced by the students while using SNS based on gender

S.No.	Factors	Male		Female	
		AR	FR	AR	FR
1.	Reduce learning and retaining capacity	3.87	4	5.23	6
2.	Distracts the focus of attention on academics	2.12	1	3.12	2
3.	Reduces the communication skills and socialization	4.23	5	3.88	3
4.	Reduce the language skills and creative writing skills	2.98	2	5.02	5
5.	Get attracted towards other online activities	3.34	3	2.07	1
6.	End up in non professional and non academic activities	5.76	6	4.56	4

AR- Average Rank; FR - Final Rank

Table 6 provides that the respondents ranking with regard to the problems faced by the engineering students while using SNS. Male respondents ranked 'distracts the focus of attention on academics' as first, 'reduces the language skills and creating writing skills' as second, 'get attracted towards other online activities' as third, fourth for 'reduce learning and retaining capacity', fifth for 'reduces the communication skills and socialization' and last for 'end up in non professional and non academic activities'. The female respondents ranked first for the problem 'get attracted towards other online activities', second for 'distracts the focus of attention on academics', third for 'reduces the communication skills and socialization', fourth for 'end up in non-professional and non-academic activities', fifth for 'reduce the language skills and creative writing skills' and sixth for 'reduce the learning and retaining capacity'. The study results are in line with the past studies where, Students who attempt to multi-task, checking social media sites while studying, show reduced academic performance (http://viralms.com/blog/2011/04/how-social-media-affects-students/). Their ability to concentrate on the task at hand is significantly reduced by the distractions that are brought about by YouTube, Face book or Twitter.

Demographic Characteristics and Academic Performance

Demographic characteristics such as gender, age, and frequency of usage of SNS would have a direct or indirect influence on the academic performance of the respondents. Table 7 presents the results of the ANOVA which shows the difference in academic performance based on demographic characteristics of the respondents. The following hypotheses were to be empirically tested in this regard.

H4: There is no significant difference in the academic performance based on demographic characteristics of the respondents.

H4a: There is no significant difference in academic performance based on gender of the respondents.

H4b: There is no significant difference in academic performance based on age of the respondents.

H4c: There is no significant difference in academic performance based on frequency of usage of SNS of the respondents.

It can be interpreted from the Table 7 that the high mean value was found for the male respondents compare to the female respondents. The F value (49.483) also indicated that there

was significant difference in academic performance of the respondents based on gender. Hence, hypothesis H4a was rejected.

With the age the high mean value was found among the respondents who belonged to the age group 18-20 years compare to the respondents who belonged to the other age group. Further from the F value (35.814) it was clear that there was significant difference in academic performance of the respondents based on age. Hence, hypothesis H4b was rejected. This could be due to the maturity level and learning experience of the respondents day by day and them learn to balance various activities.

It can be interpreted from the frequency of usage of SNS high mean value was found for the respondents who use daily compare to the respondents who use weekly few times and occasionally. Further from the F value (13.428) it was clear that there was significant difference in academic performance of the respondents based of the frequency of usage of SNS. Hence, hypothesis H4c was rejected.

Table 7 Gender, Age and Frequency of Usage of SNS and academic performance - ANOVA results

Demographic Factors	N	Mean	S.D	F Value	Sig at 5% level	Result
Gender						
Male	175	3.80	.593			
Female	131	3.63	.744	49.483	.002	Significant
Total	306	3.71	.680			
AGE(in years)						
Below 18 years	56	3.64	.680			
18 - 20 years	157	3.72	.688	35.814	.001	Significant
Above 20 years	93	3.56	.681			
Total	306	3.71	.680			
Frequency of Usage of SNS						
Daily	149	3.84	.680			
Weekly few times	117	3.72	.688	13.428	.010	Significant
Occasionally	40	3.72	.688			
Total	306	3.71	.680			

Findings

The analysis of the data shows that

- Majority of the respondents are male.
- 51% of the respondents belong to the age group of 18-20 years.
- Majority of the respondents, (46%) belong to urban area.
- Among the 306 respondents, (43%) of the respondents prefer browsing browse at their home.
- 36% of the respondents prefer browsing for information gathering.
- Mostly 45% of the respondents have more than two account on SNS
- 52% of the respondents use SNS for 1-2 years.

- Among the 306respondents, 55% of the respondents have 100-200 friends in SNS.
- Most of the respondents visit SNS daily.
- Majority of the respondents (61%) felt that the personal information provided in the SNS is secured.
- 93% of the respondents use SNS for getting connected with friends.
- Most of the respondents provided E-mails in SNS.
- Most of the respondents share information related to entertainment in SNS.
- Distracts of focus of attention on academics is the main problem faced by the male respondents while using SNS whereas female respondents reported that they get attracted towards other online activities

The chi-square result shows that

- There is a significant relationship between gender and frequency of visit, reason for using SNS, Personal information provided and more usage of SNS.
- There is a significant relationship between age and frequency of visit, reason for using SNS, Personal information provided and more usage of SNS
- There is a significant relationship between are of residence and frequency of visit, reason for using SNS, Personal information provided and more usage of SNS.

ANOVA result shows that

- There is significant difference in academic performance based on gender of the respondents.
- There is significant difference in academic performance based on age of the respondents
- There is significant difference in academic performance based on frequency of usage of SNS of the respondents

Conclusion

Advancement in technology has its merits and demerits. By all accounts, it appears that we may be at the cusp of an educational revolution, where the influence of social media is radically changing the way education has been traditionally delivered. The study shows that the engineering students are well aware of social networking sites. The usage and awareness of SNS by students are increasing rapidly. Social networking sites provide opportunity for all recent developments world over to easily reach the students. However, the usage of SNS calls for academic concern of the students. Time will tell whether the benefits outweigh the drawbacks but one thing is certain social media is having, and will continue to have, a lasting impact on the education field.

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Efficacy and Convergence of ICT In Business Augmentation In Rural Market Segment

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Abstract

In the insurance sector, ICT can provide a practical and enabling solution for improving the quality of service to policyholders. ICT enabled service delivery of Life Insurance Corporation of India (LIC) encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the service delivery process which ranges from KIOSKS,IVR,SMS and Satellite Sampark etc. The objective of this study is to analyse the awareness on ICT facilities of Life Insurance Corporation of India by the rural policyholders and to test association between socio economic profile of the respondents and Information and Communication Technology (ICT) usage by the rural policyholders. Methodology of the study is based on the analysis of the data collected through structured questionnaire from 241 life insurance policy holders in rural market segment of Coimbatore district by using interview schedule method. Statistical tools like percentage and ANOVA were employed for data analysis.

Keywords

ICT facilities, Policies, Rural segment

Introduction

In the insurance sector, ICT can provide a sensible solution to improve the quality of service to policyholders. The initiation of highly responsive networks of information, development of new software and, hardwares have offered real opportunity to solve deficiency in the system. The initiatives in insurance policies with ICT applications in promoting solutions instigate tremendous potential of ICT for enhancing the quality of service delivery. ICT enabled service delivery of Life Insurance Corporation of India (LIC) includes a range of techniques and resources meant to improve the service quality and effectiveness of the service delivery process which ranges from KIOSKS,IVR,SMS AND Satellite Sampark etc. Capacity building among policyholders is the widespread infusion of ICT enabled practices in insurance.

Review of Literature

According to Shobhit and Sanjai Shukla (2004),the growth of life insurance sector purely depend on how effectively the insurers were meeting their customers' expectations and perceptions in India and to make aware of the them about the insurable risks. Rise in income of the consumer will trigger the growth of insurance, on the demand side. Enhanced competition and reforms has provided a better choice to the customers. In rural areas LIC continues to remain strong when compared to major urban metros. Insurance awareness, availability of insurance products, and quality of services largely depends on penetration into the market. (Krishnamurthy et al.,2005). IRDA has opened sectors to private firms and it was aimed at fostering competition and innovation through a greater choice of products to their customers (Rastogi and Sarkar,2006). Purchase intention of policyholders is determined by normative factors. The recommendation is that the initial point of contact for marketing communications regarding purchase of new life policies should be through family and friends (Ogenyi and Frimpong ,2007). Reforms have helped to promote growth in life insurance sector in India, but still the insurance sector remains under-penetrated. Further the finding revealed that the average number of life policies as well as non-life policies held by an Indian consumer is just 1.33 percent policies, compared with the average of 5.2 policies per client for matured markets. (World Insurance Report, 2008). Clifford Paul et.al (2010), in their research revealed that low awareness was found and needs improvement among the uneducated, lower age group and daily wage class people. LIC should advertise their products through various mass media, it should develop viable and cost effective distribution channels and insurance companies should adopt CRM technology to store the lot of data for maintaining long term relationship and carry out continuous follow up programmes (Hasanbanu and Nagajothi, 2007).There is a need to study the awareness about varied insurance products of LIC of India to suit the difference financial needs and adoption of ICT for enhancing the reach and for easy operation. The importance and usage of ICT and capacity building among rural segment clients view, the present study incorporates four key dimensions namely awareness on ICT features offered by LIC for easy and effective reach, and adoption and utilization of ICT facilities by rural customers across their socio-economic profile. The focus of the study is to assess the current status of ICT applications in teaching- learning process and also to find the enabling environment for ICT capacity building.

Statement of the Problem

Policyholders awareness towards the products brings success to the life insurance business and satisfaction of the policyholders regarding the service rendered by LIC of India. As a result, LIC started to introduce ICT in its all business operations including policy distribution and service delivery which was once the domain of intermediary agents.LIC was associated or recognized for prospecting business in both urban and rural market segments. LIC has faced increased pressure to meet the policyholder's requirements. The insurance companies need to constantly innovate products to suit the customer needs, identify the changes in policyholder's behavior, new life style changes, technological advancement, distribution network, automation, government intervention, competitions, service quality and customer relationship management.

Objectives of the Study

The objectives of the study are

- To understand the life insurance holdings of the sample respondents
- To analyse the awareness on ICT facilities of Life Insurance Corporation of India by the rural policyholders and
- To test association between socio economic profile of the respondents and Information and Communication Technology (ICT) usage by the rural policyholders

Hypothesis

The following hypothesis is tested

- Significant difference exists between awareness on information and communication technology and socio-economic and demographic profile of the respondents.

Research Methodology

Coimbatore district is selected as the locale of the study owing to the reason that it is one among the industrially developed and commercially active districts of Tamil Nadu. Coimbatore city is identified as one of the fast developing metros of India. According to the 2011 census, total population is 34,72,578 with 17,35,362 males and 17,37,216 females. Urban population consisting of 20,62,131 and its rural population was reported with 8,54,489.The multi - stage sampling method was applied for the selection of the respondents. In order to select the respondents from rural area in the first stage, the Life Insurance Corporation of India Sulur branch serving rural area was selected because it is one among the well established oldest branch of Coimbatore division. As on 31.3.2012, Of the total policies of 1,21,376, the policies which fulfilled the condition of being in force for more than three years of lock in period in the above mentioned branch resulted with 76,828 policies consisting of 50,587 policyholders constituting population for rural sample. The stratified sampling method was followed for the selection of proposed sample size of 241 policyholders from Coimbatore rural at the third stage. Primary data were collected through personal interview with the insurance policy holders. The secondary data were collected from reports and publications of Insurance Regulatory Development Authority of India, and also from various journals, magazines, websites, etc. The data collected were analyzed statistically. Frequency and percentages were used to know the distribution pattern of the respondents in respect to variables. ANOVA test was applied to test the hypotheses whether there is any significant difference between mean values of Level of awareness and other features of policies.

Results and Discussion

Pro le of the Sample Respondents

Majority of the respondents in rural segment, 61.40 percent were male and 38.60 percent were female who were all invested in the life insurance policies of Life Insurance Corporation of India. Need for life insurance is higher among married respondents as revealed by 67 percent of the respondents were married and 33 percent of them were unmarried. The education attainment showed

that graduates (27.8), post graduates (24.1 percent), professionals (19.1 percent), diploma holders (14.9 percent), higher secondary education (10 percent) and skill oriented education (4.1 percent) constitute the sample. In India, the rural market segment offer remarkable growth opportunities for insurance companies. It is necessary to understand the changing needs of customers and their occupational structure (Sheela, 2007).Occupation-wise classification of the respondents showed that 37.50 percent of respondents were employed in private sector, 22.50 percent engaged in agriculture and 18.75 percent were employed in government sector. Monthly household income of the respondents revealed that39.83 percent of the respondents had monthly household income up to Rs. 20,000, 31.54 percent respondents earned income between Rs. 20,001 and Rs. 30,000 and Rs. 17.01 percent of the respondents earned between Rs. 30,001 and Rs. 40,000. About 60 percent of the respondents have an annual saving less than Rs. 1,00,000 and 14 percent of them saved between Rs. 1,00,000 and Rs. 2,00,000 per annum. Durable assets owned by the respondents reveals the fact that, with regard to rural respondents the entire sample respondents owned radio and television. 98.34 percent owned mobile phone, 97.10 percent owned two wheeler, computer (67.22 percent), internet (42.74 percent) and car (40.66 percent).

Distribution of respondents based on Life Insurance Policy Holdings

The distribution of respondents based on life insurance policy holdings, were presented in Table 1.

Table 1 Distribution of Respondents Based on Life Insurance Policy Holdings

Variables	Classifications	N (n=241)	%
Name of the policies held	Children's policy	79	14.74
	Endowment policy	123	22.95
	Money back policy	99	18.47
	Joint life policy	43	8.02
	Pension policy	22	4.10
	Women's policy	15	2.80
	Whole life policy	102	19.03
	Unit- linked policy (ULIP)	14	2.61
	Medical policy	27	5.04
	Term Policy	12	2.24
Sum Assured (in)	Up to 1,00,000	86	35.68
	1,00,000–3,00,000	121	50.21
	3,00,000–5,00,000	20	8.30
	Above 5,00,000	14	5.81
Term period of policy (in years)	5–10	56	23.24
	10–15	79	32.78
	15–20	85	35.27
	Above 20	21	8.71
Sources of information (Personal)	Agents	140	58.09
	Development officers	20	8.30
	Friends	61	25.31
	Relatives	20	8.30

Sources of information (impersonal)	Newspapers and magazines	126	52.28
	Posters and banners	30	12.45
	Notice and pamphlets	14	5.81
	Radio	28	11.62
	Television	26	10.79
	Internet	17	7.05
Attractive aspects of advertisements of LIC	Brand	146	60.58
	Content	28	11.62
	Customary	32	13.28
	Message	19	7.88
	Symbol	16	6.64
Mode of payment	Electronic clearing service	38	15.77
	Counter payment / Agent	148	61.41
	Electronic bill payments	6	2.49
	LIC website	3	1.24
	Franchisees	8	3.32
	Banks	11	4.56
	Merchant premium points	12	4.98
	Salary saving scheme	10	4.15
	ATM	5	2.07
Premium payment paid(₹)	Within due date	185	76.80
	Within grace period	55	22.80
	Defaulted payment	1	.40
	Up to 10,000	98	40.66
	10,000 – 20,000	94	39.00
	20,000 – 30,000	19	7.88
	Above 30,000	30	12.45
Interval of premium payment	Monthly	69	28.63
	Quarterly	112	46.47
	Half-yearly	23	9.54
	Yearly	24	9.96
	Single premium	13	5.39
Insurance cover matching the human life value (calculator)	Yes	34	14.11
	No	207	85.89
If No, reason	Higher amount of premium payment	78	37.68
	Save the money other than LIC	35	16.91
	No financial planning for old age	30	14.49
	Not having enough	24	11.59

If yes, the reason for surrender	Deposit in bank	13	30.95
	Invest in shares and bonds	7	16.67
	Children's education, marriage	11	26.19
	Invest in fixed assets	8	19.05
	Protect the mortgaged property	3	7.14
Opinion on the amount of loss on surrender	High	17	40.48
	Moderate	9	21.43
	Low	16	38.10
Received maturity amount	Yes	90	37.34
	No	151	62.66
If yes, opinion on Time lag for settlement	Short period	27	30.00
	Medium	38	42.22
	Long period	25	27.78
Utilisation of the maturity amount	Deposited in bank	19	21.11
	Invested in shares and mutual funds	7	7.78
	Children's marriage, education	12	13.33
	Taken new policy	21	23.33
	Invested in fixed assets	9	10.00
	Deposited in post office	10	11.11
	Settled the debts	12	13.33
Agent contacts	Frequently	170	70.54
	Rarely	56	23.24
	Not at all	15	6.22
Complaint 's lodged	Yes	57	23.65
	No	184	76.35
If yes, satisfaction on remedy.	Highly satisfied	26	45.61
	Satisfied	13	22.81
	Not satisfied	18	31.58
Further insurance	Yes	132	54.77
	No	109	45.23
Recommendation of LIC	Yes	176	73.03
	No	65	26.97

Source: Primary data

The respondents, Rs.50.21 percent respondents have assured their life between Rs.1,00,000 and Rs.3,00,000, Rs.35.68 percent have life assurance up to Rs.1,00,000 and 8.30 percent respondents have assured their life between Rs.3,00,000 and Rs.5,00,000. The popular policies among them were endowment policy (22.95 percent), whole life policy (19.03 percent), money back policy (18.47 percent) and children's policy (14.47 percent).

The policy period comprise the time between the exact hour and date of policy initiation and the hour and date of expiration. With regard to the rural respondents 35.27 percent respondents have assured their life for term period of 15 and 20 years, 32.78 percent have assurance term period between 10 and 15 years. Sources of information about the LIC policies were recognized from personal and impersonal sources. Personal sources of information were received through

the agent advisors, development officers, friends and relatives and impersonal sources were the official promotions of LIC. The above table clearly showed that 58.09 percent respondents received information from agents personally and 25.31 percent personally received information from their friends.

Sources of information about LIC policies through impersonal mode were recognized through newspaper and magazines, posters and banners, notice and pamphlets, radio, television, internet and other mode. In case of rural respondents, 52.28 percent received information from newspapers and magazines, 12.45 percent respondent's source of information were posters and banners, 11.62 percent through radio and 10.79 percent through television.

The most attractive aspect of advertisement of LIC among respondents was that 60.58 percent respondents preferred aspect in the LIC's advertisement was found to be the brand name. 13.28 percent were attracted towards the LIC advertisement for its customization and 11.62 percent preferred the content.

In order to provide coverage described in the policy or bond, the insurer charges certain amount as premium. Policyholder can pay their premium amount either directly in the cash counters or through the LIC's alternate channels of premium collection like electronic clearance service, electronic bill payments, LIC websites, franchisees, authorized banks, merchant premium points, salary saving scheme and ATM. The above table revealed the fact that 61.41 percent respondents pay their premium through their agents or through direct counter payments and 15.77 percent respondent preferred to pay their premium through the electronic clearing service.

If the premium is not paid within the due date the LIC permit the policyholder to pay delayed premium payment without interest charges. This period is called the grace period. The grace period of 15 days is allowed from the due date for premium payment if the frequency of payment premium is monthly (LIC Website). When the premium payment mode is quarterly, half-yearly or yearly the grace period for policies is one month but not less than 30 days. About 76.8 percent respondents paid their premium payment within due date and 22.8 percent paid within grace period. About 40.66 percent were paying premium amount annually up to Rs.10,000, 39 percent of respondents paid premium amount between Rs.10,000 and Rs.20,000 and 12.45 percent of respondents paid premium payments annually above Rs.30,000.

Policyholders have the option to pay premium at various time intervals such as monthly, quarterly, half-yearly, yearly and single premium. About 46 percent of respondents preferred to pay quarterly premium, 28.63 percent respondents paid their premium monthly and 9.96 percent respondents preferred to pay their premium annually and 9.54 percent respondents paid their premium amount half-yearly.

Human life value (HLV) is used to identify the amount of insurance that a person should buy. It is an estimate of the financial value for a human life. Simply it is expressed as the sum insured must equal the human life value (LIC Website).It is revealed that 85.89 percent of respondents have no insurance cover based on the human life value calculator and the remaining 14.11 percent respondents have matched their insurance policies matched with the human life value calculator for their insurance needs.

The reason for not having adequate life insurance equivalent to human life value estimation revealed that, among the respondents 37.68 percent respondents felt that higher amount of premium payment was involved on policies based on the human life value calculator, 16.91 percent respondents wanted to save their money other than the LIC, 14.49 percent respondents have no

financial planning for old age, 11.59 percent of respondents were not having enough knowledge about the human life value calculator and 10.63 percent respondents were not approached by any agents.LIC provides facility to surrender the policies. Surrender of policy means the policyholder when decided to terminate the policy before the maturity of the policy (LIC Website). Among the respondents 17.43 percent respondents had the experience of surrender of policy and the remaining 82.57 percent respondents have not surrendered their policies.

Reasons for surrender of policy were analysed. The respondents, 30.95 percent respondents wanted to deposit the amount in bank, 26.19 percent respondents utilized the surrendered amount for their children's education and marriage, 19.05 percent respondents wanted to invest in fixed assets and 16.67 percent respondents invest in sharers and bonds.

Urban policyholder's opinion on the amount of loss on surrender revealed that 40.48 percent of respondents felt that the amount of loss on surrender was high, 38.10 percent of respondents felt that the amount of loss on surrender was low and the remaining 21.43 percent respondents felt that the amount of loss on surrender was moderate.

Maturity is used to describe a life insurance policy whose face amount has become payable. The respondents, 62.66 percent have not received any maturity amount and the remaining 37.34 percent respondents have received the maturity amount. With respect to the rural respondents, 42.22 percent respondents' settlement of maturity period was medium, 30 percent of respondents' settlement of maturity period was short and the remaining 27.78 percent respondents' settlement of maturity period was long. The respondents 23.33 percent respondents have taken new policy, 21.11 percent respondents have deposited in bank, 13.33 percent respondents have utilized the maturity amount for their children's education and marriage and also utilized it for settling the debts and 11.11 percent of respondents deposited in post office.

Sales personnel by providing enough information to the customers, enables them in forming their assessment about the products or services, which ultimately becomes customer value (Tam and Wong, 2001). Agent is considered as the key player for insurance companies and reaches the traditional and innovative products to the customer. He acts as the focal points for customers seeking to procure insurance coverage and long term saving (Neetu Bala and Sandhu, 2011). For majority of the respondents, 70.54 percent agents contact their customers frequently and 23.24 percent respondents rarely contact their customers.

Policyholders of LIC have a grievance redressal forum to lodge a complaint. About 23 percent of the respondents have lodged complaint with the LIC and 76.35 percent respondents have not lodged any complaint with the LIC. About 54.77 percent respondents wanted to take insurance with LIC further. In all, 70.17 percent respondents were interested to go for further insurance with the LIC.

Recommending from other customers are viewed as more credible than are firm-initiated promotional activities and can have a dominant influence on people's decisions to use a service. (Christopher Lovelock, 2008). Majority of the respondents (73.03 percent)wanted to recommend the LIC to others. In all, 82.33 percent respondents were willing to recommend the LIC to others.

Awareness on ICT facilities of LIC

Information technology paves the way for all the stake holders including the customers. In order to avail detailed information regarding the products and services offered by various organizations,

compare the prices, perform their transactional operations in a fast and secure way and to obtain technology enabled services in a most effective way (Parthasarathi Choudhuri, 2012). Awareness of respondents towards information communication technology facilities offered by LIC was analysed and results are presented in table 2.

Table 2 Awareness on Information and Communication Technology of LIC

ICT Facilities	RURAL RESPONDENTS (n=241)				
	Not at all	Slightly	Somewhat	Moderately	Extremely
Information KIOSKS (online touch screen)	66 (27.4)	29 (12.0)	60 (24.9)	35 (14.5)	51 (21.2)
Interactive voice response systems	93 (38.6)	52 (21.6)	32 (13.3)	30 (12.4)	34 (14.1)
Information centre	100 (41.5)	43 (17.8)	52 (21.6)	19 (7.9)	27 (11.2)
Short message service (SMS)	50 (20.7)	65 (27.0)	68 (28.2)	22 (9.1)	36 (14.9)
Enterprise portals	32 (13.3)	53 (22.0)	69 (28.6)	43 (17.8)	44 (18.3)
Information over the internet	10 (4.1)	36 (14.9)	40 (16.6)	96 (39.8)	59 (24.5)
Satellite Sampark branches	28 (11.6)	36 (14.9)	58 (24.1)	67 (27.8)	52 (21.6)
Information Service	49 (20.3)	37 (15.4)	84 (34.9)	34 (14.1)	37 (15.4)

Source: Primary data Figures in parenthesis represents percentage to the total

LIC has introduced Interactive Touch screen based Multimedia KIOSKS in prime locations for distribution of information to the general public on products and services to accept premium payments. With regard to the respondents, awareness about information KIOSKS reveals that about 52.3 percent were having very low level or not at all aware of this facility.

Interactive voice response system (IVRS) facilitate customers to receive information through telephone calls to know about their next premium due, policy status, loan amount, and maturity payment due, accumulated bonus etc. Only 14 percent of the respondents were highly aware of this facility and 38 percent rural respondents were not at all aware about IVRS.

LIC has also introduced information call centers operated by skilled employees to provide customers with information about products, policy services, branch addresses and other organizational information. Among the respondents, 21.6 percent were somewhat aware, 17.8 percent were slightly aware and only 11.2 percent were extremely aware.

LIC has introduced free Short Message Service (SMS) to help all LIC policyholders to get data for easy policy servicing. Of the total respondents, 28.2 percent were somewhat aware, 27 percent were slightly aware and 14.9 percent were extremely aware about the SMS facility available in LIC.

A service at the doorstep of policyholder's is one of the benchmark of LIC's vision. LIC has implemented an Enterprise Portal Solution (EPS), a web-based system, which provides a single-point personalized interaction and a wide variety of content and services to site-visitors, customers, agents, business partners and employees. It is a gateway to LIC's enterprise applications through convenient, customized and personalized web access. In addition to aggregating and presenting information that is relevant to specific set of users, EPS will also enable customers with online transactional capabilities like payment of premium, address change etc. Implementation of Enterprise Portal has enabled the Corporation to undertake sophisticated web development activity and extensive use of secured web applications for the information dissemination and service delivery to the customers, agents and other users (Yogakshema, 2007) Awareness among the respondents was analyzed about this facility, 50.6 percent respondents had low awareness about the enterprise portal.

LIC's web site is an information bank, about LIC and its offices. Information over the internet is one of the facilities provided by the LIC to their customers. In all, about 62 percent respondents had very high awareness about 20 percent respondents were somewhat aware about the information over the internet facility.

Satellite Sampark offices are situated closer to the customer. It is smaller and leaner. It facilitates anywhere services with the help of digitalized records of the satellite offices. Among the respondents 49.4 percent were highly aware about the satellite sampark branches. 24.1 percent were somewhat aware. With regard to the total respondents and 55.1 percent were highly aware about the satellite branches and 20.5 percent were somewhat aware of this facility.

LIC provides specific information services to their customer in the form of messages, e-mails and information, news groups and affinity group activities on and off the site. Among the sample respondents, 34.9 percent were somewhat aware, 15.4 percent were extremely aware and 15.4 percent were slightly aware about the information services provided by LIC.

It is inferred that awareness ICT facilities of LIC among rural sample policyholder were very low in order to render its services effectively and efficiently. LIC need to popularize and familiarize these facilities among its policyholders. Individual's effort to visit offices or contacting agents could be eliminated and the policyholders would be served with first hand information. The respondents' awareness on information over internet satellite sampark branches and information services were increasing but low awareness noted with facilities such as information centers, interactive voice response system and information of LIC KIOSKS.

Information and Communication Technology (ICT) and socioeconomic profile of the respondents

LIC has initiated the use of information technology for enhancing the quality of its service to customers. LIC is the largest insurer in India, and it has explored the possibilities that technology offers to provide the best of services to its valued customers and other stakeholders (Annual Report of LIC - 2013). LIC has to invest more in IT infrastructure in its business to survive in the long run and to establish its competitive advantage in the insurance market by providing better information technology enabled quality of services to its customers (Parthasarathi Choudhuri, 2012). The awareness on such facilities was tested among policyholders framing hypothesis.

H_0: There is no significant difference between awareness on information and communication technology and socio-economic and demographic profile of the respondents.

H_a: There is a significant difference between awareness on information and communication technology and socio-economic and demographic profile of the respondents.

The results of the analysis of variance show that age of the respondents was found to have significant difference on the awareness of information and communication technology facilities available in LIC. In case of the rural respondents, there is no statistical significant difference was found among the different age group. With regard to the gender and marital status of the respondents no significant difference in awareness was found. With regard to the educational attainment it was found to be insignificant. Occupation status of the respondents was found to be significant (0.021) and at five percent level. The spouse's occupation was not statistically significant.

Table 3 Socio-economic and Demographic Profile of the Respondents and Awareness on Information and Communication Technology

Variables	Classification	M	SD	DMRT	F	Sig
Age (in years)	Up to 26	57.28	15.34	a	1.611	0.202
	27 – 46	59.52	15.23	a		
	Above 46	54.46	9.46	a		
Gender	Male	58.75	15.31	a	0.104	0.747
	Female	58.11	13.91	a		
Marital Status	Married	57.50	14.15	a	2.225	0.137
	Unmarried	60.49	15.78	a		
Educational qualification	Higher secondary	56.77	11.36	a	0.788	0.559
	Diploma	57.08	14.05	a		
	Graduate	61.34	14.77	a		
	Post Graduate	57.80	13.57	a		
	Professional	56.90	17.98	a		
	Skill oriented	60.25	15.20	a		
Occupation	Government employee	61.89	16.51	a	2.538	0.021
	Private employee	52.14	12.02	b		
	Business	60.00	14.17	a b		
	Agriculture	53.75	14.27	a b		
	Retired	58.16	12.45	a b		
	Professional	60.80	15.23	a b		
Spouse Occupation	Government employee	58.45	15.21	a	0.525	0.788
	Private employee	56.40	12.08	a		
	Business	56.59	7.85	a		
	Agriculture	60.60	18.27	a		
	Retired	51.67	11.99	a		
	Professional	56.43	15.43	a		
Monthly Income (in ₹)	Up to 12500	58.36	14.78	a	0.983	0.376
	12,501 – 25,000	59.74	13.49	a		
	Above 25,000	56.33	16.88	a		

M = Mean Score; SD = Standard Deviation; DMRT = Duncan Multiple Range Test

Note: Different alphabets between socio-economic profiles denote significance at 5% level using Duncan Multiple Range Test

There is no significant difference was found among respondents towards the awareness of ICT avenues in LIC and income earned by them.

It is inferred that among respondents significant difference was found with the occupation of the respondents and a good perception towards ICT facilities offered by LIC were noted among the respondents employed in government sector, professionals and respondents engaged in business. Technology plays an essential role in the deliverance of services with highest standard to its end customer and the intermediary (Syamala Rao, 2012).

Conclusion

The key points which emerged from the study are:

- The incorporation of ICTs in insurance business operation is inevitable. The demand for life insurance has encouraged noteworthy growth in both private and public sector insurance companies. Younger generation with quick technology adoption provides scope for convergence of ICT in business operations.
- ICT is moving ahead of personal computers to mobile computing technology, Cloud Computing etc. LIC has to take necessary steps to integrate the emerging technologies into its policies and programmes. LIC has to make sensible policy and it has to analyse what is appropriate when it is appropriate after a careful analysis of long-term costs and benefits.
- Enhancing research capabilities and provide adequate infrastructure backed by capacity building. LIC has to identify the role of ICT.
- LIC is to design ICT policies and programmes on their generative and developmental roles. ICT brings value to the role of LIC in economic growth. With the combination of technologies it has become essential to take a complete look about information and communication technologies for improving the business of LIC. LIC has to build sound policies in order to bring holistic development with the ample choice of ICT.

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Farmer Empowerment as a Tool to Stimulate Local Economic Development: The Case of the Cashew Production in Tanzania

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Abstract

This study looks at farmer empowerment in different collaborative structures in Tanzania. It compares several initiatives in Tanzania's cashew nut industry by means of their contributions to farmer empowerment and local economic development (LED). Farmers pay a substantial amount to be part of current state-cooperatives, but few of these invest in farmer empowerment. However, new forms of farmer organizations, accounting for only a small percentage of the cashew industry, significantly focus more on structural and strategic empowerment.

Some structures allow for (semi-)processing, thereby adding value for the farmer. The share of the value chain that each of these structures captures was therefore found to strengthen the farmer's position. The findings result in a call for Tanzania's cashew value chain to change, in order to help farmers attain a better position within the industry.

Key words

empowerment, human coordination, local economic development, global value chain, cashew nut industry, Tanzania

Introduction

In developing countries, the agricultural sector is a large contributor to the GDP and crucial to economic growth. Strong evidence of the relationship between agricultural and economic growth has been presented by Tiffin and Irz (2006), as agriculture employs many and thereby gives a developing nation the ability to become economically independent (DeJanvry & Sadoulet, 2010).

In Tanzania, cooperatives have played a vital role in rural and urban economic development, but they have suffered much criticism in recent years. They are seen as 'stuck in the past and unable to cope with modern economic realities' and poor administration, corruption, poor business practice and poor leadership have led to unprofitable structures (Bibby, 2006). Even the Tanzania Federation for Cooperatives recognizes this:

'cooperatives have struggled to compete with the private sector and many have not been able to provide their members with the services they need' (TFC, 2006).

In the cashew industry, one of Tanzania's main cash crops, farmers are bound to the state co-operatives, because government regulation only allows the sale of cashews through the primary cooperative societies (PCS). However, farmer empowerment efforts are low in these structures, so little benefit can be derived from membership of these PCS. There is little investment in training or education for farmers and profit is lost in the many layers of the cooperative structure (Navuri, 2013). Currently, farmers deal with low yields, a lack of education and high cost of PCS membership, while make little profit, so cashew farming has become unsustainable business. The current situation creates unrest in the country with farmer riots in the southern regions of Tanzania, where most of the countries' cashew is grown.

To achieve economic growth the position of individual farmers must be strengthened, which can be done through human coordination (Orogo, 1994). New initiatives have recently emerged, aiming for a better position for the farmer. They focus more on empowerment in terms of training, but also incorporate processing into their activities in order for farmers to capture more value from their product. This vertical integration is called chain empowerment (KIT, 2006), which is especially needed now that the undesirable influence of international markets is increasingly felt.

Given that 90% of Tanzania's cashew production is exported in the form of raw nuts (CBT, 2013) most processing, and therefore value capturing happens abroad. Tanzania is claimed to lose $110 million each year because of this low value addition, and processing could, apart from possible job creation, allow the sector to become a large driver for economic development again (Navuri, 2013). The goal of this study is therefore to describe the farmer's position in Tanzania's cashew nut value chain, to determine in which way their collaborative structures can empower them and to suggest improvements. The research question for this study:

What is the current state of empowerment in collaborative structures in the cashew nut sector in Tanzania, what is the effect of this on local economic development and in which way can the farmer's strategic position be improved through value-addition activities?

Theoretical contributions of this research come from combining the literature on empowerment, local economic development (LED) and the global value chain (GVC). The case studies in the cashew nut industry allow for comparison of the current situation to this literature and will further academic knowledge by providing empirical data from Tanzania as a specific geographical area, as well as the cashew nut sector as a specific industry. From a managerial perspective, the findings highlight the importance of empowerment in collaborative structures and their contributions to LED and they provide insights on how more could be gained from farmer's association in collaborative structures. Over 250,000 smallholder farmers in Tanzania grow cashew nuts, so the economy can benefit significantly if the farmer's position is strengthened and our findings might even attract investments in processing in Tanzania's cashew nut industry.

In the following section the literature and background will be reviewed, resulting in propositions and a framework to guide the research. This is followed by the methods and the findings from the case studies. Cases are compared in the discussion, contrasted with findings from other sectors and the conclusion links the findings back to the literature and discusses limitations, implications and suggestions for further research.

Background

In order to understand the farmer's position in the system, we link the current literature on co-operatives to economic development, while stressing the importance of empowerment and global value chain (GVC) integration. Also, the background of agriculture in Tanzania and the development of the cashew nut industry need to be understood. Throughout this section propositions are developed, which result in a framework.

Economic Development

Economic development can be evaluated on different levels within a country, e.g. collaborative structures can advance economic development on a local level while contribute to the national economy, but they are influenced by (regional) governments and institutions with national laws and regulations. Stimson et al. (2009) see institutions as an endogenous variable which influences regional growth and development. However, they neglect the (inter)national and local levels, which are added by Pennink (2013). Government, universities and businesses play a role in economic development as they influence individuals or group like the farmer cooperative.

Human coordination, e.g. a farmer cooperative, was found to stimulate local economic development (LED), because collective organization of people allows them to do more than they could do on their own through bundled power, knowledge and resources. It gives farmers an advantage when taking their crops to the market (Bibby, 2006) and provides access to other resources like information (Han et al., 2012), enhancing a person's well-being. These networks can therefore be seen as a resource for farmers, and contribute to LED, but only when there is empowerment of members (de Bruin, 2013).

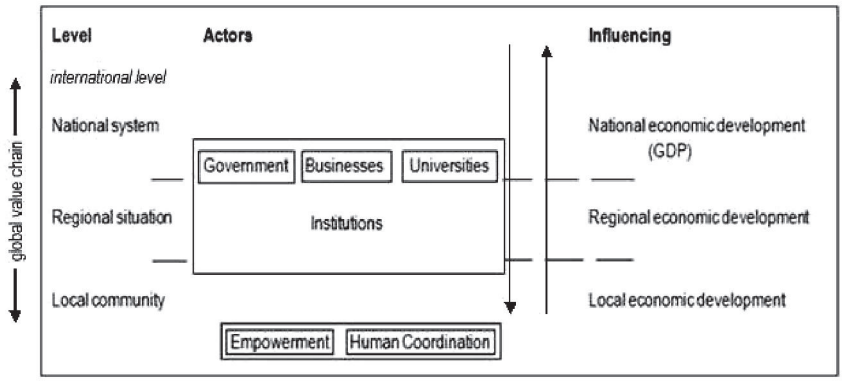


Figure 1 Model for economic development (adapted from Stimson et al., 2009; de Bruin, 2013, Pennink, 2013)

The national, regional and local economic levels as well as the relevant actors for this research are depicted in figure 1. The institutions, consisting of universities, government and business, operate on all three economic levels and influence the human coordination initiatives, which serve the farmer on the local level. From a more distant perspective this figure 1 can also be seen as a

model of the global value chain in which agricultural commodities are produced and brought to the market through different levels. Produced in the local community, they pass through cooperatives in the regional situation and end up in the national system, or even on an international level.

National Economic Development Through Agriculture

On a national level, economic and political reforms, such as market liberalization and multiparty elections have made Tanzania a successful example of good governance reforms in Africa (Utz, 2007; Mitchell, 2004). The country is an example for other African nations with a 7% GDP growth per year between 2000 and 2008 and 6% per year in 2009-2011 (CIA Factbook). In developing countries, much of the economic development comes from agriculture and several studies have indicated that agricultural development effectively reduces poverty and accelerates economic growth (Amani, 2005; Dixon et al., 2001; Hammond, 2005; Mellor, 2000).

Mnenwa and Maliti (2010) claim that 'the agricultural sector is the main provider of livelihoods for around 80% of the population in Tanzania' and agriculture attributed to 27.8% of Tanzania's total $67.9 billion GDP in 2011. This is mainly because of Tanzania's cash crops, which are largely export-based and therefore receive high government attention. One of the main cash crops is cashew, third after tobacco and coffee in foreign exchange earnings from 2009 to 2011 (CBT, 2013).

Cashew trade did not develop in Tanzania until the 1930s, when Anacardium Occidentale, the cashew nut, was introduced. Tanzania has since then been an important producer of cashews and the sector recovered well after the agrarian crisis in the 1980s. This was due to the decision to start exporting raw nuts rather than local processing (Mitchell, 2004), so farmers got paid quicker and could therefore invest in inputs like sulfur and increase yields. This switch to exporting, however, also led to processing facilities in Tanzania operating at a loss, and 9 of Tanzania's 12 factories closing between 1985 and 1990. Today, almost 90% of Tanzania's raw cashews are exported, resulting in a large dependence on India as their main buyer and low value-addition in the Tanzanian industry. In the 2011/12 season, 158000 tons were produced, making Tanzania the third in Africa by volume (Fitzpatrick, 2013), so increasing processing could significantly enhance the farmer's position and the cashew sector's contribution to economic development.

The Regional Situation; Institutional Interference

Cashew is mainly produced in the South-East of Tanzania and this is the main contributor to this region's economic development. However, given that cashew is a high-value crop, Mnenwa and Maliti (2010) found it alarming that the incidence of poverty is so high in households in the industry. The lack of economic development in the region is caused by the low prices paid to cashew farmers and the inadequate processing industry (Mitchell, 2004) in a region where 48% of cashew-growing households rely on the sale of crops as their main source of income.

The cashew sector in Tanzania is the most regulated in the world (Fitzpatrick, 2013) by institutions including government, the public and private sector, NGOs and community actors. These can have a powerful effect, both negative and positive, on economic development (Stimson et al., 2009). Swinburn et al. (2006) also identify the importance of different actors, namely public, business and non-governmental partners to work collectively to create better conditions for economic growth and employment generation.

Tanzania's cashew sales go through one main channel: the Warehouse Receipt System (WRS). It was introduced for cash crops in 2007, as part of the Agricultural Marketing Systems Development Program, with the aim of improving the price for the farmer. Reasoning behind the system is that bigger quantities can be sold at once and quality control can be higher, resulting in a transparent system with a better bargaining position for the farmer. Other inititatives to help the farmer include state-funded research institutions like Naliendele, the countries' agricultural research institute, and CIDTF, the Cashew Nut Industry Development Trust Fund, which aim to improve yields and methods used in the sector.

Cashew collection is done by Primary Cooperative Societies (PCS), whereas Cooperative Unions (CUs) oversee these PCS and organize auctions to sell the cashew. These state cooperatives are audited annually by the Cooperative Audit and Supervision Corporation (COASCO). In some districts, other collaborative structures like farmer associations or private companies can be found.

The Cashew Nut Board of Tanzania (CBT) oversees and regulates all cashew activities on behalf of the Ministry of Agriculture, Food security and Cooperatives (MAFC), together with the Warehouse Licensing Board (TWLB). They distribute the buying and export licenses, but also set the indicative price for the auction. Regional governments decide which organizations are allowed to collect cashew from the farmers.

In short, these institutions can decide whether collaborative structures are able to collect, process and sell their member's cashews and will be included in this research in order to determine whether this interference has a positive or negative influence on the performance of these structures. Resulting from this is the first proposition:

P1: Increasing institutional influence in the current PCS will enhance the performance of these collaborative structures in the cashew nut industry, because regulation can allow or restrict them in performing their tasks.

High control is expected to enhance farmer empowerment, as structures are then obliged to adhere to the standards which were set in CRMP to help the farmer. Low control, in turn, might allow for corruption and lower investments in farmer empowerment. The institutions involved in the cashew-nut value chain are depicted in figure 3, after the different collaborative structures are discussed in the next section.

Collaborative Structures in Tanzania: A Closer Look at Institutions Influencing The Local Situation

Narayan and Pritchett (1997) researched economic performance in rural homes of Tanzania and found that participation in collective organizations resulted in higher levels of incomes as a result of better agricultural practices, because farmers knew more about chemicals, fertilizers and seeds. Cooperatives have a purpose to fulfil the economic and social needs of their members, who in turn, own and control the cooperative (Bibby, 2006) and the Tanzania Federation for Cooperatives, TFC (2013) defines a cooperative as 'an autonomous association of persons united voluntarily, to meet their common economic, social, and cultural needs through a jointly-owned and democratically-controlled enterprise'. These different collaborative structures are the marketing channels for farmers, so they have an impact on the local level. Participation in collective organizations is expected to produce benefits, which leads to proposition 2:

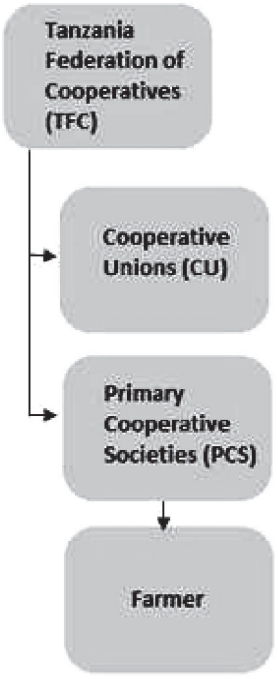
P2: Collaborative structures will strengthen the farmer's strategic position and thereby advance local economic development.

This proposition assumes that association in collaborative structures will help the farmer. In Tanzania, these structures occur in the form of the traditional state cooperative, and the more recent initiatives of farmer groups or associations.

State cooperatives

State cooperatives in Tanzania have existed since the 1920's and their history with high government influence explains their poor performance. Cooperatives were set up in the colonial period to organize the countries' cash crops for export, and "by 1965, over 20 types of crops were being marketed through 1287 primary co-ops, which controlled over 80% of agricultural production and marketing" (Banturaki, 2000).

Rapid growth-rate led to many weak primary cooperative societies (PCS) with bad management and high degrees of corruption. Government involvement was high in management of the cooperatives, which discouraged member participation. The World bank, ICA, the UN and ILO called for new associative forms, a transformation of old cooperatives, laws which recognized cooperative autonomy, provided assistance to and ownership for members, as well as education, training and regular audits (Birchall & Simmons, 2010).



National level. Set up in 1994, TFC is the national cooperative organization which promotes, serves and coordinates the development and prosperity of all cooperative societies in Tanzania. It is an independent cooperative body, promoting cooperative autonomy and member empowerment.

District level. The operating cooperative unions for cashews are CORECU, ILULU, MAMCU, TANECU and TANCU. They assist PCS, coordinate their activities and organize auctions for cashew sale.

Village or ward level. PCS collect the cashew nuts from the farmers in their area and facilitate delivery to the warehouse. They also facilitate farmer payments, through loans with banks.

Local level. Farmers collect their cashew nuts and deliver them to the PCS. For most farmers, this is the only marketing channel.

Figure 2 State cooperative levels in Tanzania's cashew industry

Recognizing the importance of the agricultural sector and the role of cooperatives in this, the Tanzanian government introduced the cooperative development policy in 2002 to help cooperatives regain their importance in the economic lives of people (TFC, 2006). Cooperative unions

(CU) were introduced as a means to organize the agricultural sector and new cooperative policy was written in 2002, along with a cooperative societies act in 2003. The cooperative reform and modernization program objectified to "initiate a comprehensive transformation of cooperatives to become organizations which are member owned and controlled, competitive, viable, sustainable and with capability of fulfilling member's economic and social needs (CRMP 2004: IV)".

The structure of the state cooperative system in Tanzania, depicted in figure 2 is arranged as follows:

Other structures

Still, the reputation of Tanzania's state cooperatives is poor, and some farmers decide not be a member as the added value is not always evident to farmers (De Bruin, 2013). CRMP identifies problems of poor management, inappropriate cooperative structures,

corruption, a lack of cooperative democracy and education, weakness of supporting institutions and, in general, an inability to compete in a liberalized market economy' (Bibby, 2006). In some regions, farmer associations are being promoted instead (Birchall & Simmons, 2010), which were also encountered in the cashew nut sector. Most of these were initiated with international help in order to improve the farmer's position and occur in different structures; farmer associations and registered companies.

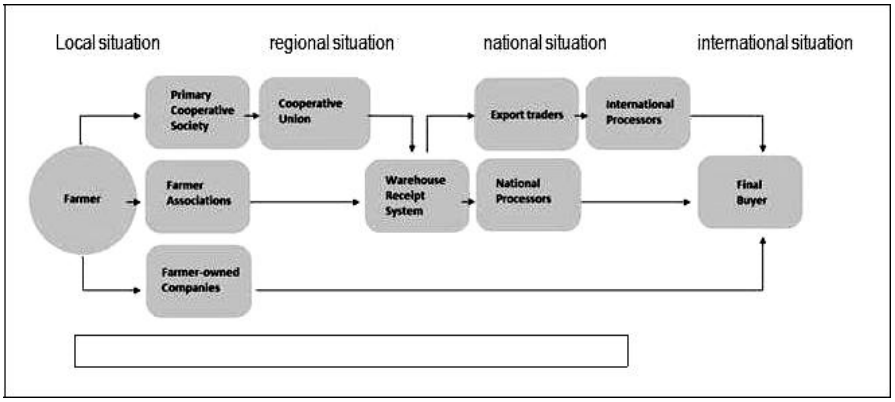


Figure 3 Tanzania's simplified cashew value chain

Empowerment

These collaborative structures could make a region more developed and defend farmers against the major forces in the international market, but as said, empowerment of farmers is crucial to the functioning of any form of human coordination (De Bruin, 2013). Bibby (2006) also mentions the importance of member empowerment; a process of power-sharing with members, in order to build their confidence and their ability to manage their own economic affairs.

Empowerment refers to the expansion of freedom of choice and action; increasing one's authority and control over the resources and decisions that affect their life. The World Bank (2002) definition is: "the expansion of assets and capabilities of poor people to participate in, negotiate

with, influence, control, and hold accountable institutions that affect their lives". The empowerment can be more focused on the position of the farmers within the cooperative which we label as strategic empowerment or focused on the position of the farmer within the value chain which we label as structural empowerment

Empowerment Through Strategy: Strategic Empowerment

The World Bank (2002) identifies four key elements of empowerment; namely access to information, inclusion or participation, accountability and local organizational capacity. These can be explained in the following way:

1. **Access to information;** e.g. the availability of reports regarding financial and market information can empower the farmer and aid them in decision making. Information is an important benefit of cooperative structures and Baticados (2004) states that cooperatives should function as an information source. Transparency is very important, as a lack of information on the global cashew industry results in decisions being made which are not based on accurate perceptions (Fitzpatrick, 2013). TFC (2006) therefore requires cooperatives to present audit reports, budgets, business plans and performance reports.

   Besides reports, information can be provided through training and education, but currently there is a lack of education among cashew farmers (Bibby, 2006). Educating farmers on issues like when and how to prune trees could bring yields up (Fitzpatrick, 2013), which are currently low in Tanzania compared to countries with similar resource endowments and climatic conditions (Mnenwa & Maliti, 2010). However, education also helps for decision-making purposes (Pomeroy et al., 1998). Cooperatives are required to train members, representatives, managers, and employees, and training budgets are supposed to correspond to 10% of their income (CSA, 2003).
2. **Inclusion or participation** refers to the involvement of community members in the decision making process. Bibby (2006) claims there is a lack of cooperative democracy and Birchall and Simmons (2010) think that cooperatives are ill-prepared to respond to competitive markets because they are not member-owned. Develtere (1994) agrees: "members became to see them as quasi-governmental agencies that provided useful services but did not belong to them". The number of meetings held outside the required annual general meeting, as well as inclusion of farmers in the decision-making process are factors of inclusion, but also the possibility for farmers to share ideas for improvement and strategic planning.
3. **Accountability** is the ability of members to call officials to account. It is increased by holding regular elections and enforcing internal accountability mechanisms, like annual reports. Leaders must be elected democratically, be qualified and loyal to its members (TFC, 2006), but corruption and embezzlement are problems in Tanzania's cooperatives (Bibby, 2006).
4. **Local Organizational Capacity (LOC)** assesses the ability of people to work together, organize themselves, and mobilize resources, to solve problems of common interest. An organization's performance is a result of the possession of resources (Lin et al.,1999; Chen et al. 2007) and like informational and technological assets, a network can also be seen as an asset. The resources to which individuals or collectives have access, through their

social relationships, can be called social capital (Portes, 1998; Putnam, 1995). Nahapiet and Ghoshal (1998) describe it as: "the sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit." LOC can create collective bargaining power with e.g. buyers and consists of assessing how inputs are distributed, how farmers interact with each other directly and indirectly, whether rewards are shared collectively (Bibby, 2006) and how much resources are shared within the network. If LOC is high, more benefits can be derived from membership of the network.

Figure 4 shows the four constructs for what we call strategic empowerment:

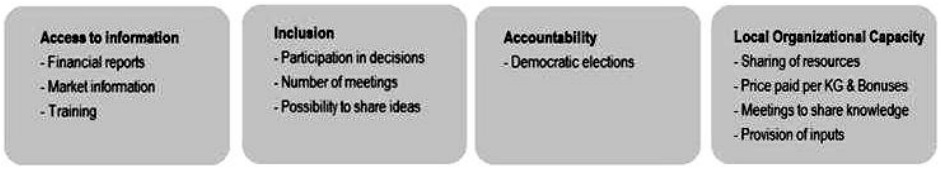


Figure 4 Constructs of strategic empowerment

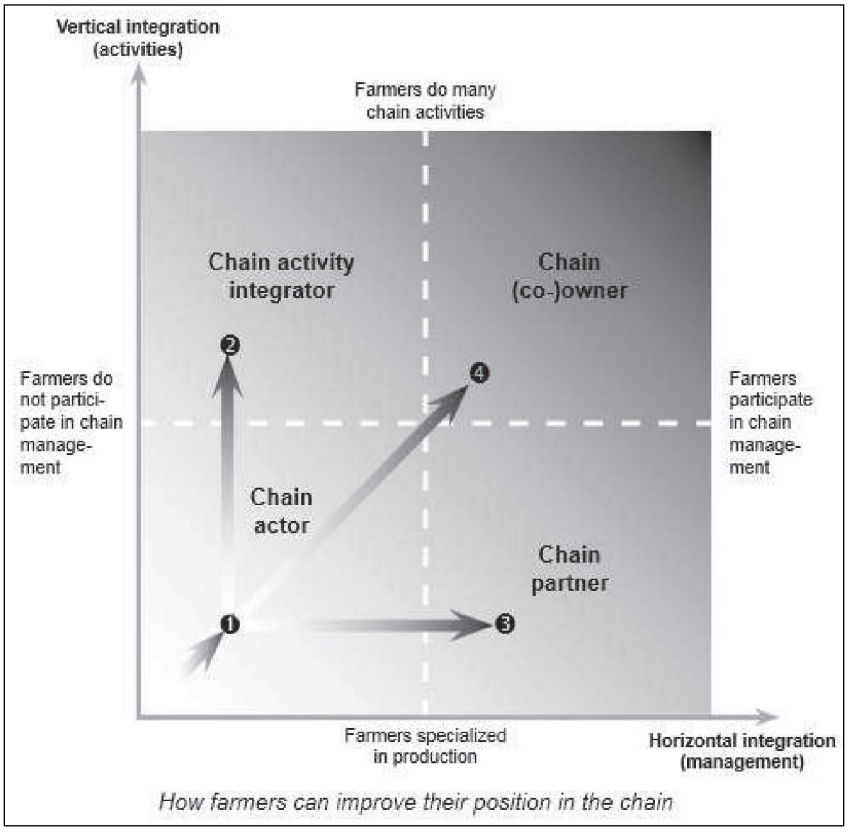


Figure 5 Vertical and horizontal integration for smallholder farmers (KIT,2006)

This strategic empowerment can enhance LED, because when efforts are made to empower the farmer through these constructs, the farmer is benefitted. This is achieved by educating farmers, and sharing resources and information, allowing them to gain more knowledge in their field. As a result, yields and quality will go up, and better practices could result in a higher price. In turn, a better income means a better strategic position for the farmer and therefore a significant contribution to LED.

This results in proposition 3:

P3: Collaborative structures can empower farmers through their strategic actions in terms of information, inclusion, accountability and LOC (horizontal / strategic empowerment). This will enhance the structure's performance, strengthen the farmer's position and increase contributions to local economic development

Strategic empowerment, or horizontal integration, refers to the management responsibilities of a farmer and or the inclusion in the strategic activities, allowing farmers to move from a chain actor position to a chain partner position. However, besides strategic empowerment, farmers can be empowered when their collaborative structures capture a larger share of the value chain, making the farmer a chain activity integrator. Vertical integration is the addition of activities to the portfolio of the farmer, like grading or processing of nuts, which I will call structural empowerment. Both horizontal and vertical empowerment are depicted in figure 5.

Empowerment Through Structure: Structural Empowerment

Vertical integration is called chain empowerment (KIT,2006). Mol et al. (2005) describe the vertical dimension of the value system as a constant 'tug-of-war' among vertically related actors, where value-chain envy motivates actors to integrate into stages where more value is captured than created. In Tanzania, the indicative price for raw nuts was 1200TSH per KG last season, and the farm gate price which was paid by the buyers was 1500 TSH. Prices in local supermarkets for processed cashews, prices are 20000 TSH per KG, putting the farmer, which only receives 6% of the total sales price, in a very unfortunate position. Farmers, as suppliers of primary input, feel that they get few returns compared to the actors in the processing stage, therefore envying these processors.

Some of Tanzania's collaborative structures export processed nuts, but most sell raw nuts through WRS. However, processing can enhance the farmer's position by allowing farmers to capture a larger share of the revenues in the value chain. This will increase their incomes and generate jobs in the area (KIT, 2006), allowing the structures engaged in processing to contribute more to LED. This results in proposition 4:

P4: Collaborative structures can empower farmers by vertically integrating into the value chain, as processing activities increase the added value (vertical / structural empowerment). This will enhance the structure's performance, strengthen the farmer's position and increase contributions to local economic development

Conceptual Model

Based on these propositions, a research framework can be constructed. The dependent, or forecasted variable is the degree of economic development on the local level as in figure 1.

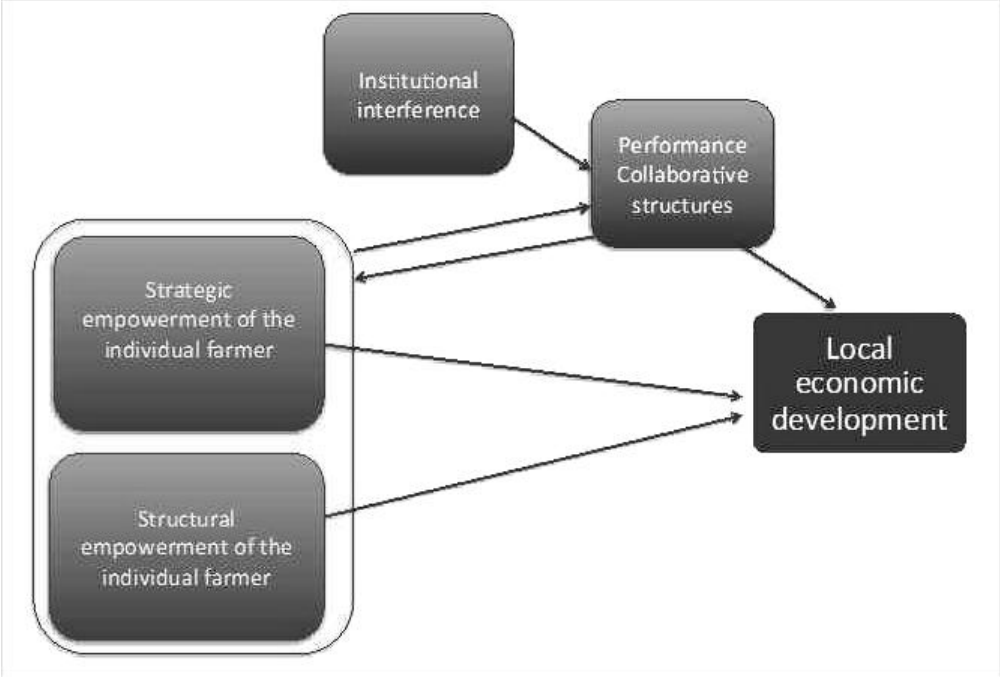


Figure 6 Conceptual model: the role of strategic and structural empowerment

Collaborative structures can increase their performance through strategic and structural empowerment of farmers, as structures with a focus on empowerment will be more profitable (de Bruin, 2013). This profit will strengthen the farmer's position and thereby enhance LED. Institutional interference, whether on a national, regional or local level, can facilitate or restrict the profitability directly, by influencing their ability to perform their tasks. Figure 6 depicts the relations of these four propositions.

Methods

As stated, this qualitative study evaluates empowerment in collaborative structures, through six case studies in Tanzania's cashew nut industry. These case studies are used to validate the theory (Yin, 2004) on empowerment and describe contributions to LED. Case study research is based on empirical, real-life data, so results contain a higher degree of validity (Eisenhardt et al., 2007). Each structure empowers the farmer differently and therefore has a different influence on LED. Comparison of the case studies allows for an analysis of the relationships described in the framework and an identification of success factors for LED contributions.

Respondents

In previous research on value chains, Rouse and Daellenbach (1999) describe that clustering of strategic groups is necessary in order to conduct a detailed comparison of the actors. The strategic groups for this research were the PCS and the different farmer groups, which are the farmer's possible marketing channels, as shown in figure 3. By using theoretical sampling (Eisenhardt, 2007), cases in this research cover all possible collaborative structures. This is needed to provide

a full overview of the industry and contrast the different empowerment strategies. Figure 7 gives an overview of the 3 primary societies and 3 farmer groups which were visited.

Figure 7 Cases

Each of these initiatives was evaluated according to the constructs for strategic and structural empowerment, as described under P3 and P4. This is depicted in figure 8.

Strategic empowerment	
Access to information	
Financial reports	Not available ←----→ Available
Market information	Not available ←----→ Available
Training	Not available ←----→ Available
Inclusion	
Participation in decisions	Low ←----→ High
Number of meetings	Low ←----→ High
Possibility to share ideas	Low ←----→ High
Accountability	
Democratic elections	Not available ←----→ Available
Local organizational capacity	
Sharing of resources	Low ←----→ High
Price paid per KG	Low ←----→ High
Meetings to share knowledge	Not available ←----→ Available
Provision of inputs	Not available ←----→ Available
Structural empowerment	
Value chain integration	Low ←----→ High

Figure 8 Case evaluation constructs

The farmer groups were selected with the help of sector experts and selection of the PCS was done after consulting the cooperative unions, who possessed information on their performance. The best-performing PCS in terms of output and profitability were chosen to visit, as they were expected to invest most in farmer empowerment. Besides, underperforming PCS were not willing to provide information and financial statements or simply claimed to not have time or information. Farmer groups were set up as the state cooperative system did not provide benefits to the farmers and are therefore expected to show higher levels of farmer empowerment and higher LED contributions.

Interviews, all semi-structured, were conducted with board members of the organizations and answers were checked with farmers of the corresponding organizations where possible. The outcome of the case-study interviews was cross-checked with own observations and expert views of several other actors in all levels of Tanzania's cashew nut value chain. This creates a multi-sided overview of the industry with many different points of view, including universities, agricultural research institutes, government institutions, financial institutions, companies in the industry and NGOs. The final case studies allow for cross-case analysis, comparing the different initiatives, their empowerment initiatives, the institutional interference and their contributions to LED.

Besides case- and expert-interviews, secondary literature such as financial- and annual reports of the collaborative structures, government documents on policy and cooperative law and sector reviews provided information. The results can be found in the next section.

Results from the Cashew Industry in Tanzania

In this section, the results of the interviews in the cashew sector in Tanzania will be discussed. Efforts of farmer empowerment will be discussed through the constructs mentioned in figure 4: access to information, inclusion, accountability and local organizational capacity (LOC), as well as their level of integration into the value chain. Besides empowerment efforts, institutional interference and LED-contributions will be discussed for each group of cases, starting with the cooperative unions, then the primary cooperative societies and then the other collaborative structures.

Structural and Strategic Empowerment in Collaborative Structures

Cooperative Unions

On the union level, overseeing the PCS, little efforts are made for strategic farmer empowerment. As CUs are in close contact with CBT, their knowledge of the market was extensive, but due to limited contact with the PCS, this knowledge is not being shared with lower levels of the cooperative structures and does therefore not reach the farmer. Some do organize training, but merely for board members and PCS representatives, who do not educate their farmers with that knowledge. Also inclusion of farmers is very low in the union level and board members were chosen at the AGMs without direct farmer input. Lastly, the resources of the CU are not shared with lower levels; neither do they facilitate knowledge- or resource sharing on any other level.

Looking at structural empowerment; ILULU and MAMCU do not engage in any sort of value chain integration, but a positive development is TANECU's plan to invest in a processing facility at their warehouse in Tandahimba. This will allow for the sale of processed nuts at the auction and therefore value-addition for the farmer, which might be beneficial for the farmers in this region in the future.

So, farmers do indirectly pay for CU operations, but receive little benefit; information which the unions receive from CBT and other institutions is in no way shared with farmers and educational efforts only reach PCS level. Lastly, the task of coordination of PCS is not performed well, as CUs have little contact with PCS and little information available on their operations and performance. The only CU task useful to the farmer is that they organize the auctions for the sale of their cashews.

Primary Cooperative Societies (PCS) and Farmer Groups (FGS)

Figure 10 depicts the characteristics of the three PCS cases and the three new collaborative initiatives that we encountered.

	KITUMIKI AMCOS	LUMANA AMCOS	MUUNGANO AMCOS
Founded	1988	1993	1982
Municipality (CU)	Lindi (ILULU)	Newala (TANECU)	Mikindani (MAMCU)
Board members	11	9	6
Members	180	459	330
Price paid last season (bonus)	1200 (none)	1200 (60)	1200 (131)

	KITAMA	UWAKOTA	MHQFP
Founded	2008	2009	2008
Municipality	Tandahimba	Tandahimba	Masasi
Board members	6	11	9
Members	252	784	1589
Price paid last season	1500	1880	1500-1750

Figure 9 Characteristics of collaborative structures

For both groups of cases, we will now discuss the structural and strategic empowerment, followed by the institutional interference and the contributions to local economic development.

Primary Cooperative Societies (PCS)

Efforts to empower the farmer are, like in CUs, low on the PCS level. Financial information was not available to farmers and while PCS could provide some data about past seasons, there were no official reports. When asked about market information, KITUMIKI did know about market trends in their area, but MUUNGANO knew little about what happened outside their municipality. LUMANA did know about the countries' market trends, but no information was shared with farmers in any of the PCS.

The only PCS which provided farmer training was LUMANA, which had a budget of 1.000.000 TSH. Training was given in 10 villages on the use of inputs and preparing their farm and they saw that this increased yields for this season, as 903022KG was collected with a target of 500000KG. Both MUUNGANO and KITUMIKI failed to provide training due to their weak financial position and limited funds.

In terms of accountability, all PCS have democratic board elections, like the CUs, to elect their board and each member gets one vote. The board is then accountable for all decisions for the following three years and operational decisions are made during board meetings, without presence of members. Farmer inclusion, however, is low, as there are no meetings outside the AGM in any of the PCS, so farmers have little influence in decisions. However, at KITUMIKI board members occasionally visit villages before board meetings, which are held 4 times a year. MUUNGANO stated that additional meetings were only held for emergency issues and that they have a suggestion box for all other matters, which has not resulted in much farmer input so far.

Looking at LOC, none of the PCS facilitate the sharing of resources. Blowers, used to spray trees with sulphur are owned by individual farmers and rented out to others[1]. All PCS did, however, provide discounted inputs with the subsidies they received from the government, but they admitted that there was not always enough supply and not all farmers were able to pay for it. There were no reported cases of farmers meeting individually to share knowledge, ideas or discuss current events, and this is also not stimulated by the PCS.

These three PCS have all been able to pay the farmers the indicative price in the 2011/12 season. However, LUMANA, which was able to provide a bonus last year, has only paid their farmers half of the indicative price this season, meaning 600TSH of the 1200TSH indicative price. This is also the case for MUUNGANO, who has not been able to make a second payment yet. They blame this on the market trends, CBT's indicative price and high transportation costs to the warehouse. Communication to farmers regarding the payments is bad, as PCS informed me that all cashew has been sold from the warehouse, while the farmers are being told that their second payment is still coming, after the sale of the cashews. In terms of structural empowerment, none of these PCS are involved in processing activities.

Farmer Groups

Looking at strategic empowerment, there are substantial differences with the state cooperatives. In KITAMA and UWAKOTA, there were no official financial documents, but both were aware of market conditions, knew how their approach differed from PCS and had a lot of market information. MHQFP has annual reports, clearly depicting market and financial information as well as company structure and board members are all aware of world market trends. All three structures shared this information with farmers through their AGMs and both UWAKOTA and MHQFP have meetings at the village and ward levels besides the AGM. This higher farmer inclusion allows for the sharing of information, ideas and knowledge. UWAKOTA, who call themselves an "institution built by farmers' was even recognized as a strong farmer group by national institutions like the Tanzania Warehouse Licensing Board (TWLB).

All three of these initiatives provide training at least once a year. KITAMA trained farmers on cashew growing and processing with help of Naliendele, CBT and NGOs like UNIDO and UWAKOTA provided training as well. However, MHQFP is an innovative player as they provide the most extensive training in the industry. They have farmer field schools (FFS), which are groups of 20-25 farmers, studying cashews for an entire cropping cycle, managing one plot together year-round. Participating farmers can serve as trainers in the following season, resulting in a pool of expert farmers which train fellow farmers on topics of sustainable production. So far, 822 members have completed FFS and both quantity and quality of their cashews have increased. Besides FFS, farmers are trained in record keeping, organic farming and sustainable production and field officers advise and inspect other farmers so they comply with organic standards, adding even more value to their product.

In terms of accountability, both KITAMA and MHQFP farmers own shares and elect board members during the AGM. For UWAKOTA, farmers do not own shares, but pay a membership fee. However, in all three structures, board members are elected at the AGM, like in the PCS, and

[1] KITUMIKI has about 20 farmers which own a blower, LUMANA stated that at least one farmer owns a blower in each village and also MUUNGANO has farmers which own blowers.

each farmer gets one vote. An important remark is that in MHQFP, board members produce an annual report to validate their actions towards the farmers, which does not happen in any other structure.

Looking at LOC, resource sharing for all three structures is the same as in the PCS, where farmers rent out their blowers to others. For input provision, UWAKOTA also follows the PCS-strategy by using government subsidies and KITAMA's does not provide inputs because there is no capital for this yet, but they aim to do this in the future. However, inputs in MHQFP are bought in bulk throughout the year, in order to distribute to farmers at the right time at a discounted price. This means that they do not rely on government subsidies and are self-sufficient in the supply of inputs.

However, the biggest difference with state cooperatives can be found in the structural empowerment. Both KITAMA and MHQFP add value by processing their cashews and this structural empowerment allows them to pay their farmers a higher price. KITAMA started processing in their Tandahimba factory in the 2011/12 season and sells to local factories like Rivervalley Foods, OLAM and MCC. MHQFP has processing plants in Maugura and Chakama and besides selling to local processors, their export quality kernels are sold directly to Intersnack (NL). They add extra value by producing fair-trade and organic nuts, the first two containers of which were exported in 2012. UWAKOTA does not process, but aims to improve the farmer's position by collecting the raw cashew from their members and sell directly at the auction trough the WRS. This eliminates the costly CU level, creating significant benefits for farmers. These new structures recognize the network as a potential resource and this awareness that network benefits will decrease with a larger structure was not encountered in state cooperatives. KITAMA focuses on facilitation of current members and also MHQFP stated to have a member limit, to keep their network strong.

Institutional Interference

The Cooperative Societies Act (CSA, 2003) regulates PCS management activities as well, regarding budgets for training, board elections, etc. Board requirements are the same, but also on this level, the adherence to these rules is not regulated very well. CSA clearly states that 10% should be spent on training, but two out of three PCS failed to provide any training to members. So; rules are in place, but not strictly adhered to.

Other institutions influencing the PCS are banks, like NMB and CRDB. They facilitate the payments to farmers, as 70% of the indicative price is paid as a loan when they bring in their cashews. Buyers pay the corresponding banks after the auction, and costs for WRS, PCS and banks are deducted from this before second payments are made to farmers. However, as these second payments have not always been made in past seasons, banks can now only guarantee 50% of the indicative price, meaning 600 TSH, lowering farmer trust in PCS. PCS blame CBT for setting this indicative price, as it creates farmer expectations, while it cannot always be paid.

For the farmer groups, institutional interference is high, because national and local government influence their operations. Both UWAKOTA and MHQFP have been denied the license to collect cashew from their farmers by the regional government this season, as a result of government protection of the PCS. They were therefore restricted in their business, and not able to make profit to pay their farmers.

For KITAMA, buyer influence is also of great importance. They have the licenses to collect and process, but no channels to sell their semi-processed nuts. As they have not built a proper buyer-network yet, their processing stopped in February 2013, because prices dropped to 1000TSH per KG. They aim to sell the remaining nuts to a new buyer, with whom they are now negotiating. As there are few buyers in Tanzania, they have large bargaining power, which is an issue for processors and farmer groups.

Effects on Local Economic Development

Besides providing work for board members, PCS generally donate money to their communities, e.g. KITUMIKI contributed to water provision in the community and LUMANA has contributed to a secondary school. MUUNGANO has not made contributions to the community due to a lack of funds, and none of the PCS expect to have a budget for it in the current season. However, as farmers have not received their full payments yet, we believe this money could better flow directly to the farmers.

Strategic empowerment, e.g. providing training and information can result in sustainable LED, as this can strengthen the farmer's position. Increased knowledge and yields allow farmers to earn more money in following seasons. Unfortunately training only took place in one PCS. Also, as PCS struggle to pay farmers the indicative price, resulting in unrest, low trust in the PCS and financial problems for farmers, as they e.g. cannot pay school fees in time. The financial position of the PCS, especially in the past season, results in a weak farmer position and therefore low LED-contribution.

None of these three PCS have reached vertical integration, but an example of structural empowerment is JIPANGE AMCOS under MAMCU. They have a group of women in Mtwara who process and sell part of their farmer's production. This initiative was started by Naliendele in 2006, and it provides these women with work and the farmers with higher income. If more PCS would follow this example, it would enhance the farmer's position, income and the structure's LED contributions.

In the farmer groups, the prices paid to farmers are significantly higher. The increased income from profitable business strengthens the farmer's position and contributes to LED. UWAKOTA does not have bank loans[2] or a CU level, and therefore fewer organizational costs than the state cooperatives. KITAMA and MHQFP add value through processing and MHQFP also increases prices with of fair-trade and organic certifications[3]. With these profits, UWAKOTA for example invests in the local schools in a sustainable way.

Evaluation

There has been a recent increase in PCS members, but this growth is stagnating. Looking at overall farmer engagement, low membership levels were encountered[4]. The reasons mentioned for this are that some farmers only produce small quantities each season, so cashew is not their main

[2]4 They collect the cashew nuts right before the auction and pay the farmer directly, without paying interest fees to banks

[3]The different certifications explain the different prices of 1500-1750 paid to farmers.

[4]To illustrate; only 180 out of 1500 farmers in KITUMIKI's area, for LUMANA 459 out of approximately 2000 in their area and MUUNGANO only 330 of more than 800 farmers

source of income and they see no need to become a PCS-member. Besides that, MUUNGANO stated that farmers are not being educated about the benefits of a PCS, or are not able to pay the shares. However, as the only direct contact besides the AGM is when farmers visit the PCS to bring their crops or buy inputs, little benefits are derived from PCS membership, which is the main reason for these low membership levels.

Even non-members must sell their cashews through the PCS, and inputs, subsidized by the government, are the same price for members and non-members[5]. Besides, the sharing of resources and knowledge is not facilitated by the cooperatives, apart from the training given by LUMANA. When asked about member loyalty, MUUNGANO management explained that finance was a problem, and that farmers complain about board members using money for personal gains. Besides farmers mentioning corruption, they find that PCS charges too high costs for their work. The lack of strategic and structural empowerment in PCS results in little contributions to the farmer's position and LED.

In contrast, the new structures were all recently established out of unhappiness with PCS and both KITAMA and MHQFP received international aid from e.g. UNIDO and AECF, as these NGOs see the importance of properly functioning collaborative structures. All three stressed the importance of farmer empowerment and an MHQFP representative stated that 'empowerment does not exist without ownership'. This does not only refer to company ownership, but also the share of the value chain. In KITAMA and MHQFP, farmers 'own' the cashew until it is semi-processed and therefore receive a higher price. This structural empowerment has strengthened the position of the farmer.

For all three new initiatives a steep member increase was seen[6], as their efforts in strategic and structural empowerment allowed them to make profits, which strengthen the farmer's position and make substantial contributions to LED.

In the next section, the two groups of cases will be compared on the basis of the four propositions.

Discussion

In this section, the case studies will be compared according to the four propositions and an answer to the research question is provided, ending with the call for the value chain to change. In structuring this paragraph we will use our conceptual model and start with the first independent variable: Institutional interference and our first proposition.

Institutional Interference

P1: Increasing institutional influence in the current PCS will enhance the performance of these collaborative structures in the cashew nut industry, because regulation can allow or restrict them in performing their tasks.

[5]Given that inputs are available when needed, because government subsidies are provided in the spraying season, when demand, and therefore the price is high

[6]252 members joined KITAMA, UWAKOTA grew from 241 to 784 members and MHQFP grew from 840 members to 1589 farmers, with prospects of 2200 farmers in September 2013

National system

Government interference in the cashew nut industry is high, as there are many regulations. For the sales process, government intervention has a significant impact. With the mandatory nature of WRS, there is only one channel for farmers to market their products, but this actually reduces farmer empowerment. In the old system, farmers or their collaborative structures could build relationships with buyers, e.g. negotiating terms for quality and fair-trade or organic standards. However, as all cashews are currently sold through the auction, with an exception of structures like MHQFP and KITAMA, there is no longer a reward for better quality. Besides, cashew sold through WRS must be grade 1, with corresponding quality expectations[7], and some farmers are now stuck with undergrade cashews, which they were previously allowed to sell.

All interviewed parties indicated that WRS has potential benefits for farmers, but besides limiting marketing channels, there are problems with the execution of the initiative by the warehouse officers. LUMANA stated that lesser amounts were being documented than actually brought in[8], reducing the profit and position of the farmer. These corruptions in the system call for better monitoring of assessing weight and quality and if the system is continued, it should have a voluntary set-up in order to allow collaborative structures to establish their own buyer relations if they want to.

State cooperatives

For PCS, the indicative price as set by CBT poses a problem. As it is based on the global cashew price in the previous seasons plus estimated production costs per KG, it fails to take current global market trends into account. As a result, prices paid to farmers are sometimes below this indicative price. Also, the minimum price at the auction has reduced the number of buyers, leaving cashew in the warehouse and the farmers without pay.

Besides, government enforcement of the cooperative societies act is low. This lack of government regulation has resulted in a low focus on strategic empowerment in the state cooperatives, i.e. most PCS do not provide training as required and there are no financial reports available. This allows for corruption and weakens the farmer's position. More government enforcement of PCS and WRS rules would increase these structures' profit through higher yields and thereby ensure more income for the farmer, strengthening their position.

New collaborative structures

For the new initiatives, too much regulation from regional governments has had a significant negative impact. The inability to obtain the license to collect produce from their members has limited UWAKOTA and MHQFP in their business, because without these permits their profitability is reduced, weakening the farmer's position and inhibiting LED contributions.

In short, institutional interference inhibits performance of both state cooperatives and the new initiatives, but in different ways. Government regulation binds farmers to the state cooperative system in which empowerment is not enforced and restricts the new initiatives from performing their tasks at the same time. Institutional interference is therefore split up in:

[7] 9 Moisture should be between 7% and 10% and the nut count approximately 172 per KG (CBT).

[8] e.g. when 10KGs are brought in, only 9.6KG is documented.

1. government enforcement of empowerment in PCS, which will have a positive effect on the performance of the state cooperatives, their enhancement of the farmer's strategic position and LED.
2. government regulation of new structures, which has a negative effect on the performance of these structures, their enhancement of the farmer's strategic position and LED.

Contribution to LED

P2: Collaborative structures will strengthen the farmer's strategic position and thereby advance local economic development.

In order for collaborative structures to contribute to LED, they must be profitable first. As many of the state cooperatives fail to make a profit, their contributions to the farmer's position and therefore LED are low.

However, community donations as seen in PCS and UWAKOTA do enhance LED, but ideally, this money should flow back to the farmers, because this money was made on their behalf. Besides donations, collaborative structures provide work to local people in the form of board positions and processing jobs as in KITAMA and MHQFP. The income from this is also seen as a contribution to economic development and is much more sustainable than donations to local institutions. However, these LED contributions are not a result of strengthening the farmer's strategic position, as depicted in the original research framework, but a direct influence from the structure to the community.

In contrast, the profitability of new structures results in direct economic benefits for the farmer. They keep costs low, invested money in training to increase yields and distribute their profits among members. Besides training given, the set-up of processing facilities and the efforts to produce organic and fair-trade cashews provide farmers long-term solutions which enhance profitability, strengthen their position and allow for larger LED contributions. Institutions do have an influence, as proposed in P2, although collaborative structures' LED contributions sometimes flow differently than was originally thought.

Strategic Empowerment

P3: *Collaborative structures can empower farmers through their strategic actions in terms of information, inclusion, accountability and LOC (horizontal / strategic empowerment). This will enhance the structure's performance, strengthen the farmer's position and increase contributions to local economic development*

Access to information and inclusion of farmers were found to be higher in the new structures as compared to the state cooperatives. However, the lack of financial reports in all structures besides MHQFP and the lack of market knowledge in PCS is alarming. The structures which provided training, being new initiatives and LUMANA, have seen a yield increase, and this higher production led to better income for the farmer. Accountability was found to be similar in all structures, as board members were elected at an AGM and serve for three-year periods. However, the MHQFP board presented annual reports, whereas other structures do not, increasing accountability through transparency. In terms of LOC, similarities were encountered in the input provision strategies, but even though subsidized by the government, sulphur is not always available at the necessary time.

A solution could be to buy inputs year-round to have sufficient stock in May, like MHQFP does. Sharing of resources like blowers happened the same way for all structures.

As shown, prices paid to farmers are substantially higher in the new initiatives. For UWAKOTA, this is because their costs are significantly lower that the PCS and CU costs, allowing them to pay 1880TSH in comparison to 1200TSH paid by PCS in the same season. Trust of the farmer in state cooperatives is therefore very low, as much of their profit is lost in these structures. On the other hand, these higher prices paid by new structures can be explained by the focus on strategic empowerment. Training and information increased yields, and production enhances performance and farmer income. Besides, MHQFP farmers received a higher price because of better quality, which was achieved through their FFS's. So, in line with proposition 3, the structures which focus more on strategic empowerment within the attributes defined did perform better and were therefore able to pay the farmer a higher price, strengthening their position and making higher LED contributions.

Other sectors in Tanzania have also seen the rise of initiatives which focus on strategic farmer empowerment. In the coffee sector, the MEMCOOP project provided training to over 60000 cooperative members. Results showed that farmers felt they had more ownership over their cooperatives, resulting in higher inclusion. Besides, prices obtained by participating cooperatives were higher than of those not in the study, which enhances the farmer position and LED contributions. In the milk-sector, TangaFresh set up a model farm to educate their farmers and increase yields, as this enhances performance. These initiatives once more underline the importance of strategic empowerment.

Structural Empowerment

P4: *Collaborative structures can empower farmers by vertically integrating into the value chain, as processing activities increase the added value (vertical / structural empowerment). This will enhance the structure's performance, strengthen the farmer's position and increase contributions to local economic development*

Looking at the MHQFP and KITAMA, their engagement in (semi-) processing allows them to capture a larger share of the value chain. This structural empowerment increased their profitability and allowed them to pay their farmers 1500 to 1750TSH, compared to the 1200TSH indicative price for raw cashews, showing that higher focus on structural empowerment does enhance the farmer's position, as proposed in P4, as the structures which engage in vertical integration are more profitable. This makes them able to pay their farmer a higher price, strengthening their position, and therefore contribute to LED in a sustainable way.

Calling for Chains to Change

What is the current state of empowerment in collaborative structures in the cashew nut sector in Tanzania, what is the effect of this on local economic development and in which way can the farmer's strategic position be improved through value-addition activities?

More could be gained from farmer's association in collaborative structures. This research shows the importance of empowerment in collaborative structures, but most state cooperatives in Tanzania fail to empower farmers both structurally and strategically. Farmer associations can offer

an alternative to PCS (Fitzpatrick, 2013), but the institutional interference discourages them. A lack of empowerment, low yields, little value-addition and a lack of bargaining power due to WRS have weakened the farmer's strategic position.

Profit from their crop is low, and a shift towards cultivating maize and cassava can be seen in the region, lowering the LED contributions and the competitiveness of the cashew sector in general.

As demand for cashews is likely to grow (Fitzpatrick, 2013) it is key for Tanzania to follow the lead of new initiatives in order to increase production and processing through strategic, but mostly structural empowerment. This will result in a chain 'characterized by value addition and information' (Fitzpatrick, 2013).

Given that (semi-) processing is a form of empowerment which can significantly strengthen the farmer's position, vertical integration is the way forward for Tanzania.

In other industries in Tanzania, vertical integration has also shown benefits. An example is the sugar-industry, where a large outgrower program allows farmers to deliver their crop to a processing plant in Bagamoyo and thereby gain more from their product. This has significantly strengthened the farmer's position and LED contribution of their industry. Across borders, the cashew industry in Mozambique is another successful example, as farmers have successfully integrated into the processing-part of the value chain in Mozambique (KIT, 2006). However, processing in Tanzania currently only happens in 4 factories (CBT, 2013) and on a smaller scale by collaborative structures. Only MHQFP and KITAMA have yet been able to establish vertical integration, but there is interest from TANECU as a cooperative union to follow this example, which could benefit many farmers in the region. Besides creating a long-term profit potential for farmers, processing will reduce Tanzania's dependence on large buyers of raw nuts. Besides, the added value from processing and the job creation might aid the economic development of the region.

Conclusion

This last section relates the findings to theory, modifies the models presented in the literature review accordingly and provides theoretical and managerial implications. Last, the limitations and possibilities for further research are discussed.

Findings

First, the importance of both types of empowerment in human coordination initiatives was demonstrated by the case studies. Comparison shows that strategic empowerment can increase yields and that structural empowerment raises value captured from the product. Empowerment of farmers therefore improves the collaborative structure's performance, which enhances the farmer's position, and increases contributions to LED. Second, collaborative structures were found to also make direct contributions to economic development, through donations to communities and job creation in processing and management. Third, the lack of government enforcement in Tanzania's cashew nut sector lowers empowerment efforts and the performance of state cooperatives, whereas government regulation of new collaborative structures lowers these structures' performance. To depict the actual situation, modifications to the original model must be made, as shown in figure 12. In this adapted model we have added the role of the regional and national government explicitly as

an independent variable even though one could argue that the institutional variable includes this influence. We have done this because we believe governments have a different influence on the different types of collaborative structures and must be evaluated separately.

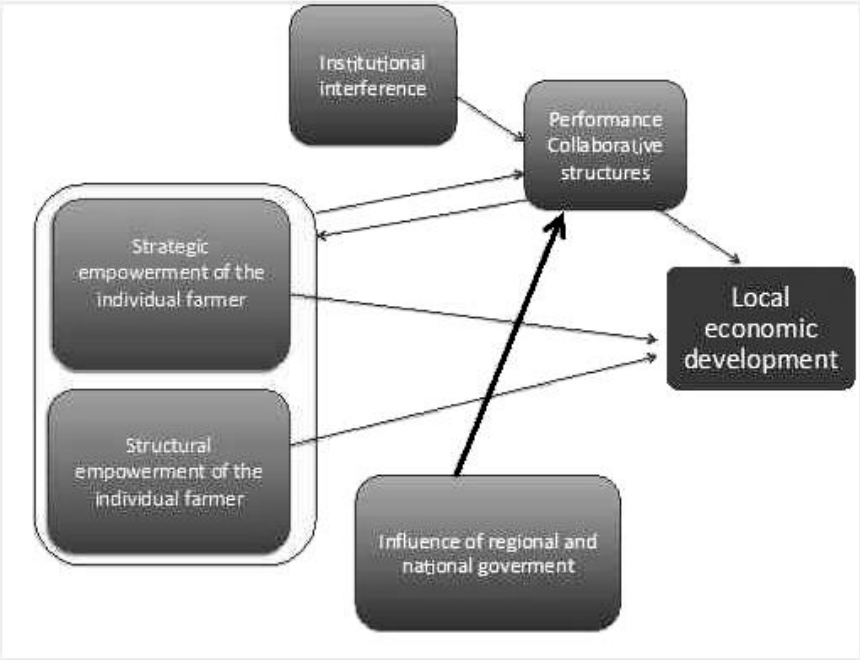


Figure 10 Modified conceptual model

Economic development

As argued, strategic empowerment increases yields and income of the individual farmer, and therefore has an impact on a local level, whereas structural empowerment can also have a regional influence by providing processing jobs in the area.

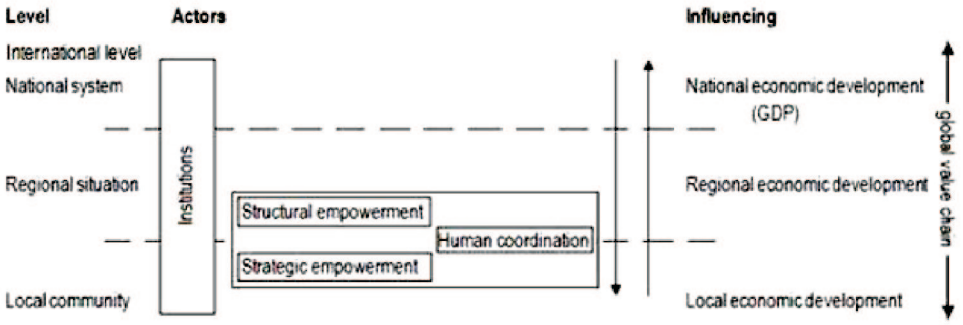


Figure 11 Modified model for economic development

By allowing farmers to reach a chain activity integrator position, as depicted in figure 5, the farmer's position in the value chain is strengthened, and the cashew sector could make much larger economic contributions. Structural empowerment is therefore positioned in the regional level. Institutional interference was found to be present on all levels of the national system and include universities, business and government. Figure 13 shows the adaptions made to the model for economic development.

Implications

To conclude, this study shows that empowerment in human coordination as defined in the literature advances economic development as both strategic and structural empowerment can increase collaborative structure's performance, thereby strengthen the farmer's position and raise contributions to economic development.

However, the current literature shows that collaborative structures influence economic development on a local level, but structural empowerment could also make regional contributions. This was shown by the case studies in Tanzania's cashew nut industry.

Practical implications are that collaborative structures could advance Tanzania's economic development if they increase focus on strategic and structural empowerment. However, investments in processing are needed and it should be stimulated by the government in more convincing ways[9]. Furthermore, government should allow any structure to collect from their farmers and negotiate their own terms with buyers, make the auction more transparent[10] and WRS optional. This can make cashew a cash crop, not only for government purposes, but also for the farmer, and increase contributions to the economic development of the cashew-producing regions in Tanzania.

With a value chain-approach, focus of this research would have been on vertical business links. However, as businesses do not operate in isolation, the understanding of local institutions is of key importance. GVC and LED literature therefore complement each other, and by combining these, this paper provides an integral view on empowerment, with a solution which is owned by local populations and adapted to local context.

Limitations and Further Research

First of all, the adapted model for economic development, figure 13, is not complete. This research looks at farmer empowerment and its influence on economic development, but there are many other factors besides empowerment, as explained by Stimson et al. (2009). These are not covered by this research, and as many households in developing countries depend on agriculture as their main source of income, further research could be conducted on endogenous factors which influence all levels of economic development.

Looking at research methods, the level of education and language barriers had an impact on interviews. For some interviews, e.g. PCS and farmer visits, a translator was present, because not

[9]The only encouragement now is that processed cashews can be exported at a 0% levy, whereas raw cashews are exported at 15%.

[10]The auction discourages processing, as there is no guarantee of supply. Bids are silent, winning bids are not announced and licenses are needed, so some processors ended up without cashews. An example of this is MCC, who has not processed any cashew this season, because they were not granted a buying license for the auction.

all respondents spoke English. However, questions were simplified as much as possible in order to avoid confusion and misinterpretation.

Besides this, criticism on the case-study method exists. A lack of internal validity can be caused by the investigator bias, as he/she can influence what is observed. This study uses triangulation of data to strengthen the validity, so besides the cases; interviews, observations and annual (financial) reports provided insights. Another point of critique is that case studies have limited external validity, since it is impossible to generalize from a single case. This was solved by selecting several cases on multiple levels of the state cooperative system in Tanzania and by comparing these to other initiatives in the industry. However, geographical limitations do exist, as this study was performed in one sector in the South-East of Tanzania. This limits generalizability, so other research could examine the influence of strategic and structural empowerment on the economic development in other regions, sectors and nations.

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Internationalisation and Market Access for Tanzania Food Processing SMEs: Challenges And Opportunities

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Abstract

The research aimed at looking into the factors hindering international market access for local food processing SMEs and identifying available opportunities for these firms. Prior to identifying challenges and opportunities the level involvement of these enterprises in international business was first assessed. Based the research objectives, the study used exploratory and descriptive designs. Data were primarily collected from 125 respondents from 15 food processing enterprises and 5 SMEs support service institutions in Dar es Salaam region where the sample was obtained using stratified, simple random and purposive sampling techniques. Secondary data were obtained through web survey. Both qualitative and quantitative approaches were used in presenting and analyzing data. It was revealed that there is low involvement of food processing SMEs in international business and they account for less than one to total Tanzania exports.

The findings also show that key impediments to internationalization of local food processing SMEs include low product quality, inefficient production and low production capacity which were directly associated to poor technology and limited knowledge base. Stiff international standard requirements, competition and limited technical support are other key hindrances. Local food processing SMEs should invest in innovation and technology. They strategically take advantage of existing inter-regional trade opportunities and intelligently exploit special treatment market prospects since they provide room for specific processed food products.

Keywords

SMEs Internationalisation, Market access, Tanzania,

Introduction

The role of small and medium enterprises in today's global economy is immense. These enterprises constitute an industry dominating economic activities in many countries across the world as well as huge share on the GDP. About 95% of all enterprises are SMEs and are the major employer in the private sector of which share amounts to 60% (Ayagari et al. 2011) in Edinburg Group (2013). The sector employs 60 million people in India and creates 1.3 million jobs every

year (Europe-India SMEs BC, 2010), accounts for half of the GDP generated by the nonagricultural sector in the United States (USITC, 2010) whereas 99.8% of EU-27 are in SMEs category, employing 67% of labor force (EG, 2013).

This economic value has made SMEs an attraction not only to government but also to both academicians and practitioners across the world. While small and medium firms portray some likeness, many studies have also identified differences among them in many aspects hence losing universal application of many research outputs. First of all, while all use similar categorization parameters i.e. number of employees, capital invested and annual revenue, their sizes differ from one country to another. For example in the in the United States all enterprises whose number of employees is below 500 are under SMEs category (SBA Advocacy; USITC, 2010) while Tanzania considers it to be below 100 (URT, 2002) whereas fewer than 250 is the range for European Commission.

Second the contributions they offer to the economy differ from one country to another depending on their productivity and total output brought to the economy. The more is the engagement of an enterprise in value addition activities the higher the contribution to the economy and the lesser the involvement the lower the contribution (Waweru, 1995). This is more advantageous to developed countries where the manufacturing and other transformation sectors have attained high growth as opposed to developing countries like Tanzania where the sector is at infant stage.

In addition to that, many have been the studies in the SMEs industry but among them the most interesting are those which have focused on the understanding of competitiveness and internationalization of these firms. In this regard, according to empirical research findings, the firms that internationalize are more efficient, productive and grow faster than those that cater for domestic markets (Melitz, 2003; Hiep & Ohta, 2008). This directly exemplifies the importance of internationalization of enterprises in different countries.

In addition to firm specific advantages such as efficiency, revenue increase, acquisition of new technology and knowledge, high productivity and increased competitiveness, firms in cross border business have greater impact on national economy: they employ more labor, increase customer choice, and most importantly are the main source of foreign currency for many nations, especially those selling in international markets. The research by the Edinburg Group (2013) holds that the contribution of SMEs in international business varies from 16% of GDP in low-income countries (where the sector is typically large but informal) to 51% of GDP in high-income countries. Despite these paramount advantages this example shows the discrepancy between developed and developing countries hence the need for improvements.

Report by the EU commission (2010) indicates that 29% of SMEs across EU27 export, those in foreign subcontracting and those technological cooperation accounts for 7% each. From 1997 to 2007 SMEs accounted for 30% of total US exports. In India, according to the MSME Overview (2007), SMEs export share amounts to 40%. SADC countries, among which Tanzania, have low involvement in export business. With their substantial share in economic activities, if SMEs have heavily participated, the SADC countries would probably be competitive exporters (Matambalya 2000; Melitz, 2003; Hiep & Ohta, 2008; USITC, 2010).

Although for many years the game was for developed nations, SMEs export in developing countries have also speed up (Torrs, 1999; McDougall and Oviatt, 2000; Fillis, 2001; Ruzzier et al., 2006) quoted from (Lin, 2010). However, the case of Tanzania still remained questionable and the involvement in international trade is surprisingly low. Nevertheless, empirical studies provide a

lot concerning the back logs to international move for SMEs. Aranoff et al. (2010) and the Expert Group (2007) provide the findings on the barriers to internationalization for US and EU SMEs. These reports indicate the insufficient managerial skills required for internationalization leading to lack of international strategy, shortage of financial resources and inadequate capital investment, insufficient knowledge of the foreign markets and inability to identify market opportunities. (Ibid) also mentions that high cost of labor in the US is another key impediment since it makes smaller SMEs opt for less skilled cheap labor.

A report on "SMEs in SADC Economies" by Matambalya (2000) gives the details on the factors which restrain the economic performance and competitiveness of SMEs SADC countries. According to this report, internal impediments associated with firm specific factors include among others the disadvantage in enterprise factor costs which comprise *labor, capital and land;* lack of enterprise policy and participation in technological development such as limited investment in ICT and R & D as well as lack of plans for acquisition of licenses and alliances, enterprise size and growth strategies, predominant opportunistic entrepreneurial culture, limited knowledge of management and staff of the enterprise generally managed by individuals or families with no real professional managerial cadre involved.

Factors associated with external environment include inadequate SMEs support organizations and sector framework, macro-economic instabilities (Collins, 1997; Collins & Grunning 1998; Owen & Woods, 1998), incompatibility of regulatory environment with entrepreneurial efforts, poor infrastructure (ERO, 1998; Matambalya, 1999) and the policy framework to advance technology.

Some similarities can be identified between SADC and developed countries but the contradicting elements are in the macro-economic aspects as compared to SADC countries where they are still critical challenge countries. In addition to that the study in SADC countries is very generic to the extent that some country specific elements are ignored and for others they are exaggerated, i.e. not all SADC countries suffer from economic instability today. In fact, the government of Tanzania had made a lot in the efforts to support SMEs by availing the SMEs policy of 2003, establishment of support organizations such like TCCIA, SIDO, TANTRADE but the industry is still proving poor performance especially in the global business arena, 'even in the agriculture and food processing sectors where the country has comparative advantage' (ESRF, 2009). Above all, empirical researches on local enterprises had inward focus and less attention has been paid on international orientation.

Departing from that, a long range of studies and reports in the developing, emerging and developed economies have recognized the considerable contribution of Small and Medium enterprises to the growth of the economy. In addition to being the main employers, having greater share to the GDP and catalysts of economic growth, those in international trade also contribute much to the foreign currency inflows. Researchers have also revealed that while these enterprises have some common characteristics such as growth potentials, management approaches, etc. some have become sustainable and have successfully penetrated in the international markets, most of which are from developed and emerging economies, whereas others are lagging behind. The attention drawing reality is that the SMEs involved in international business are the one that mark higher productivity, performance, competitiveness, sustainability and growth than those, which remain trapped in domestic market. As the case of Tanzania very few SMEs have managed to compete internationally (Crick et al., 2011, Kaganda, 2014). Given the comparative advantage of Tanza-

nia in agro-manufacturing sector and the importance of food processing SMEs to the Tanzanian economy, this study is motivated to establish the understanding of the factors which impede internationalization of such enterprises and recommend alternative solutions thereon. In partucular this study etails to look into the challenges facing local food processing SMEs in accessing international markets and identify opportunities for these enterprises. Categorically, specific objectives aimed at achieving the following objectives are to assess the involvement of food processing SMEs in international business; to identify factors hindering international market access for food processing SMEs; and to depict international market opportunities for indigenous SMEs in food processing sector. With such objectives three main questions needs to be addressed. The first is to what extent local food processing SMEs are involved in international business? Secondly, what are the factors hindering food processing SMEs access in the international markets? Finally, what are the current opportunities for local food processing SMEs to go international?

Small and Medium Enterprise Concept: The Global and Tanzanian Perspectives

The definition for small and medium enterprise varies from one country to another where the industry and level of the economy constitute the key elements for the disparities. Before looking into different perspectives it is better to understand what an enterprise is. According to the U.S. Census Bureau (Census) an enterprise, is a business organization consisting of one or more domestic establishments under common ownership or control (USITC, 2010). Being an enterprise is independent of legal status, it is any entity involved in an economic activity (EU, 2005). For the sake of the present research, the terms “enterprise,” “firm,” “business,” and “company” shall be used interchangeably.

Generally, many countries use number of employees, capital invested and annual revenue or annual balance sheet total as thresholds for categorizing enterprises. The classification by the Small Business Administration’s Office of Advocacy (SBA Advocacy) that is believed the most straightforward includes all enterprises with fewer than 500 employees in the SMEs category. The report by the US International Trade Commission indicates the same number of employees for both manufacturing and service firms but pinpoints the difference concerning the annual revenue criterion for exporting service firms. Most of the exporting service firms with annual revenue less or equal to USD 7 million are under the SMEs category except for those with high value offers especially involved in computer services where the annual revenue is less or equal to USD 25 million.

There is a different scenario in Europe where according to the European Commission’s Enterprise and Industry division, enterprises having less than 10 employees with less or equal to USD 2.78 million are under the micro enterprise category. The small enterprise class includes firms having fewer than 50 employees with the total annual revenue of less or equal to USD 13.9 million whereas those of which staff headcount is fewer than 250 and whose revenue is less or equal to USD 69.5 million are medium enterprises. The MSME Act of India defines SMEs using the initial investment in plant and machinery where it is up to USD 2 million and USD 1 million for manufacturing and services respectively. The table below summarizes the World Bank definition for SMEs.

Table 1 World Bank Definition of MSME

Enterprise Size	Employee	Assets (USD)	Annual sales (USD)
Medium	< 300	$\leq$ 15Million	$\leq$ 15 Million
Small	< 50	$\leq$ 3 Million	$\leq$ 3 Million
Micro	< 10	$\leq$ 10,000	$\leq$ 10,000

Source: MSME in India/WB, 2012.

The Tanzania SMEs policy classifies under SMEs category all enterprises with fewer than 100 employees and having up to USD 491,000 capital investment in machinery. This definition is inclusive of enterprises in both service and manufacturing sectors. The policy categories are summarized in the table hereunder.

Table 2 Categories of SMEs in Tanzania

Categories	Staff Headcount	Capital Invested in Machinery (USD)
Medium	50 - 99	$>$ 122,700 to 491,000
Small	5 - 49	$>$ 3000 to 122,700
Micro	1 - 4	Up to 3000

Source: Tanzania SMEs Policy, 2002.

The Tanzania classification is the least of all in terms of maximum benchmarks compared to developed and developing economies, about one third and one fifth on account to number of employees for the World Bank and USA respectively, and four times lesser than India in terms of investment in machinery . Despite the differences, they share some common characteristics. First, almost same categorization parameters are applied as basis for definition such as staff-head counts, annual turnover and investment in machinery. Second, the classification is independent of the legal status of the business to the sense that there is no exclusiveness between formal and informal businesses.

Theoretical review of SMEs Internationalization

The pioneers of internationalization theories include but not limited to Mercantilism Theories ('wealth of nations', measured with precious metals, gold and silver, and with productive capacity countries have (Demirel & Dulupcu, 2005); the Classical theories (The 'absolute advantage' and 'comparative advantage' also see the factor proportion Theory etc) Ricardo, 1776 and Demirel & Dulupco, 2005; Ranzau, 2009); The Product Cycle Theory by Raymond Vernon in 1996 ('International Investment and International trade in the product life cycle' based on cost advantage'); The Increasing Return to Scale Theory (Dixit and Stiglitz, 1977 - due to differences in factor endowment, technology and preferences different countries should specialize in different goods (Donaldson, 2011); Firm Heterogeneity Theory (Mark Melitz, 2003) based on differencies between the exporters and non exporters though highlighting their core characteristics; and The National Competitiveness Theory by Michale Porter (1990).

A firm is said to internationalize when it engages in building business relationship in the market beyond its domestic boundaries. Internationalization of an enterprise can take different facets depending on the nature of the business, enterprise capabilities and motives as well as the overall domestic and international business environments (He, 2010). Pan and Tse (2000) classified entry modes in two major categories: non-equity and equity modes. The first category includes export, direct and indirect; and contractual agreements including licensing, franchising, R&D contracting, co-marketing and turnkey project. The second category, equity (FDI), consists of joint ventures and wholly owned subsidiary (WOS). Contractual agreements and joint-ventures constitute what is known as *strategic alliances*.

According to a report on the Internationalization of European SMEs by the European Commission's Enterprise and Industry, SMEs can internationalize through export, import, foreign direct investment, international sub-contracting or technical cooperation. These are also known as entry modes in international trade. This second perspective considers internationalization as any being involved in any business involving international transactions reason for including import, unlike the first one.

Prior to looking into what empirical studies have revealed concerning the extent of SMEs in cross border business, one key question should be the drivers and motives triggering this move. In the paper on the Top Barriers and Drivers for SMEs Internationalization (2009) the Organization for Economic Co-operation and Development gives the findings of its joint study with the Asia-Pacific Economic Cooperation conducted. The findings show that the motives for internationalization differ from one country to another. For example, according to EFIC (2008) the motives behind Australian SMEs internationalization include market growth, control of supply chain and cost reduction. The stimulus in India and Ireland is the knowledge resources base (Garney & Brennan, 2006) whereas US SMEs are motivated by profit gain (UPS, 2007) and countries endowment in global trade infrastructure (USA today, 2008). For the case of Portugal the internationalization of SMEs is stimulated by search for social networks and international ties (Camara & Simon, 2008). According to He (2010), the factors influencing SMEs to internationalize can be grouped into three groups, in terms of, 1) external factors, like the global financial crisis and the changes of monetary policy, 2) the infrastructural factors, like the domestic environment context on internationalization, the governmental support and infrastructure building, and the international environment for internationalization, and 3) the congenital factors, like the entrepreneurial spirit of the SMEs, the psychic distance. The latter is strongly supported by the final report of the expert group on supporting the internationalization of SMEs in EU countries stating that international orientation of decision makers is a key determinant of the nature and extent of internationalization. So far as this study is concerned, the attitudes that lead to internationalization stem from the same source as start-ups, innovation and entrepreneurship: developing lines of growth.

In the light of previous studies SMEs internationalization stimuli differ from firm specific level to country altitude. At the firm level the motive discrepancies are as diverse as their strategic goals, resources and entrepreneurial orientations. Internationalization infrastructure for SMEs, domestic and international market settings are key factors shaping sector and country specific differences in internationalizing. The Tanzania perspective, especially local SMEs, on this concern remained unrevealed.

Involvement of SMEs in International Business

The number of internationalizing SMEs has been increasing over time. For many years the wave speeded up in developed countries but since recent decades the move has gained pace in developing countries (Torrs, 1999; McDougall and Oviatt, 2000; Fillis, 2001; Ruzzier et al., 2006) quoted from (Lin, 2010). Internationalization process and involvement is also varying from one economy to another as well as across sectors (EU, 2010; Aranoff et al,. 2010; Ashish & Akbar, 2011).

The report by EU's Enterprise and Industry division (2010) which has analyzed 9,480 SMEs in 33 European countries indicates that of all the entry modes the most prevailing for SMEs to get into international engagement is through import and export where the case of EU27 the SMEs in export and import account for 25% and 29% respectively, those involved in subcontracting to a foreign partner and technological cooperation have share of 7% each whereas only 2% are in active foreign direct investment. From 1997 to 2007 SMEs accounted for 30% of total US exports. In India, according to the MSME Overview (2007), SMEs export share amounts to 40%. SADC countries, among which Tanzania, have low involvement in export business. With their substantial share in economic activities, if SMEs have heavily participated, the SADC countries would probably be competitive exporters (Matambalya 2000; Melitz, 2003; Hiep & Ohta, 2008; USITC, 2010).

An observation of different SMEs internationalizing from different countries also vary by sector. Computer and electronic products, machinery and chemicals have been principal exports for US SMEs exporting to NAFTA, their major export destinations (Aranoff S. L. et al, 2010) whereas in Europe mining, manufacturing, research, transport and communication are the most internationalizing sectors (EU, 2010). Indian SMEs export activities are highly dominated by IT and IT Enabled Services accounting for 36% of total exports (Ashish H. & M., Akbar, 2011).

Empirical studies have also indicated that the smaller the country, the more its SMEs are internationalized, and that the level of involvement in international markets is not directly related to the proximity to national borders. On top of that, researchers have revealed that internationalization is positively related to the age of the enterprise. Exporting and importing activities increase in intensity by age of enterprise. For the case of EU27 the percentages of SMEs that are exporting gradually increases from just over 15% for enterprises up to 4 years of age to nearly 30% for enterprises that have existed for 25 years or more. It was as well noted that companies involved in E-commerce are more internationally active (EU, 2010).

SMEs export supporting services

Governments have a major role in supporting SMEs to internationalize (Wymenga P. et al, 2013). Successful policies to increase the number of internationalized SMEs must start by understanding which are the main problems faced by SMEs when considering the possibility to start operating with a foreign partner (EG, 2007). In this regard many governments have put policies and adequate frameworks in support of SMEs. For example in EU in contrast to domestic support SMEs through EU based organizations; chamber of commerce, investment and trade agencies, business associations, embassies, finance institutions and other government institutions located in a third country play an important role in facilitating SMEs access foreign markets. The location of these organizations in the market destinations have hugely contributed to the international market penetration

for European small firms. Similar approach is used by the US government through government owned agencies such as the Export-Import Banks, Small Business Act, oversea private investment corporations and commerce.

The government of Tanzania has also made some efforts in supporting SMEs by introducing the SMEs policy by the early 2000, the establishment of different organizations such as the small industries development organization (SIDO), the Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA), TANTRADE, etc. Despite their existence the access and participation of local SMEs in foreign markets is still dramatically low that the need to dig into the underlying impediments was significant.

Barriers to Internationalization of SMEs

According to Aranoff, et al (2010) and the Expert Group (2007) barriers to internationalization can be grouped in three major categories for US and EU SMEs respectively namely, shortage of managerial skills, Limited finance and inability to identify international market opportunities.

A report on "SMEs in SADC Economies" by Matambalya (2000) groups the drawbacks to internationalization in two categories: intrinsic and extrinsic factors. According to this report intrinsic impediments pertaining to internal firm specific factors include among others the enterprise factor costs which comprise labor, capital and land; lack of enterprise policy and participation in technological development such as limited investment in ICT and R&D also associated with the plans for acquisition of licenses and alliances, enterprise size and growth strategies, predominant entrepreneurial culture dominated by opportunistic entrepreneurs, limited knowledge of management and staff of the enterprise generally managed by individuals or families with no real professional managerial cadre involved, as well as the patterns of enterprise linkage with modern business sector.

For the case of extrinsic factors the findings of the study identifies SMEs support organizations with no sound base such as association and sector level and chamber of commerce, and SMEs sector framework. Addition to that, macro-environmental factors with impact on the competitiveness of comprise macro-economic instabilities (Collins, 1997; Collins & Grunning 1998; Owen & Woods, 1998), unfriendly regulatory environment for entrepreneurial efforts, national education and human development policy and poor infrastructure (ERO 1998), poor infrastructure (ERO, 1998; Matambalya, 1999) and the policy framework to advance technology.

The Tanzania Food Processing Industry: Scope and Performance

The market demand for processed foods has developed in all cultures and societies. A wide spectrum of food processing enterprises can be found in Africa, ranging from very small entrepreneurs extracting oil in laborious, manual operations, through small expeller mills providing services to customers and also selling some oil, up to large-scale enterprises processing food for national and international markets (Dietz et al., 2000).

According to the World Bank report (1999), agro-based industries are generally the first to develop in the industrial sector of a developing economy and generated 40% of all manufacturing added value, more than any other industrial activity in sub-Saharan Africa. It is the same case in Tanzania where more than 90% of industrial activities are dominated by small and medium sized

enterprises specializing in food processing among which dairy products, meat packing, preserving fruits and vegetables and beverages with few involved in production of textile and apparel, leather tanning and plastics revealed the findings of the study by the Economic and Social Research Foundation (2009).

While food processing is directly attached to manufacturing sector, agribusiness plays an important role in such a way that the performance of the latter directly affects the former. This therefore accounts for the contribution of agriculture sector in manufacturing. While *Tanzania has a comparative advantage in agribusiness and manufacturing* (ESRF, 2009), the potential of these two sectors is underexploited compared to other developing countries. Through value chain analysis various empirical studies have indicated the potential of value addition in boosting the growth of the economy. For example, Waweru (1995) indicates that milk sold pasteurized to consumers in Kenya, fetches three times the price of raw milk at the farm gate. Similarly, Sunflower oil in Tanzania increases its value by a factor of two to three after extraction. The contributions of the manufacturing and agriculture to Tanzania GDP are 8% and 26% respectively. This share of manufacturing is relative low compared to its counterparts in EAC such as Kenya 9.2%.

Enterprises in the food processing sector present certain characteristics. Previous studies show that only a few enterprises in the formal sector can be referred to as large-scale: they include the breweries and soft drink manufacturers, and a few of the large parastatals such as flour and oil mills. Then there are all those enterprises that process crops such as coffee, tea or cashew. Most operate with foreign capital and imported machinery and equipment. More than 1000 small- and medium-scale enterprises (SMEs) are registered in Tanzania. This figure can surely be no more than an indication, as many are not registered. Most of these enterprises produce traditional, well known products using locally established technologies. Enterprises such as flour and oil mills, and also bakeries are well established within the agro-food chain. Raw material supplies are generally obtained locally, close to the location of the enterprise, and are on the market for 6-9 months or even longer during the year. Markets for the finished product are also local but a small number of these enterprises are now catering for international markets.

Given the potential of food processing industry to the economy the importance of this sector is deemed important for assurance of economic independence in the long-run due to a series of advantages attached to the sector (ESRF, 2009). Among other reasons is the ease economic diversification by of shifting from primary sector to manufacturing, the food processing sector provides substantial forward and backward linkages with other sectors, employment creation, the opportunity of technology transfer and adaptation, last but not least the industry the sector is very green for loosening external shocks through diversified internationalization.

Despite considerable potential to the economy manufacturing sector especially food processing is lagging behind and portrays low performance in cross border business. Manufacturing enterprises in Tanzania are 18 percent less likely to export and export about 4.7 percent less of their output than similar Kenyan firms (Ibid). This has been associated with trade and customs regulations which appear to be more burdensome than they are in Kenya discourage enterprises in Tanzania from exporting (Ibid).

Research Gap

A great deal of studies has been conducted in the area of internationalization of SMEs but many of these studies have been conducted in developed countries where the number of internationalizing enterprises has been increasing for many decades. In addition to having more developed economies' orientation and less of developing countries, most of these studies were generic in nature.

Whereas the literature provides some similarities among various studies, a number of discrepancies have also been noticed from the features characterizing them to their internationalization process and establishments in foreign markets and for this fact the findings are far from fitting universal application. Empirical studies have also proved the pervasiveness of ultimate role of SMEs in boosting the growth of the economy in different countries across the globe. However, despite the underlying drawbacks, internationalizing SMEs in developed countries have demonstrated tremendous performance while those in developing economies like Tanzania are lagging behind hence providing less to the economy.

Finally, a few studies made in the last decades about SMEs in Tanzania had inward focus and lacked international orientation. To this end given the comparative advantage Tanzania has in manufacturing especially in food processing sector and its potential to economic growth, there was need to understand the internationalization hindrances of small and medium enterprises in the sector in order to remediate their international competitiveness.

The Conceptual Framework

The theoretical framework provides the perspective or approach the research pursued to achieve the research objectives. This includes empirical theories which best explains how the variables are interrelated and provides understanding on the overall approach pertaining to the study. Two types of variables applied in the study: independent and dependent variables. Dependent variable is the one of which value or extent depends on another variable, the independent variable (see figure below). The dependent variables comprised elements of firm's competitiveness such as efficiency and other firm specific capabilities. Independent variables consisted of internal and external factors impeding enterprise's competitiveness and ability to access international markets.

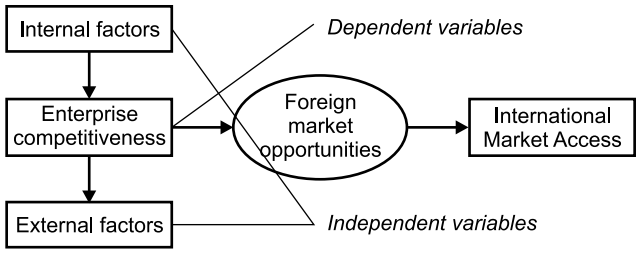


Figure 1 Conceptual Framework

Source: Researcher's construction from empirical literature

There are many theories in international trade but for the sake of this tudy research three theories applied. The first is the theory of *comparative advantage* according to which a country

should get involved in production of goods in which it has comparative advantage over others and import those in which it has comparative disadvantage. The second was the *firm heterogeneity theory*, which holds that firms catering for international market are efficient and grow faster than those with domestic focus. The third was the *factor proportion theory* for which a country with high labor endowments should export labor-intensive goods and capital or technology intensive nation should export capital or technology intensive goods.

Method

This research was conducted in the city of Dar es Salaam, United Republic of Tanzania, East Africa. The resources constraint, accessibility and the existence of a number of SMEs in the food-processing sector were the basis for selection of this region. The research used descriptive and exploratory approaches in the process of data collection and analysis. The purpose of descriptive design was to portray an accurate snapshot of some aspects of units under study whereas the exploratory design focused on gaining familiarity with a problem less known in the local context (Kothari, 2004; Adam & Kamuzora, 2008; Crick etal., 2011; Kaganda, 2014). Therefore, the descriptive approach helped the researcher understand the characteristics pertaining to the small and medium enterprises in Tanzania while the exploratory design enabled the researcher gain familiarity with internationalization environment surrounding them and then come up with new insight on the study gap. Besides, both qualitative and quantitative methods were applied in presenting and analyzing data.

The population for the study involved small and medium enterprise owners, managers and employees in food processing sector; as well as SMEs support services providers. The choice of researcher was driven by many reasons basing on the research objectives. The management and employees concerning their business experience, characteristics and the challenges they face in the pursuit of their business goals as related to international market access. SMEs support services providers were expected to provide answers about available services associated with internationalization and how they have helped SMEs competitiveness and growth. The study involved 165 respondents from the selected SMEs and support service organizations. There were total of 15 SMEs from five food processing sub-sectors namely snack foods, honey, nutrition flour, horticulture and edible oil processors where by 3 SMEs from each category. To this point, 10 respondents were expected to be obtained from every individual enterprise of which 4 from the management or business owners and 6 employees. Support services providers were from TANTRADE, TCCIA, SIDO and IMED and EPZA where, 3 from each organization. Stratified sampling was used based on heterogeneous nature of the sample. As such it was found to be the appropriate technique in identifying and making sure that every selected food-processing sub-sector was represented. Moreover, simple randon sampling technique was used in the process of getting a sample of employees from selected enterprises (Kothari, 2004; Jamal & Kamuzora, 2008). Purposive sampling were used for selecting entrepreneurs based on the knowledge and position held in organizations (owner managers and decision makers).

Given the nature of the study, the researcher used structured questionnaires with the mixture of both closed and open ended questions in order to increase the response rate while saving time in the process of collecting data. There were three different questionnaires: the first category was designed for employees, the second for the management and/or business owners and the latter for

SMEs support service providers. The first two categories were basically designated to collect information about general business characteristics, their involvement in international business, internal and external challenges as well as suggestions on the way forward, etc. In addition to challenges and way forward, the third category helped collect information about general environment aspect of SMEs in the food processing sector, support services and any other internal or external opportunities available to them. Questionnaires for the customers and employees were directly handed out to the respondents.

On the other hand interviews with the business owners and/or managers and SMEs support service provided in-depth information regarding the main research agenda. The reason behind this option is that it researcher were convinced that such respondents had more experience that they would have more to tell. Collected data were analysed using excel and presented using percentages and frequencies in tables and graphs. Through this technique initial isigths gained could conviniently be generated without jeopordizing quality of processed data.

Ethical consideration

Research involved observation of human beings, although others may not, asking them questions or examining what they have done (Kothary, 2004). In this study the researcher shall ensure that the rights of the participants are not violated. The present study considered and observed ethical issues like the professional practice and ethical standards by avoiding fabrication, falsifications, concealment and deception. In addition to that, having good relationship with the respondent, the protection of personal privacy as well as voluntary participation in the study were taken into consideration. Also good relationship with other researchers was observed in avoiding plagiarism. Generally the present research observed all concerned ethics in data collection or recording, processing, analyzing interpretation and reporting. This is due to the fact that adhering to research ethics could enable the study to collect valid and relevant data.

Research Findings, Presentation and Discussion

The snapshot of the demographic information of the respondents include the age, gender as well as the level of education. In addition to that, professional background and job positions are also evaluated with the aim of making a comparison between the professional background and job position, and thereafter look at the impact this may have on the enterprise performance and internationalization process.

Of all the respondents, 35 (28%) were aged from 25 to 31 years old and 30 (24%) from 32 to 38. The respondents whose age ranged from 39 to 45 were 23 (18.4%) and 18 (14.4%) were from 18 to 24 years of age whereas the remaining 14 (11.2%) were older than 45. According these data, the age groups ranging from 25 to 31 and 32 to 38 are the predominant accounting for 52 percent of all the respondents. Those aged below 25 and beyond 45 are the least represented of all the age groups. It is also observed that more than 2/3 of all the respondents are from 25 to 45 years of age, the major predominant age group. So far as the gender is concerned, 67 (54%) were female and the remaining 58 (46%) (see figure 3).

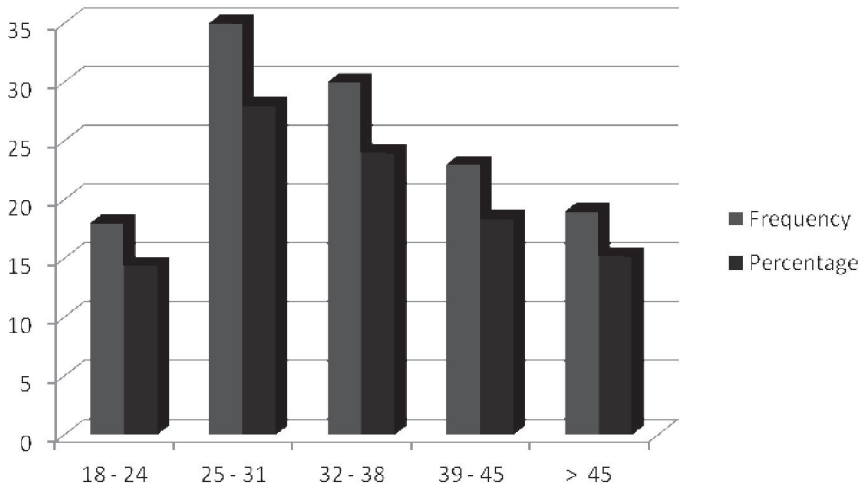


Figure 2 Age of Respondents

Source: Research findings, 2014.

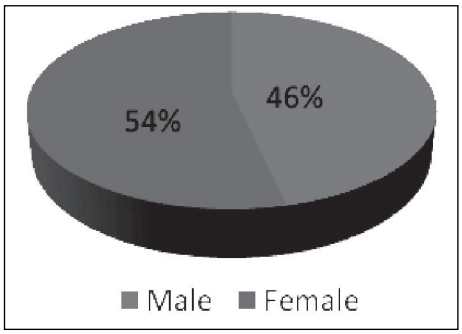


Figure 3 Gender of respondents

Source: Research findings, 2014.

With 91.2% of the respondents being from food processing enterprises, the results lead to undoubtedly state that the age ranging from 25 to 45 prevails in the food processing SMEs labor force and women are more than the male. This predominance of women was substantially higher in smaller enterprises than in medium ones.

According to the data approximately half of all the respondents were secondary school leavers, about one third attended higher education and the rest were of primary education. On the question concerning the professional background, respondents with no professional background and those from other fields such as education, journalism, sociology, economics, etc. were the most dominant group; they were 56 in number (49.1%).

It was noted that among the respondents reached, all secondary school leavers were from food processing enterprises, all PhD holders and more than half of Masters Degree holders belonged to the SMEs support services providers. There were only three Chemical engineers in 15 enterprises reached. None of the respondents in food processing enterprises had background in international

business only a few who were asked have taken international marketing as a subject. About two thirds of the business owners the researcher came across with were secondary school leavers and all of them held managerial positions.

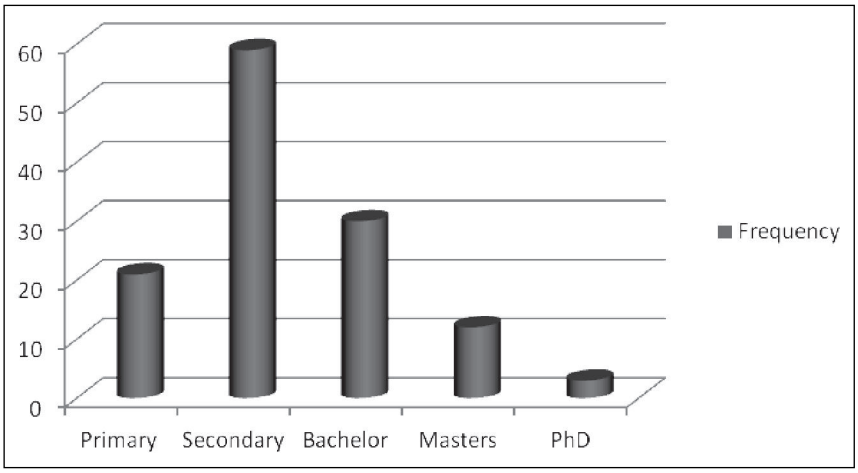


Figure 4 Level of Education

Source: Research findings, 2014.

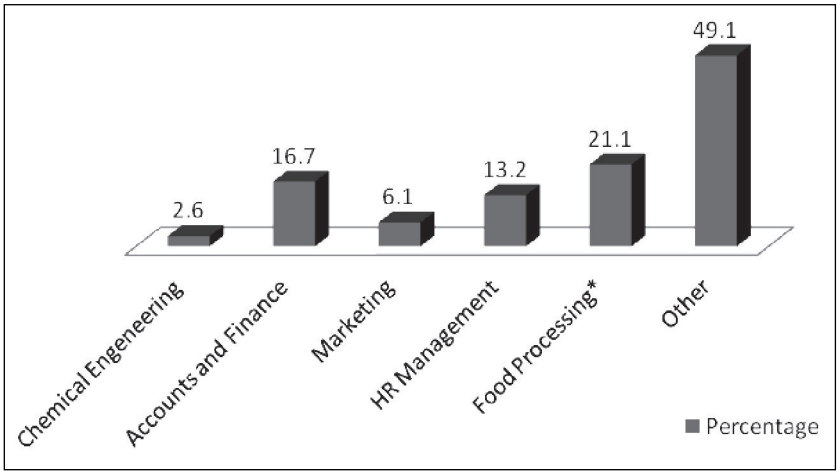


Figure 5 Professional Background

Source: Research findings, 2014.

Enterprise General Characteristics

This segment describes the characteristics of the food processing enterprises from which the data were collected. The main features of concern include the form of the business as may be recognized legally, the nature of the firm ownership whether independent or a subsidiary of another firm and the current age of the enterprise.

Table 3 Legal form of the Business

Form of Business	Number of Enterprises
Sole Proprietor	5
Partnership	6
Private Limited Company	4
Public Limited Company	0

The main legal forms of business in Tanzania are sole proprietor, partnership and limited company. The later can be either public or private. According the results above, partnerships and sole proprietorship forms are the most common in many food processing SMEs and a few limited companies while public limited companies are hardly found.

Table 4 Age of the Enterprise

Age of Enterprise	Number of Enterprises
$<$ 5 years	4
5 to 10 years	6
11 to 16 years	4
$>$ 16 years	1
Total	15

Source: Research findings, 2014.

The age of business is key ingredient among the characteristics or determinants in analyzing the internationalization given the positive relationship between the firm's internationalization and its age. There was only one oldest SME and which has existed for more than 16 years. About two thirds of the SMEs reached have existed for not more than 10 years and those aged from 11 years accounted for only one third.

In addition to the main product lines which were the basis for categorizing and selection of these food processing SMEs, many of them process more than one product line. The most common lines include varieties of soya and maize flour with different additives, mango and lemon pickles, a variety of jams, dried vegetables and fruits. The products with high manufacturing potentials and which demonstrate moderate quality and reasonably well packaged include honey, cashew nuts, nutrition four, canned fruits and food oil.

Involvement of Food Processing SMEs in International Business

The extents to which firms engage in international trade vary from an enterprise's size and strategic orientations to a country's economic patterns. In this aspect individual enterprises can get involved through export or import, foreign direct investment, joint venture, contractual agreement such as licensing or franchising, joint R&D, technological cooperation, technical assistance, etc. This section looks into the level of engagement of local food processing enterprises in cross border business. The table below illustrates the international sourcing engagement. This involves the import of raw materials, packaging materials, machines and equipments and use expatriates.

Table 5 SMEs Outsourcing Engagement

Item	Number of SMEs out of 15	Valid Sample
Raw materials	3	15
Packaging Materials	5	15
Machines/Equipments	4	15
Labor	2	15

Source: Research findings, 2014

Among the firms which outsource raw materials from international markets were two producers of food oil and one manufacturer of nutrition flour. The most outsourced materials for food oil include crude palm oil, palm olein and sunflower from Malaysia. It is good to get raw material locally to improve local supply chain but limited local supply also impedes manufacturing production capacity. Kenya is among the major suppliers of the small number of SMEs which outsource packaging materials. Packaging material is a critical problem for many local food processors. This is discussed in the next subchapter. Only a few SMEs, about a quarter of the enterprises reached, have managed to import processing machines and are involved in regular purchase of spare parts. This implies that the majority of the local food processing enterprises are still stuck to local machinery which is actually less developed compared to the current global technological trend.

Table 6 Involvement in Contractual Agreement

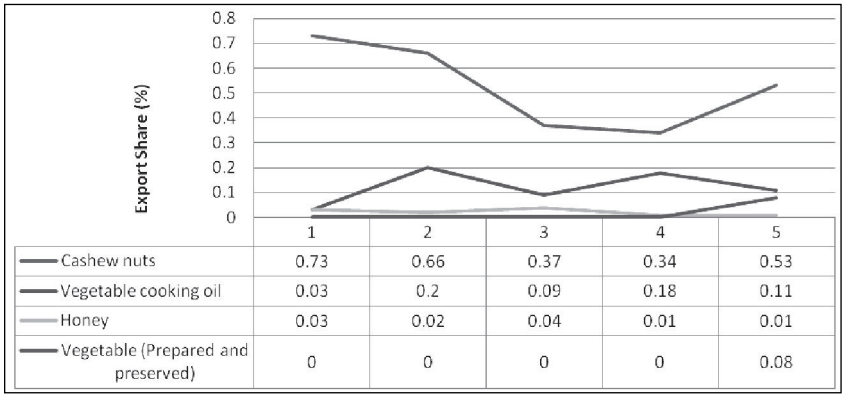
Contractual Arrangement	Number of SMEs	Valid Sample
License/Franchise	None	15
Technical Assistance	1	15
Joint R&D	None	15
Technological Cooperation	None	15

Source: Research findings, 2014.

As illustrated in the table above, none of the enterprises met is in contractual agreement expect only one SME which is in technical assistance with international organizations. It is involved in nutrition flour production under technical assistance of UNICEF, its major buyer. This UN agency controls the production standards of nutrition flour produced for different countries. This shows the collaboration gap between local SMEs with technologically developed and innovative foreign enterprises and organizations. It has very negative impact on SMEs' internationalization process especially for the case of developing countries like Tanzania where global learning through technological assistance and technical support are still needed to meet international standard requirements for processed food.

The researcher has also assessed the extent to which local food processing SMEs participate in export. This was made by considering four product categories taken as prototype where their shares in total Tanzania exports were used as indicators. Only processed products were taken into account and for this reason the harmonized system code used is of 8 digits of which, according to the international trade center, are purely manufacturing outputs.

Figure 6: Share (%) of Selected Processed Food Products on Total Tanzania Exports 2009/2013 (HS Code: 8 digits)



	1	2	3	4	5
Cashew nuts	0.73	0.66	0.37	0.34	0.53
Vegetable cooking oil	0.03	0.2	0.09	0.18	0.11
Honey	0.03	0.02	0.04	0.01	0.01
Vegetable (Prepared and preserved)	0	0	0	0	0.08

Figure 6

Source: Constructed with data from ITC calculations based on UN COMTRADE statistics, 2014.

The export contribution of cashew nuts has dramatically declined from 0.73% in 2009 to 0.34% 2012. The share has slightly increased in 2013 where it accounted for 0.53% of total Tanzania export in 2013. Vegetable oil's share has subsequently recognized remarkable fluctuations for 5 years since 2009 with 0.12% share on average. Almost the same behavior was observed for natural honey where its highest share was 0.04% as observed in 2011 after which it dropped and flattened to 0.01% during the following two years. The case of prepared and preserved vegetables was different from the previous ones, where its export share showed up in 2013 accounting for 0.08% of total exports. It is to note that total Tanzania exports value from 2009 to 2013 was USD 4.3 billion on average.

The selected products which are among the major processed foods exported by local SMEs, all together have less than one per cent share in total Tanzania exports. Relying on the findings there is very low involvement of local SMEs in international business in all internationalization aspects. In EU27 SMEs account for 25% of total exports (EUEI, 2010) and according to MSMEs Overview (2007) in India they account for 40%, 30% in the USA. For these three economic giants most of their SMEs engage in the export of products in which they have comparative advantage and those in which they are endowed with resources. In addition to that, enterprises in these economies benefit from contractual agreements and technical supports from other foreign developed enterprises. The findings prove a different case in Tanzania where SMEs are hardly in contractual arrangements. This contributes to victimization of these local firms to lower international market competitiveness. The bag logs to effective involvement of indigenous food processing SMEs are discussed in the next part.

Challenges to Internationalization of Local Food Processing SMEs

The subchapter looks into the factors hindering local food processing SMEs to access international market as one of the major concern of the study. These factors are looked at in two different angles: those perceived as enterprise specific factors or internal and those which are regarded as extrinsic

or market driven, external factors. In this regard the underlying factors were presented in such a way that the respondent would select the factor in accordance with the extent to which he or she agrees or disagrees with it being a hindrance to internationalize. The data from respondents is succinctly presented and discussed hereunder.

Internal Challenges

Internal challenges are regarded as those upon which the firm may have direct discretion to control. These include the cost of production, the quality of the products, available technology, foreign market information and knowledge base the firm possesses, the firm's production capacity and ability of an enterprise to meet the existing market demand. The table below presents the views from respondents.

Table 7 Internal Drawbacks to Internationalization

Impeding Factor	SA	A	N	D	SD	Valid Sample
High cost of production	13.2	50.0	7.9	24.6	4.4	114
Low quality of the product	18.4	67.5	0.0	10.5	3.5	114
Poor technology	21.9	56.1	5.3	14.0	2.6	114
Low production capacity	16.7	53.5	4.4	17.5	7.9	114
Lack of knowledge about foreign market	11.4	71.1	0.0	15.7	1.8	114
Lack of skilled labor	16.3	63.2	1.8	18.8	0.0	114
Limited access to information	10.5	43.0	13.2	28.9	4.4	114

Source: Research findings, 2014.
Keys:
SA = Strongly Agree
A = Agree
N = Neutral
SD = Strongly Disagree
D = Disagree

(i) Cost of Production

According to the results, more than two thirds of the respondents reached believe that high cost of production negatively affects the efforts of local firms to access international market. The production cost directly dictated the price of the product. This means that the higher the production cost, the higher the price of the product and the lower the competitiveness.

(ii) Quality of Products

The respondents who regard product quality as drawback to international market access account for 85.9 per cent against only 14.0 per cent who objected. Meeting the required product quality is hence among major hindrances for local food processing firms to compete internationally. Of course this is directly related to the compliance to international benchmarks of which most of the local firms are still far from meeting.

(iii) Technology

So far as technology is concerned, the results show that the technology used by most of the firms in food processing is less developed. The production machines are traditional and locally made. Very few firms use imported production machinery. The technology in use also has impact on the efficiency of an enterprise as well as the quality of the products and consequently the firm's competitiveness. In general the results lead to the conclusion that the technology used by local food processing SMEs is still poor and remain key challenge for them to compete in the global market.

(iv) Production Capacity

When the respondents were asked about whether the production capacity is among the barriers to international market access, more than two thirds of the respondents the researcher came across with were of the view that the existing production capacity is still lower to meet the international market demand. This was observed as a remarkable impediment for SMEs in the production nutrition flower, dried food and even cashew nut which have for several times been unable to meet the minimum delivery quantity to overseas markets as it was also stated by an interviewee from the TANTRADE. In addition to meeting the market demand, the large scope of production is an advantage for an internationalizing firm as it yields the benefits of economies of scale adding value to competitiveness. Many local food processing firms remain on a disadvantageous side in this regard.

(v) Knowledge about Foreign Market

With regard to the awareness about international market, as illustrated in the table, 71.1% of the valid sample accepted it to be another challenge. In actual sense, most of the local food processors lack knowledge about oversea markets. These include the knowledge about how to identify international market opportunities, how to scan international market environment parameters such as political, and economic, socio-cultural and legal aspects as well as how to engage in international business negotiations and transactions.

(vi) Lack of Quali ed labor

Availability of labor was another factor the researcher has assessed. According to the data in the table, 79.5 per cent were convinced that there is shortage of skilled labor to fill the gap in food processing SMEs while only 18.8 per cent are of different opinion. It was revealed that there is only 2.6% of qualified chemical engineers and that two thirds of the existing workforce have not gone beyond secondary education in food processing SMEs. This corroborates the fact that the shortage of skilled labor leaves local food processing SMEs on the disadvantaged side in the pursuit of international market access.

(vii) Access to Information

On the basis of the data in the table, more than half are of the opinion that the accessibility to information is limited and one third is of different view. However, from other sources such as the SMEs support services providers, it was revealed that the information is available but the users are not information seekers. There are factors which can be associated with access to information concern among which, the recognition of information gap, the availability of source of information, the willingness to be informed and the ability to search for informa-

tion. The second is available for food processing SMEs the challenge arises from the first and the last two components. These ingredients are directly related to the level of education.

External Challenges

Under the external category are those factors which arise from the external business environment on which an enterprise cannot exercise direct control. Those which were presented to respondents in the present research include the accessibility to finance, compliance with international standard requirements, the extent of familiarity with foreign culture, local government restrictions to export, high tariffs and NTB in foreign countries and the competitors from global market. In this part, the validity of each of these factors is weighed in the local perspective.

Table 8 Internal Drawbacks to Internationalization

Impeding Factor	SA	A	N	D	SD	Valid Sample
Limited access to finance	10.5	36.0	0.0	34.2	19.3	114
Stiff standard requirements	21.9	47.4	7.0	18.4	5.3	114
Unfamiliarity with foreign language and culture	17.5	41.2	10.5	21.9	8.8	114
Complexity of internationalization procedures	12.3	44.1	3.2	34.2	6.2	114
Export restrictions from home government	9.6	27.2	10.5	44.7	7.9	114
High tariff and NTBs in foreign countries	20.2	60.5	0.0	13.2	6.1	114
Competition in foreign market	11.4	57.0	6.1	22.8	2.6	114

Source: Research findings, 2014.

Keys:

SA = Strongly Agree

A = Agree

N = Neutral

SD = Strongly Disagree

D = Disagree

(i) International Standard Requirements

The engagement to the global market requires adhesion to different standards as may be defined by international bodies or organizations with this authority. Some standards are also country specific or can be set by a regional trade bloc. Products have access into cross border markets unless they meet these standards. They include environmental standards, food additive and residues, packaging, ISO, ECO, etc.

When respondents were asked if these requirements pose any problem pertaining to the accessibility to international markets, the respondents who regarded product standard requirements as an objection to internationalize accounted for 69.3 per cent in total and those with adverse stand altogether were represented by 23.7 per cent. The results therefore lead to assert that the standards set by international organizations leave local food processing SMEs greatly underpinned to domestic markets.

(ii) Foreign Language and Culture

Most of the respondents, 58.9 per cent, recognize language and culture to be a hindrance for them to fully penetrate the global market. The understanding of the culture in the targeted foreign market is very important for any business and the ignorance of this ingredient has led many enterprises irrespective of their sizes and competitiveness to failure.

(iii) International Market Access procedure

Business owners and staff in food processing SMEs were asked to give their standing points about the internationalization procedures. Though some respondents were of the stand that the internationalization procedures do not pose problems, a good number accounting for 56.4% found it to be a challenge for them. In practice it takes time for a firm to comply with international trade requirements as it involves multiple documentations from different authorities. Many of those who regarded it as challenges pointed that there is much paperwork that need sacrifice in terms of both time and money along the process.

(iv) Access to Finance

With respect to the data, 53.5% believe that there is accessibility to finance meaning that the hindrance to cater for the foreign market is attributed to factors other than finance. Despite that, about half still find it to be challenge. Access to finance has been a big challenge for SMEs and for this reason the government has introduced a series of schemes to facilitate finance for local SMEs. Among these schemes is the Small Enterprises Loan Facility (SELF) under the ministry of finance. Many banks in the country have also opened special windows for SMEs.

(v) Export Restrictions from Home Country

Concerning export restrictions from home country, 44.7% of the valid sample said that there is no restriction from the government of Tanzania for processed food products, 27.2% of the respondents pointed that the home country impose some restrictions to export, 10.5% remained undecided, and 9.6% have strongly agreed with the existence of home government limitations to export while 7.9% have firmly objected. Those who objected altogether accounted for 52.3 per cent. Some of the respondents with the view that there are restrictions from the government are producing maize and wheat flour and said they have been experiencing export limits.

(vi) Tariffs and Non-tariff Barriers

For the concern of imposition of high tariffs and non tariff barrier to entry by foreign governments, 80.5 per cent are convinced that the foreign governments are setting up high tariff and non tariff measures to restrict entry of products from other countries; there is only 19.3% who have remained hostile on this point of view. In fact, processed foods are of high concern in developed economies and for this case they impose standard requirements which are deemed difficult to be met by manufacturers in developing and least developed economies. This has remained a major agenda in WTO negotiations with the main object of loosening restrictions for LDCs.

(vii) Competition

The foreign market competition is certain because all firms regardless the size; age and origin are allowed to cater for same markets as SMEs. When respondents were asked on

this aspect, more than two thirds held that competition from international food processors is among major barriers for local food processing SMEs to cater for foreign markets. In addition to having modern technology and technical knowledge base, major foreign processors also take advantage of economies of scale leading them to high competitiveness hence limiting the chance for small scale manufacturers with less developed technology to compete.

International Market Access Support Services for Food Processing SMEs

SMEs support services play an important role in the development and internationalization of enterprises. They provide required services such as trainings and consultations; they are key sources of information on international markets, business environment and other related information. The SMEs support services providers reached are: TCCIA, TANTRADE, SIDO, EPZA and IMED. These few were selected based on the available time and ease of accessibility.

Service Providers' Perspective

This section focuses on the description of services available for SMEs as provided by different services providers. It briefly enlightens the manner in which they are provided to meet the demand of the users.

The Small Industries Development Organization (SIDO) is a main government agency which creates and sustains entrepreneurial base with priority on productive economic sectors, among which food processing. The organization focuses on developing manufacturing SMEs, however, the organization is still has weaknesses in some critical areas where the key ones include the lack of international orientation, development of products most of which do not meet international standards and technology which hardly match current global technological advancements, lack of growth strategies and expansion plans for many of its SMEs and the lack of appropriate marketing approach for manufactured products. The organization is working hard to improve its services whatsoever.

TANTRADE, under the ministry of industry and trade, is the major trade information center. It provides linkages to international markets, organizes international trade exhibitions locally every year where local and international suppliers and buyers come together. In 2014 were the 38th exhibitions in Dar es Salaam. It also engages in tracking foreign international exhibitions for domestic enterprises. Through its Trade Point Dar es Salaam, TANTRADE is a member of the World Trade Point Federation (WTPF), an international non-governmental organization which is network of 100 Trade Information and Facilitation Centers. It assists SMEs in over 70 countries worldwide to trade internationally through the use of electronic commerce technology. The Trade Point Dar es Salaam would be a good international market access point but it will offer less benefit due to lower involvement of local food processing enterprises in the use of information technology.

The Tanzania Chamber Commerce Industry and Agriculture (TCCIA) is an important private institution in the country with a broad range of business services for local enterprises with physical presence in all regions in Tanzania, working to stimulate commercial, industrial and agricultural growth. With its services portfolio, the most notable services for exporting food processing enterprises include the issue of export licenses and certificates of origin. The organization provides

information on limited basis, that is only subscribed member enterprises have access to information. The organization offers generic services and a there are no specific ones for exporting food processing SMEs. A part from being a member of the International Chamber of Commerce and the East African Chamber of Commerce, TCCIA is not affiliated to any other international organization. The recent Joint Business Council with Oman is only for meat exporters in that country. The underlying challenges interviewees at the chamber mentioned include shortage of financial resources to reach members and implement different initiatives and lack of expertise in specific areas such as international business.

Other SMEs support service providers available include the Tanzania Bureau of Standards (TBS) which is responsible for issuing standards certificates to ensure quality products for safety of consumers and Tanzania Food and Drugs Authority which provides similar services but limited to food, drugs, cosmetics and medical devices. These organizations play important role in promoting production of quality products by local enterprises. The challenge they share in common is the complexity of procedures from the assessment to delivery of certificates due to shortage of facilities to meet the demand and lack of capacitated and equipped regional representations. As result the procedures remain centralized hence making it difficult to effectively meet the needs of existing food processors. This constitutes a shortcoming for exporting food processors because the compliance to local standards is the basic eligibility to cross the border.

On the concern about the response of local food processing enterprises to services available to them, services providers stated that the response is generally low whereby a number of reasons were pointed. These include the lack of information seeking culture for many local citizens and the illiteracy to information technology. As a result, the information available for them on service providers' websites remains inaccessible. However, according to the research findings this problem is also certain for many services providers where a lot of information deemed important for enterprises in international is not updated. The lack of willingness to learn, preference to rely on traditional knowledge and lack of ability and willingness to pay for services such as consultancy and trainings provided by private institutions. Last but not least, the reliance to donor funded programs which may or may not fill their real skills or knowledge gap.

Service Users' Perspective

Food processors were in turn asked on the concern of the awareness on the existence of support services and the extent to which they have responded to their internationalization needs. For the case of awareness many respondents reached, about three quarters, are aware of where they can get assistance for the information or any other market related service they may need. But very few of them proved to be well informed about what is really offered in terms of information whereas a larger number, more than half, had limited understanding. The respondents were later asked whether these institutions have provided them with adequate market access related services to their respective enterprises.

According the results, 47.3 per cent of the respondents from food processing SMEs claim that they have acquired adequate services relating to international market access, those who have not been assisted as expected account for 43 per cent.

Many of the services mentioned include trainings on food processing and business management as well as the opportunity to participate in exhibitions, mostly local, which gave them chance

to get connected to potential buyers and suppliers and exposure to competitors' products as learning platform. Food processors are moderately aware on the availability of international market access support services but the number of those who find inadequacy in services delivery and insufficiency of information is still bigger.

Table 9 Adequacy of Market Access Related Services as Perceived by Food Processors

Options	Frequency	Percentage	Valid Sample
Strongly Agree	13	11.4	114
Agree	41	35.9	114
Neutral	11	9.6	114
Disagree	39	34.2	114
Strongly Disagree	10	8.8	114

Source: Research findings, 2014.

In the efforts to find the way out many organizations have emerged aiming at taking advantage of the power of unity in solving their problems, where the most known include the Tanzania Women Chamber of Commerce, AWEP, TANEXA and TAFOPA. However, none of these organizations is quite stronger in information.

Internationalization Opportunities for Local Food Processing SMEs

The challenges pertaining to the international market access for local food processing SMEs are certain as evidenced in the previous sections. This however, does not obsolete the efforts for these enterprises to attain their internationalization aspirations of which contribution is deemed substantial for national economy. Following that perspective, this segment is sought to indentifying international market access opportunities for these local food enterprises. The researcher looked into these opportunities in two angles: internal and internal opportunities.

Internal Opportunities

Internal opportunities are those internal factors which are advantageous for local food processing enterprises to go international. These factors directly or indirectly provide room for these enterprises to come out of certain hindrances to internationalization. They are believed to catalyze firm specific or sub-sectoral internationalization related development that can increase efficiency and competitiveness as well as creation of enabling environment that can trigger effective move to international markets. The researcher focused on resource endowments and government export promotion programs.

Resources Endowment

Tanzania is the leader in East Africa in natural resource endowments particularly land which is the major resource in Agriculture. Other Tanzania natural resources include water and minerals. With respect to the World Bank report (2009), agricultural (arable) land in Tanzania accounts for 9.0 million hectares compared to its counterparts Uganda and Kenya having 5.5 and 4.89 million

hectares respectively. This shows Tanzania's potential in agricultural outputs over other countries not only in East Africa but also other many African nations.

Table 10 Share of Agricultural Land between Tanzania and its Counterparts

Country	Arable Land Area	
	Hectares (in millions)	Share (%) in total land area
Kenya	4.89	8.6
Uganda	5.3	26.5
Tanzania	9.0	9.9

Source: Constructed with data from World Bank report, 2009.

The increasing agricultural development in Tanzania is a paramount opportunity for local food processing SMEs as it provides the potential for access to raw materials. The production capacity is among the major challenges underpin local enterprises to domestic markets where only those with the capacity to import required quantity are yielding foreign market benefits. But the domestic agricultural potentials constitute hope for local firms to increase their production capacity.

Government Export promotion Programs: EPZA and SEZ

Different programs introduced by the government as means to encourage exports base provide an opportunity for local food processing firms. A typical program the researcher has accessed is the Export Processing Zone. Instituted in 2002, EPZ effectively started its export-led economic development in 2008 for the establishment of export oriented investments within the designated zones with the views of creating international competitiveness for export led economic growth. Having the same spirit, the authority was mandated to coordinate the SEZ in 2011 and in this case EPZ has then become a sub-component of the new scheme. With more than 14,500 hectares allocated for investment establishments, the scheme encourages manufacturing activities for export purposes. Major services of the authority include investment facilitation for both foreign and local investors, the provision of SEZ infrastructure and investment information as well as the issue of SEZ license and permits. Agricultural and agro processing are among the main priorities where others include textile and garments, ICT, tourism, forestry, leather processing, etc. The entry requirements of which minimum capital equals US$ 500,000 and US$ 100,000 for foreign and local investors respectively constitute an open opportunity for indigenous food processing SMEs.

Table 11 Eligibility for SEZ User Licensing

Eligibility criteria for SEZ user licensing	Eligibility criteria for SEZ Export user licensing
Minimum capital of USD 500,000 and 100,000 for foreign and local investors respectively	The project must encompass value addition with minimum export threshold of 80%
Investment must be located in the Special Economic Zones	Minimum annual export turnover of USD 500,000 and USD 100,000 for foreign and local investors respectively.

Source: EPZ User Guide, 2014.

The scheme guarantees attractive fiscal package to entrepreneurs including corporate tax exemption and tax holiday for exporters both for 10 years as well as import duty exemption for machinery and raw material. These exemptions reduce the cost for processed foods and provide price advantage in the international market. However, it was found that the response from local enterprises to grasp these opportunities is still low. Among 30 firms registered in 2012 only 28 per cent of them were owned by Tanzanians and 4 per cent were joint venture between Tanzanian and foreign firms. The firms in agro processing accounted for 28 per cent. When local enterprises were asked on this concern they said that the entry requirements are still difficult for them and that the issue of getting adequate technology to meet export standards is still critical. Generally, EPZ and SEZ remain an opportunity for local processing enterprises in international business given existing fiscal packages and special considerations by the government.

External Opportunities

The external opportunities are those available in the foreign markets including accessibilities created by different trade agreements at both regional and extra-regional levels. This section analyses Tanzania trade agreements with other countries and the international markets access opportunities available for indigenous food processing SMEs.

Tanzania and Regional Trade Agreements

Tanzania is member of both the East African Community and Southern African Development Community regional integrations which are potential markets for Tanzania exports. The former consist of Tanzania, Kenya, Uganda, Burundi and Rwanda whereas the later comprise Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

Headquartered in Arusha Tanzania, current EAC was signed by Tanzania, Kenya and Uganda in November 1999 and entered into force in July 2000 where Burundi and Rwanda joined in 2007. The EAC treaty is governed by the "people-centered" and "market driven" principles according to its Article 7, characterized by free movement of goods, services, persons, labor and capital as well as the freedom of establishing businesses and companies. This is an open door for local food processing enterprises to engage in cross border business. With regard to the free movement of goods there is still the need for institutional reforms of member countries and the domestic law adjustments for the effective implementation of the customs union protocol. However, Tanzania as partner country is enjoying free access to the markets in other member countries with very low non tariff barriers compared to those imposed by developed countries, which is an advantage for local food processing SMEs.

In addition to EAC, Tanzania is also one of the 15 member states of SADC. The Scandinavian Trade Centre (2013) reports the overall SADC population to be 257.7 million which is also a huge market potential for locally manufactured products. Iwanow (2011) indicates that since SADC FTA in 2000, intra-SADC trade has approximately doubled from US$ 5.02 billion in 2000 to US$ 10 billion in 2010. With data from ITC statistics, Sandry (2013) states that intra-SADC trade and SADC exports to the world are dominated by South Africa where in 2010 it accounted for 76.8% of total SADC exports and approximately 71% of intra-SADC trade. In the same year Tanzania

total exports to SADC amounted to 377 million and imports were 891 million with the total share of only 1.6% and 3.8% respectively. Despite this difference, the market provides great potential for Tanzania processed food exports.

Special Treatment Opportunities

Some developed countries have guaranteed special treatments as means to propel international trade with African countries and other LDCs. The researcher has looked into international market access opportunities to AGOA and EBA, provided by the US and EU respectively, for locally manufactured food products.

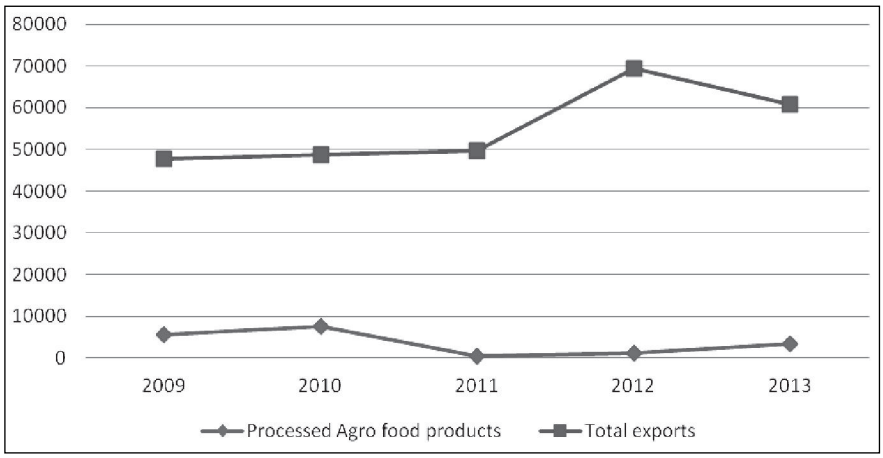


Figure 7 Share of Processed Agro food products in Total Tanzania Exports to USA (HS Code: 8 digits)

Source: ITC COMTRADE statistics data, 2014.

In 2013 the total Tanzania exports to US declined to 60.8 million from 69.3 million in 2012. During that year the share of processed food in the overall Tanzania exports was 5.4% compared to 0.6% and 1.6% in 2011 and 2012 respectively. The share trend shows that processed products had higher share in 2010 and had a dramatical drop in 2011 from where it started increasing gradually. In such circumstances, AGOA provides US market access opportunities for local SMEs but it remains evidenced that processed food share is still weak compared to other raw products. This may be due to the fact that non tariff barriers are still an obstacle for effective US market entry by local firms. The EU also provides the Everything But Arms treatment for all LDCs. This means that products from LDCs are guaranteed duty free and quota free entry to EU markets. The case of EBA is examined in the section hereunder.

International Market Prospects for Local Processed Food Products

This segment looks into market potentials for processed products. To this end, only three products were considered as prototype namely cashew nuts, natural honey and sunflower food oil. In this identification all these products are subject to 8 digits as per harmonized system code. The figure 11 shows available market diversification for processed cashew nut from Tanzania.

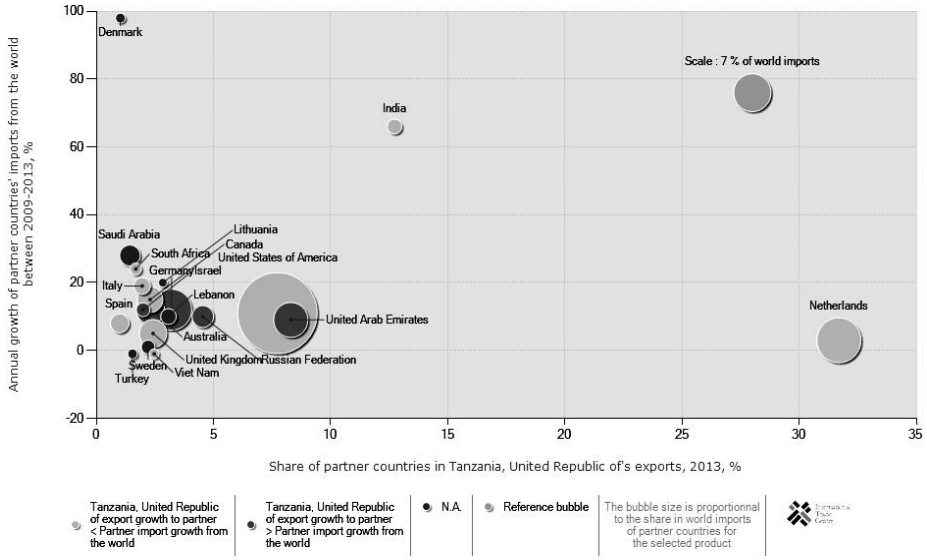


Figure 8 Prospects for Processed Cashew nuts Market Diversification (HS Code: 8 digits)

Source: ITC COMTRADE statistics data, 2014.

With respect to the figure above, major markets for Tanzania processed cashew nut export include the United States, Netherlands, Canada, UAE and the Russian Federation. According to the trade indicators the rate of Tanzania's export growth to the first three countries is lesser than the import growth rate in these countries. There is a reverse scenario for the case of the last two export destinations. In other words, the demand for cashew nuts in the first three countries is growing at higher rate than Tanzania cashew nut supply in these markets, meaning that the share of Tanzania exports is decreasing. On the other hand Tanzania's share in UAE and Russian Federation is increasing. Other markets include Spain, India, Italy and South Africa. In 2013 Tanzania exported 3821 tons valuing USD 6090 per Unit on average. From 2009 to 2013 Tanzania export growth to the world dropped by 2% and gained pace from 2012 to 2013 where it increased by 22%.

With existing market access Tanzania food processing SMEs have the advantage to exploit the special treatment opportunities under AGOA for the US and EBA in countries such like Netherlands, Italy and Spain as well as South Africa under SADC FTA. These provide the market prospect for local enterprises though this may not be exclusive of other factors to decide which market to enter.

Table 12 Prospects for Processed Natural Honey Market Diversification (HS Code: 8 Digits)

Market	Share in Tanzania's exports (%)	Exported growth value between 2012/13 (%, p.a)	Total import growth of partner country (2009-2013)	Tariff faced by Tanzania (%)
Germany	34	-30	4	0
Rwanda	28.3	-18	51	0
China	18.1		68	15
Kenya	10.5		11	0
Saudi Arabia	4.5		22	5
Oman	3.7	-76	9	5

Source: ITC COMTRADE statistics data, 2014.

The major importer of natural honey from Tanzania is Germany with the share of 34% in Tanzania export. It is the second honey importer in the world with 16.1% share after the US accounting for 24.9%. Leading exporters in the world are China and Argentina with 12.2% and 10.5% respectively. The major competitor of Tanzania from Africa in Germany market is Ethiopia but both still have minimal share in total Germany imports from the world. While China is the world leader in honey export it still have considerable share in Tanzania export 18.1% despite its highest tariff in the group. This may be driven by higher prices or other benefits. The data show that Kenya and Rwanda all together account for 38.8% of all Tanzania honey export to the world, this means that there is intra-trade potential among EAC countries. Whereas Germany is the leading trade partner, China and Rwanda demonstrate a very high import growth followed by Saudi Arabia. Despite these market potentials, in 2012-2013 Tanzania exports of honey declined by 42%. However, the data reveal international market access prospects for honey in Germany, EAC, China, Saudi Arabia and Oman but more production by local enterprises is required in order to meet existing foreign market demand.

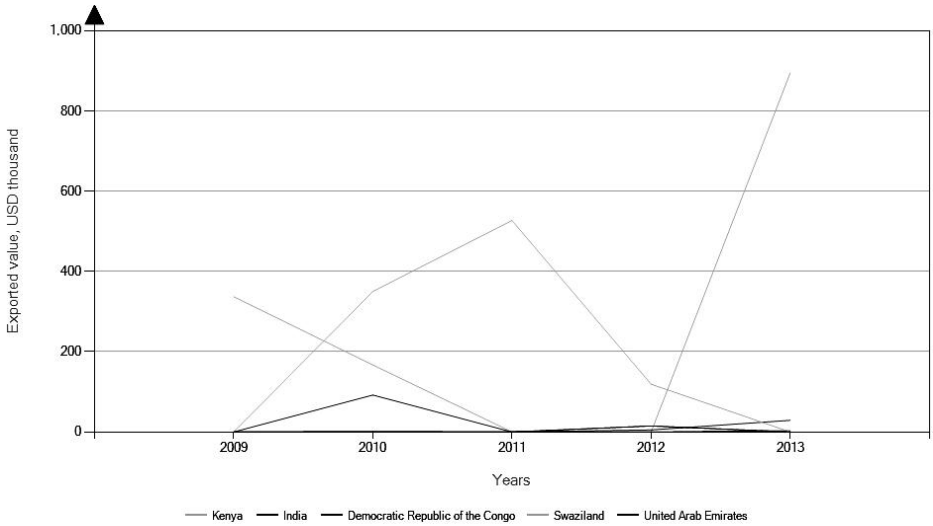


Figure 9 Prospects for Processed Sunflower Market Diversification (HS Code: 8 digits)

Source: ITC COMTRADE statistics data, 2014.

The markets for sunflower seem to have irregular characteristics. Kenya imports of sunflower have shot up in 2013 from deeper decline in 2012. Exports to Swaziland continuously grown from 2009 to 2011, and a spectacular fall has been observed in 2012 was almost null in 2013. For the case of India its imports from Tanzania declined in 2011 and started growing at lower rate from 2012 to 2013 with very minimal trade value with DRC. The researcher attempted to find reasons behind these irregularities but no relevant information was obtained thereon. These fluctuations may be caused by production capacity, internal demand characteristics or irregular export. However learning from the case of Kenya since 2009 to 2013, this trend shows that there are market opportunities only that valid information may be needed to be ascertained on the above assumptions.

Conclusion and Recommendations

The findings revealed that there is low engagement of local food processing SMEs in international business. This aligns with what Matamalya (2000) found about SMEs in SADC countries. None of the firms reached is either in technological cooperation or joint R&D with a foreign enterprise unlike many internationalizing SMEs in developed countries as it was also concluded by (Aranoff, et al., 2010). Most of the indigenous SMEs depend on local technology whereas few have managed to import machinery and raw materials. This implies low exposure to modern technological learning and adaptability to global business trends for these firms.

With regard to the results, locally manufactured food products hardly comply with international standards hence remain less competitive in foreign markets. This is associated with technological deficits and lack of foreign market knowledge base. Low supply base, high production costs and limited access to international market information were other major internal factors found as hindering market access for local food processing SMEs. The overwhelming external challenges include high NTBs in developed countries' markets, stiff competition from multinational corporations, limited finance and unfamiliarity with foreign culture.

According to Aranoff (2010), the later is certain for a firm which invests less in global business learning. In the firm heterogeneity theory, Melitz (2003) states that the more the firm internationalizes, the more it learns from global environment and the more efficient and competitive it becomes. On the contrary, the lower is the firm involved in cross border business, the lesser the gains and the higher the chance to exit. This gives the idea on how local SMEs are negatively affected by thin engagement in international business. It was also found that here is a number of SMEs support institutions but most of them are not well positioned to assist local SMEs in the internationalization process. Collins, 1997; Collins & Grunning, 1998; Owen & Woods, 1998) also state that poor SMEs support services have a very negative impact on the internationalization of emerging firms.

Despite the challenges local SMEs in the food processing sector face in accessing international markets there are opportunities to be exploited among which agricultural resource endowments and government export promotion initiatives such as EPZ and SEZ schemes. The factor proportion theory states that a country should specialize in a product if the factors to produce it are cheaper compared to others. With agricultural resource endowments, local food processing SMEs should therefore put many efforts in exploiting these opportunities. In addition to that, involvement of Tanzania into RTAs namely EAC and SADC as well as preferential treatments including AGOA and EBA remain the prospects for foreign market access.

Recommendations

Based on the study findings, the following specific recommendations are made:

(i) To the Government:

(a) Promote and facilitate inter-regional trade, especially within EAC and SADC, by availing market access support windows in target countries to assist local food processing SMEs in these markets. Same model should be applied for overseas exports through Tanzania embassies or other partner institutions.

(b) To reduce the complexity of internationalization procedures and improve customs services for food processing SMEs.
(c) Improve rural infrastructure (movement of agricultural inputs/outputs) to facilitate local SMEs domestically access raw materials and increase production capacity.
(d) Facilitate local SMEs to engage in technological cooperation with international enterprises in food processing and other related sectors.
(e) Guarantee market economy for domestic agricultural outputs and facilitate reduction of the supply chain layers.

(ii) To SMEs support Service Institutions:

(a) Assist SMEs to develop and implement enterprise growth plans and business strategies aligning with international market environment.
(b) Customize services to match with global market requirements in order to assist local SMEs accordingly (product quality and packaging standards)
(c) Design and develop international market access information gateway customized to meet local SMEs needs
(d) Bridge the service provider - user information gap by developing ICT and enabled (user-friendly) information exchange system (i.e. via mobile phones).
(e) Build partnership networks with similar SMEs support services in foreign countries (exchange of market information, knowledge and experience)
(f) Assist food processing SMEs in identifying and accessing new technology
(g) To identify sectors with international market potentials and advise local food processors to invest more in related product lines.
(h) Develop a supply chain model that will help local SMEs increase their export capacity.

(iii) To Local Food Processing Enterprises:

(a) Develop information seeking culture and learning behavior in order to remain updated and cope with global market dynamics.
(b) Design and implement enterprise growth plans and competitive strategies matching with contemporary international business trends.
(c) Invest in innovation and new (imported) technology to improve product quality and increase efficiency and competitiveness.
(d) To lob for contractual agreements including licensing, franchising, technical support and technological cooperation with foreign firms as means to acquire new technology and learning than sticking to local production technologies.
(e) To develop the ability to access, track and use international market related information by investing in modern ICT.
(f) To design and implement ICT enabled production systems in order to increase production efficiency and firm competitiveness

(iv) To Academicians:

(a) The participation of local food processing in inter-regional trade remains very low compared to other countries in the region. The root causes to this limited engagement and way forward need to be identified.

(b) Given the role ICT in today's global business and having proved to be a pillar in the internationalization of many American and European SMEs. However, the Impact of ICT in the internationalization of local enterprises and how it can be applied in the domestic environment remain unknown. It is therefore important look into this aspect.

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Impact of Technology Transfer on Environmental Degradation in the World Economy

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Introduction

The transfer of technology is an essential tool for economic development of an economy. Global efforts were undertaken to foster sustainable development in the Rio "Earth Summit" UNCED Conference in 1992. At Rio, agreement on the Rio Declaration and Agenda 21 sought to define principles and an "action plan" for global sustainable development. It was aimed at fostering sustainable development through domestic and international actions of technology transfer. The development had aggravated the problem of environmental degradation. It could be identified from the following statistical evidences. Among the top five countries of CO_2 emissions in the world economy, Unites states was the top most country in emitting the CO_2 till the year 2005. From the year, 2006 onwards, China was the top most country in emitting the CO_2. The CO_2 emission of United States was ranged between 4.99 billion tonnes to 5.94 billion tonnes for the period 1990 -2011. In 1990, the CO_2 emission was only 2.51 billion tonnes in China. It had increased to 9.7 billion tonnes in 2011. In India also, the growth rate of CO_2 was higher. It was on account of higher growth rate of gross domestic product in these countries. In 2011, China was the top most country in emitting the CO_2. It was around 9.7 billion tonnes. It was also observed that, in future, China and India will become the first two top most countries in emitting CO_2, if the same trend is going to continue. Various studies had established the adverse impact of development through liberalization on environmental degradation. Antweiler et al. (2001) postulate a Factor Endowments Hypothesis (FEH), which predicts that trade liberalization will lead to an increase in carbon emissions in capital-abundant countries and a reduction in capital-scarce countries.

They test this hypothesis using panel data on city-level ambient SO_2 concentrations and find evidence that concentrations of SO_2 are increasing in a country's capital to labour ratio. They calculate the composition elasticity and find that one percent increase in a nation's capital-to-labour ratio holding scale, income and other determinants constant leads to one percent-point increase in pollution. Cole et al (2013) replicate Antweiler *et al.*'s (2001) study for SO_2 and extend the analysis to consider CO_2, NO_2, and Biological Oxygen Demand (BOD) as well. Their estimated composition elasticities are 2.3 and 0.45 for SO_2 and CO_2, and statistically indistinguishable from zero for NO_2 and Biological Oxygen Demand. Using Chinese data, Shen (2007) calculates com-

position effects for SO_2, Dust fall, Chemical Oxygen Demand (COD), Arsenic and Cadmium, in each case finding that higher capital/labour abundance corresponds to more pollution. In this back drop, an attempt was made to analyse the impact of technology transfer on environmental pollution in the world economies with the following objectives.

Objectives

1. To assess the expenses on technology transfer in the world economies
2. To evaluate the carbon emissions in the world economies
3. To estimate the impact of technology transfer on environmental pollution.

Methodology

The data for the study is secondary in nature. The data on payment on intellectual property rights is taken as an indicator for the technology transfer between countries. The data CO_2 emissions and area under forest in various countries specified in World Bank Report 2013 are considered as the indicators of environmental indicators. Hence data on payment of intellectual property rights, CO_2 emissions and area under forest in various countries of the world economies were collected from the World Bank Report, 2013. Multiple regression analysis and discriminant analysis are used to fulfill the objectives of the study.

Specification of Empirical Models

1. **Multiple Regression Analysis**

   (a) To assess the impact of technology on gross domestic product of the world economy, the following form of the regression equation was estimated

   $Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + U$

   X_1 = Intellectual payments, X_2 = Industrial share to the gross domestic product X_3 = Foreign Direct investment, U = Random term

   (b) To assess the impact of technology on carbon emission, the following form of the equation was estimated

   $Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + U$

   X_1 = Intellectual payments ($US) X_2 = Share of Industrial gross domestic product to the total gross domestic product (In percentage) X3 = Foreign Direct investment($US), U = Random term.

2. **Discriminant Analysis**

   To identify the relative contribution of technology transfer on environmental degradation, multiple discriminant analysis was employed. In the discriminant analysis, the countries in the world economy were classified as the country of high carbon emitting countries and countries of low carbon emitting countries based on the world average carbon emission. The

high carbon emitting countries were grouped together as group I countries and the low carbon emitting countries were grouped as group II countries. The factors such as the intellectual payments, industrial share to the gross domestic product and foreign direct investment were hypothesized as the factors classifying the countries into high carbon emitting countries and low carbon emitting countries. Hence they were put into the linear discriminant analysis.

$Z = l_1X_1 + l_2X_2 + l_3X_3$

$Z =$ Total distance from the selected independent factors to the discriminant function

$X_1 =$ Intellectual payments, $X_2 =$ Industrial share to the gross domestic product

$X_3 =$ Foreign Direct investment.

As the area of forest is one of the environmental indicator, the relative contribution of the technology transfer on the area under forest was estimated through linear discriminant analysis. The countries were classified as the countries of high forest endowed and low forest endowed countries based on the average forest endowment. The factors such as intellectual payments, industrial share to the gross domestic product and foreign direct investment were hypothesized as the factors classifying the countries into high forest endowed countries and low forest endowed countries. Hence they were put into the linear discriminant analysis.

$Z = L_1X_1 + L_2X_2 + L_3X_3$

$Z =$ Total distance from the selected independent factors to the discriminant function

$X_1 =$ Intellectual payments, $X_2 =$ Industrial share to the gross domestic product

$X_3 =$ Foreign Direct investment.

l_1, l_2, l_3 are the discriminant coefficients

Results and Discussion

The indicators of development was considered as the gross domestic product and industrial gross domestic product. The payment on intellectual property rights was taken as the indicator of technology transfer. The environmental indicators were the area under forest, CO2 emissions, methane emissions and energy use. The results pertaining to the world average of technology transfer, industrial development and environmental indicators are shown in Table-1.

Averages estimated from the data given in World Bank Report, 2013.

The payment on intellectual property rights was amounted to $ 6315400000, the percentage of industrial gross domestic product to gross domestic product was 21.04 percentage, the average forest area was 1068178.28 square kilo meter, the average per capita CO_2 emissions was 4.4988 metric tonnes. The average gross domestic product was $ 1753490000000 and the average per capita energy use was 30548.37 Kilo Gram oil equivalent. The technology transfer was hypothesized to determine the economic development. Hence the indicator of technology transfer such as the payment on intellectual property rights was assumed to determine the gross domestic product along with the industrial gross domestic product and foreign direct investment. The above explanatory variables were put into the gross domestic product of the world economy equation. The results of the gross domestic product equation is shown in Table 2.

Table 1 World Average of Technology Transfer,Development and Environmental Indicators

Variables	Average
Payment on intellectual property (US $)	6315400000
Industrial Gross Domestic Product (Percentage of industrial GDP to GDP)	21.0395
Forest Area (Square Kilo meter)	1068178.28
CO_2 Emissions (Metric tonnes per capita)	4.498750996
Gross Domestic Product (US $)	1753490000000
Methane emissions (Kt of CO_2 equivalent)	2309506
Energy use (kg of oil equivalent per capita)	30548.37

Table 2 Relationship Between Trade Related Variables and Development in the World Economy - Regrssion Analysis

Variables	Regression Co efficient	't' value	Level of significance
Constant	-1.094E11	-.306	Insignificant
Intellectual payments	35.234	2.399	Significant at five percent level
Industrial GDP	-1.705E10	-1.261	Insignificant
Foreign Direct Investment	20.059	8.477	Significant at one percent level
R^2	0.40		
F Value	52.927		

Estimation based on the data from World Bank Report, 2013

The F value was statistically significant at one percent level indicating better fit of the model. The selected explanatory variables are strong enough to explain the model. Among the selected variables, the intellectual payments and foreign direct investment were statistically significant to determine the gross domestic product. The additional payment on intellectual property rights and the foreign direct investment had contributed to additional gross domestic product of the world economy. The industrial gross domestic product was statistically insignificant. The results revealed that the technology transfer and the foreign direct investment had increased the gross domestic product of the world economy significantly.

The economists argued that the important factor behind the environmental degradation was the development. The earlier studies had established a strong relationship between the Gross Domestic Product and CO_2 emissions. As the technology transfer was one of the strong factor behind the development, an attempt was made to analyse the relationship between the CO_2 and Gross Domestic Product.

The following Table 3 shows the results of regression analysis showing the relationship between the CO_2 emissions and intellectual property rights.

Among the selected variables, intellectual property rights was statistically significant at one percent level. The intellectual property rights had positive relative relationship with the CO_2 emissions. The additional CO_2 could increase the CO_2 emissions. The other factors were statistically

insignificant. The value of F was statistically significant to determine the CO_2 emissions equation. Hence the estimated model had better fit.

Table 3 Relationship Between CO_2 Emissions and Intellectual Property Rights

Variables	Regression Co efficient	't' value	Level of significance
Constant	0.058	1.240	Insignificant
Intellectual payments	5.180E-11	2.286	Significant at one percent level
Industrial GDP	.006	0.219	Insignificant
Florien Direct Investment	-4.504E-12	1.108	Insignificant
R_2	0.43		
F Value	53.927		

Estimation based on the data from World Bank Report, 2013

Impact of Technology Transfer on Carbon Emissions in the World Economy

From the above regression equation, it was confirmed that the intellectual property rights was one of the factors to determine the Gross Domestic Product and thereby the carbon emissions of the world economy. To identify the relative contribution of each variable to the carbon emission, the countries in the world economy was classified as the high CO_2 emitting countries and low CO_2 emitting countries based on the world countries' average CO_2 emission. The countries emitting carbon above world average were classified as the high carbon emitting countries and the countries emitting carbon below the world average were classified as low carbon emitting countries. The intellectual property along with the other trade related variables were put into linear discriminant analysis to identify the relative contribution of the technology transfer on the CO_2 emission. Initially to find out the mean difference in the selected variables, the means of selected variables in high CO_2 emitting and low CO_2 emitting countries were estimated and are given in Table 4.

Table 4 Group Means of Selected Variables Pertaining to High Co_2 and Low Co_2 Emitting Countries in the World Exonomies

Variables	High carbon emitting countries	Low carbon emitting countries
Foreign Direct Investment	14891000000	103870000000
Payment on intellectual property rights	100590000	16290000000
The share of Industrial Gross Domestic Product to Gross Domestic Product	20.2108	22.4149

Estimations based on the data from World Bank Report, 2013

The table shows that the average foreign direct investment was $ 103870000000 in high carbon emitting countries and was $ 14891000000 in the low carbon emitting countries. The payment on intellectual property rights was $ 16290000000 in high carbon emitting countries and $ 100590000 in the low carbon emitting countries. The share of industrial gross domestic product to total gross domestic product was 22.4149 percent in high carbon emitting countries and 20.2108 percent in

low carbon emitting countries. It showed that the foreign direct investment, payment on intellectual property rights and industrial gross domestic product were higher in high carbon emitting countries than in low carbon emitting countries. To test whether the mean differences in the selected independent factors were statistically significant the Wilks Lambda, the univariate statistic was calculated. The estimated results of Wilks Lambda are shown in Table 5.

Table 5 Wilks Lambda - Univariate Statistics

Variables	Wilks Lambda	Level of Significance
Foreign Direct Investment	.944	Significant at 1% level
Payment For intellectual property rights	.939	Significant at 1% level
Industrial Gross Domestic Product	.996	Significant at 1% level

Estimations based on the data from World Bank Report, 2013

If the Wilks lambda approaches one, greater is the difference between the group means. If it approaches zero, it indicates lower mean difference between the groups. The value of Wilks lambda was statistically significant for all the selected variables such as the foreign direct invest, payment for intellectual property rights and the share of industrial gross domestic product. It revealed that all the selected variables differed significantly between the high carbon emitting countries and low carbon emitting countries.

The magnitude of the standardized canonical discriminant function shows the order of the variable's contribution to the total difference in the discriminant function. The Table 6 shows the standardized canonical discriminant function.

Table 6 Standardized Canonical Discriminant Function Coefficients

Variables	Canonical discriminant function coefficients	Rank
Foreign Direct Investment	.325	2
Payment for intellectual property rights	.683	1
Industrial Gross Domestic Product	.189	3

Estimations based on the data from World Bank Report, 2013

The table shows that the payment for intellectual property rights was the first important factor discriminating the countries as high carbon emitting countries and low carbon emitting countries. The next important factor was the foreign direct investment followed by the industrial gross domestic product. The Table 7 shows the pooled correlation between the discriminating variables and canonical discriminant function.

Table 7 Pooled Within-Groups Correlations Between Discriminating Variables and Standardized Canonical Discriminant Functions Variables Ordered by Absolute Size of Correlation within Function

Variables	Canonical Correlation	Rank
Foreign Direct Investment	0.944	2
Payment for intellectual property rights	0.945	1
Industrial Gross Domestic Product	0.901	3

Estimations based on the data from World Bank Report, 2013

The table shows that the magnitude of foreign direct investment and payment for intellectual property right in the pooled correlation between the discriminating variables and standardised discriminant function was around 0.94. It revealed that the foreign direct investment and payment on intellectual property rights were the most important factors in classifying the countries into high and low carbon emitting countries. The relative contribution of selected variables in determining carbon emissions were calculated and are given in Table 8.

Table 8 Relative Contribution of Selected Variables

Variables	Relative contribution	Rank
Foreign Direct Investment	64.6	1
Payment for intellectual property rights	34.2	2
Industrial Gross Domestic Product	1.2	3

Estimations based on the data from World Bank Report, 2013

Foreign direct investment was the dominant factor determining the carbon emission. It alone contributed 64.6 percent in differentiating the countries into high and low carbon emitting countries. It was followed by payment for intellectual property rights which contributed to 34.2 percent. The industrial gross domestic product was the least important factor in classifying the countries into high and low carbon emitting countries.

Impact of Intellectual Property Rights on the Forest Endowed in the World Countries

The endowment of forest in a country is a strong indicator of environment. The countries in the world economy were classified as the high forest endowed and low forest endowed countries based on the average area of forest in the world countries. If a country is endowed above the average area of forest, they were classified as the high forest endowed country. If a country is endowed below the average level of forest, they were called as the low forest endowed country. The foreign direct investment, payment on intellectual property rights and industrial gross domestic product were selected as the independent factors in classifying the countries as the countries with high forest endowed and low forest endowed countries. The Table 9 shows the mean difference of the selected variables between high forest endowed and low forest endowed countries.

Table 9 Group Means of Selected Variables Pertaining to High Forest Endowed and Low Forest Endowed Countries

Variables	Group I Mean	Group II Mean
Foreign Direct Investment($US)	7355000000	372990000000
Payment on intellectual property rights($US)	811300000	50286000000
Share of Industrial Gross Domestic Product (Percentage)	21.0211	29.0022

Estimations based on the data from World Bank Report, 2013

The foreign Direct Investment was $ 3729900000000 in high forest endowed countries while the same was $ 7355000000 in low forest endowed countries. The payment on intellectual property

rights was $ 50286000000 in the high forest endowed countries while the same was $ 811300000 in low forest endowed countries. The share of industrial gross domestic product was 29.0022 percent in high forest endowed countries and 21.0211 percent in low forest endowed countries.

Through,Wilks lambda the statistical significant difference in the means of selected variables between the groups was estimated. The results of wilks lambda are shown in Table 10.

Table 10 Group Means of Selected Variables Pertaining to High Forest Endowed and Low Forest Endowed Countries

Variables	Wilks Lambda	Level of significance
Foreign Direct Investment	.598	Significant at one percent level
Payment For intellectual property rights	.769	Significant at one percent level
Industrial Gross Domestic Product	.976	Significant at one percent level

Estimations based on the data from World Bank Report, 2013

The value of Wilks lambda was statistically significant. It indicates that the mean of the variables such as the foreign direct investment, payment for intellectual property rights and industrial gross domestic product differed significantly between high forest endowed and low forest endowed countries. The results of canonical discriminant function and the pooled correlation between the selected discriminating variables and the discriminant function are shown in Table 11.

Table 11 Standardized Canonical Discriminant Function Coefficients

Variables	Canonical discriminant function coefficients	Rank
Foreign Direct Investment	1.233	2
Payment For intellectual property rights	-.336	1
Industrial Gross Domestic Product	.144	3

Estimations based on the data from World Bank Report, 2013

The Table 12 shows the pooled correlation between the discriminating variables and canonical discriminant function.

Table 12 Pooled Within-Groups Correlations

Variables	Canonical Correlation	Rank
Foreign Direct Investment	.966	1
Payment For intellectual property rights	.646	2
Industrial Gross Domestic Product	.186	3

Estimations based on the data from World Bank Report, 2013

Foreign direct investment was ranked first in the standardized discriminant canonical discriminant function. It was the first important variable discriminating the countries into high forest endowed countries and low forest endowed countries. The payment for intellectual property right was ranked as the second important factor in discriminating the countries into high and low forest endowed countries. Contribution of the variables in discriminating the forest endowment of the countries was calculated and shown in Table 13.

Table 13 Relative Contribution of Selected Variables

Variables	Relative contribution	Rank
Foreign Direct Investment	0.0000009	1
Payment for intellectual property rights	99.99999803	2
Industrial Gross Domestic Product	0.0000001	3

Estimations based on the data from World Bank Report, 2013

The payment for intellectual property right was the dominant factor in discriminating the countries into high and low forest endowed countries. It alone contributed 90 percentage of variations in classifying the countries into high and low forest endowed countries. The next important variable was foreign direct investment. The share of industrial gross domestic product in the total gross domestic product was the least important factor in classifying the countries into high and low forest endowed countries.

Conclusion

To conclude, the foreign direct investment and the transfer of technology had increased the gross domestic product of the world economy. The transfer of technology had caused the carbon emissions. Higher amount of payment on intellectual property rights and foreign direct investment were observed in the high carbon emitting countries. Similarly the same was higher in less forest endowment countries. Hence, among the trade related factors, the transfer of technology and the foreign direct investment were the dominant factors in causing the environmental degradation. It is essential to fix a boundary for the transfer of technology not to cross environmental limit.

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Humanness and Entrepreneurial Orientation

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Abstract

The construct of Entrepreneurial Orientation (EO) studied from within a development economy is argued to be an understudied aspect in the academic literature. The strategic construct EO focuses on the preferences, behaviors and beliefs of the management at the firm level. This study adapted the original conceptualization of the EO construct fit for local entrepreneurs/owner- managers of micro/ small businesses in Tanzania. Especially the aforementioned group has been selected giving their substantial contribution to local economic development (LED). Where most existing studies focus on the consequences of EO in terms of performance, this study looks into one specific antecedent of EO, culture, and defines this trough the African socio- cultural philosophy (and management style) Humanness. Best explained as a widespread spirit of caring for your extended family and community where harmony, respect and approachability are important values. The study examines how Humanness influences the EO of small business entrepreneurs in Tanzania. Based on the literature, a negative relation is expected between Humanness and EO. Empirical evidence however shows a different result. Hence, multiple statistically significant positive relations are found. Furthermore, given the patriarchal culture of Tanzania, this study scrutinizes the influence of gender on both Humanness and EO, and finds that in Tanzania there is more equality in gender in relation to EO than anticipated. Given the exploratory design of the research, this study comes with new insights contributing to a better understanding of the Tanzanian entrepreneurial orientation (mindset) and subsequent implications related to EO and local economic development.

Key words

Entrepreneurial orientation (EO), Humanness (Ubuntu), Local economic development, Female entrepreneurship, Culture, Developing economies, Tanzania, Dar es Salaam.

Introduction

Entrepreneurship is in the literature often associated with economic growth and development (Gorman, Hanlon & King,1997 ; Lee & Peterson, 2000). Hence, it is seen as the propelling force (Nafukho & Muyia, 2010) and a necessary condition of a countrys (long-term) economic development

(Canzanelli, 2001; Sautet, 2013). Research into Entrepreneurship in developing economies, and Africa in particular, is argued to be an important but under-studied aspect within the academic literature (Kshetri, 2011).

Contributing to this gap, this paper uses the concept of Entrepreneurial Orientation (EO) and adapted it for local entrepreneurs/ owner-managers of micro/ small businesses. In essence EO is best explained as a strategic construct focusing on the preferences, behaviors and beliefs of the management at the firm level (Covin, Green & Slevin, 2006). In other words, the 'how' question is key in EO since the concept aims at understanding the process of being entrepreneurial and its related methods, practices and decision-making styles. The EO construct is argued to be an understudied aspect, especially in a non-western (Lumpkin & Dess, 1996), developing country setting (Wales, Gupta & Mousa 2011). In addition, a focus on the antecedents of EO (e.g. culture) is argued to be an aspect requiring more scrutiny (Engelen, 2010; Lee & Peterson, 2000).

This study develops, based on the original Covin and Slevin (1989) conceptualization, a scale appropriate for local entrepreneurs/ owner-managers of micro/ small businesses. What is more, the research specifically focuses on the influence of (management) Culture on EO. In order to make this measureable the African socio- cultural philosophy of Humanness is being identified as the concept measuring local (management) culture and based on the literature a negative relation is expected between the aforementioned concept and EO. Finally, also the influence of gender will be adopted in the proposed model. Given the patriarchal culture were Tanzanian women are raised (Jagero & Kushoka, 2011) and go through their process of socialization, it is expected that women have a different (lower) EO than man.

Overall, the explorative nature of this paper aims at developing an instrument capable of measuring the EO (mindset) of small entrepreneurs in a developing country and see how both (management) culture and gender are of influence. Since the focus lies on the entrepreneurial process of local actors, the results contribute to a better understanding of local economic development in terms of how local entrepreneurs shape and share the future of their environment.

Literature

Entrepreneurial orientation

Within the field of entrepreneurship, a large stream of research focuses on entrepreneurial orientation (EO) (Rauch et al. 2009). After more than 30 years of research, EO is seen as a central concept within entrepreneurship research and is supported by a vast amount of empirical as well as theoretical studies (Covin & Wales, 2012; Covin, Green & Slevin, 2006). The result today is that the construct of EO has become the most applied metric in research focusing on entrepreneurial behavior in the strategy and entrepreneurship literature (Runyan et al, 2012).

Specifically, EO is a strategic construct where the conceptual domain focuses on the particular preferences, behaviors and beliefs of the management at the firm level (Covin, Green & Slevin, 2006). It is the process and the 'how' of the entrepreneurial undertakings in terms of methods practices and decision-making which matter in the EO paradigm (Lee & Peterson, 2000). The roots of the construct lie in the strategy making process literature (Mintzberg, 1973), however Miller (1983) was the first to conceptualize on the construct. Miller (1983) identified three dimensions of EO which are widely used in the literature today. The dimensions; innovativeness, risk taking and proactiveness represent the practices and policies which provide the basis for the entrepreneurial

endeavors. Building on the conceptualization of Miller (1983) together with the earlier work by Khandwalla (1977) and Miller and Friesen (1982), Covin & Slevin (1989) renewed the dimensions in what is now known as the most extensively used operationalization of EO (Runyan et al, 2012; Wales, Gupta & Mousa,2011). Covin and Slevin (1989) operationalized the construct of EO trough developing a nine-item scale, covering three items per dimension. A higher score on EO indicates the firm would have a relatively higher competitive advantage which is said to eventually improve performance (Rezaei, Ortt & Scholten, 2012). In addition, higher scores indicate managers to be more involved in innovation, less risk averse and to react more proactively towards opportunities.

With a significant amount of literature written on EO in the organizational and management literature, it still remains a phenomenon which is mostly scrutinized in a western setting involving mostly developed countries (Wales, Gupta & Mousa, 2011; Tang et al, 2008). The importance of examining the EO construct in other country settings has been argued by Lumpkin & Dess in 1996 but, as found by Wales, Gupta & Mousa (2011), still remains underexplored. Specifically mentioned in the aforementioned article are Brazil, India, Russia and clusters in the Middle east, Latin America and Sub-Saharan Africa.

Besides putting EO in a merely western perspective also the research paradigm of entrepreneurial orientation seems to focus most often on EO's consequences in terms of its relation to firm performance (Fayolle, Basso & Bouchard, 2010; Wales, Gupta & Mousa, 2011). The antecedents of EO are on the other hand less scrutinized (Fayolle, Basso & Bouchard,2010). Relatively little attention has been paid to the aspects and conditions which are responsible for yielding an entrepreneurially oriented mindset. Yet, when it comes to aspects influencing EO, various authors focus on the influence of culture and its relation to entrepreneurial activity (Zahra, Jennings & Kuratko, 1999 ; Kreiser, Marino & Weaver, 2002; Runyan et al, 2012; Lee & Peterson, 2000; Fayolle, Basso & Bouchard,2010 ; Engelen, 2010).

One of the first to argue that culture was a consistent element of the degree of entrepreneurship and subsequent economic growth in a country was Landes in 1953 (Jones & Wadhwani, 2006). One argued that national cultural factors as well as other social values and attitudes are a driving force in terms of developing a countries' entrepreneurial activity and subsequent economic performance. Also in the paper of Engelen (2010) it is found that EO is, to a certain extent, contingent on the domestic culture since culture influences individual behavior in organizations. Hence, which is consistently described in the paper of Kreiser, Marino & Weaver (2002) who state that individual behavior is especially in entrepreneurship research often related to the formation of EO and that national culture is of significant influence in determining the degree of EO in a firm. Furthermore, in the article of Runyan et al (2012) the growing support for the position of culture in relation to EO is also acknowledged and it is argued that it would be relevant to scrutinize how different cultures impact on EO. This corresponds with the article of Hayton, George and Zahra which states; 'Cultural values indicate the degree to which a society considers entrepreneurial behaviors, such as risk taking and independent thinking, to be desirable' (2002, p 33). Given the large variance in national cultures and the possible variation this fosters in terms of EO it is relevant to research how different attitudes and behaviors towards EO depend on national culture (Fayolle, Basso & Bouchard, 2010).

The original EO concept has in the literature mainly been discussed in often larger contexts where top managers and owners are responsible for the entrepreneurial process and hence orien-

tation (Lumpkin & Dess in 1996). Nonetheless, there are authors arguing that the (quasi) psychological origin of the concept makes it appropriate to be used in a micro and small business context (Krauss et all, 2005; Frese, Brantjes & Hoorn, 2002). Despite being designed to measure a firms EO, basically the construct psychologically assesses the degree of EO of an individual (Krauss et all, 2005). Especially for micro and small firms, the perspective of the owner /manager is what determines the firm's strategies, culture, mission and vision. As the firm size increases, the influence of other decision makers, processes and protocols become more influential, making the degree of EO less based on the psychological perspective of the owner/manager who in the case of a small/micro firm is representing the firm level EO (Krauss et all, 2005).

In a developing country context, and especially in Africa, micro and small businesses make up a significant part of the local economies (Frese, Brantjes & Hoorn, 2002). The aforementioned authors find in their study, in a similar African context, that the EO of owner/managers is positively related to business success. The authors also stress the importance of a focus on the (psychological) perspective of the owner/manager since one's actions and processes represent the EO of a smaller firm. Furthermore, Krauss et all (2005) argue that EO is influenced by the culture and business environment of a specific country and that especially in developing countries the influence of culture shows that there is a significant difference between Western countries EO and developing (African) countries EO. Exemplifying the influence of culture is that in a western perspective competitors are more often treated rather aggressively and the results of the Krauss et all (2005) study shows that competitors in some developing African countries are seen as potential cooperators instead of rivals. Reasons for this being that the competitor's help might be needed in the future in order to favor the owner/manager's own business prospects and vice versa. Finally, Frese, Brantjes & Hoorn, (2002) argue that more scrutiny is required into the EO of owner/managers of small firms in developing countries.

The dimensions of EO

The first dimension, Innovativeness, became one of the first characterizations of entrepreneurship. As argued by Schumpeter (1934) wealth would be created when existing market structures were to be dislocated through the acting of entrepreneurs who would introduce innovative new combinations resulting in a dynamic evolution in the economy. Innovation is by various scholars considered to be at the heart of entrepreneurship (Covin & Miles, 1999). Evidenced by the creation of new products, services, processes or technology, innovation is argued to be fundamental in entrepreneurship (Kreiser, Marino & Weaver, 2002). The innovativeness dimension specifically reflects the ability of a firm to become involved in new ideas, experimentation and other creative processes which may be of influence regarding the creation of new products, services, processes or technology (Lumkin & Dess, 1996). In the basis, innovativeness measures the firm's willingness to depart from the status-quo and look for novelty. Hence, innovative firms distinguish in their commitment to creating and introducing new aspects into a market, being earlier than the competition (Kreiser, Marino & Weaver, 2002). In the specific context of this study, innovativeness and novelty are interpreted as being new toward a relevant market, group or local environment. In a similar study context, Krauss et all (2005) argue that having a positive mindset towards new ideas involving the creation of new products, services, processes or technology in a developing context is more relevant that having an entirely new innovation.

Secondly, Risk taking is a concept which is often associated with entrepreneurs. It is seen as a quality which is in the literature commonly used to describe entrepreneurship (Lumkin & Dess, 1996). The quality specifically reflects the acceptance of uncertainty and risk as a result of some kind of resource commitment to indeterminate activities and results (Hughes & Morgan, 2007). Companies with a higher EO are often more involved in activities such as incurring debt and making resource commitments than companies who are less entrepreneurially oriented (Lumkin & Dess, 1996). Because to some extent all business endeavors carry at least some risk, the degree of risk-taking is what matters. This range is in the literature referred to as on the one end nominal or 'safe' risk and on the other high risk. The former type of risk-level refers to aspects as depositing money in a bank or holding inventory. The latter type includes having high loans or bringing new products into the market (Lumkin & Dess, 1996). Furthermore it is argued that risk is often seen as calculated risk as the entrepreneur tries to minimize the probability of failure (Krauss et all. 2005). Overall, a positive orientation towards taking risk is believed to positively influence the company's success.

The last dimension, proactiveness, revolves around the notion of taking initiative, being anticipative and tracking new opportunities (Lumkin & Dess, 1996). In other words, being able to exploit asymmetries in the market place in order to become the first mover in a particular market. The most proactive business in a market is the one which succeeded in being the fastest to innovate and subsequently being one of the first to put it into the market. Henceforth, a proactive business is a leader rather than a follower. According to Lumkin & Dess (1996), when being such a leader there is no need to constantly be the absolute first. However, a constant anticipation and drive to seize new opportunities is key. Another attribute of Proactiveness is aggressiveness towards competitors which would be improving the competitive positioning of a business (Knight, 1997). Specifically, this is the firm's ability to challenge their direct competitors and outperform them in the market place.

How gender influences EO

In general, gender relations vary largely in different cultural, environmental and socialeconomic perspectives (Berg, 1997). Before 1980 scholars predominantly focused on the role and the characteristics of the average male entrepreneur (Carter, 1993). Later, during the 80s, entrepreneurship research began to scrutinize the motivations and characteristics of women waning to start-up their own business in various settings. The first results in this particular line of work revealed that it is more difficult for women to act as an entrepreneur due to three reasons (Berg, 1997). First of all, women were found to have less opportunity in terms of education and hence improving their business skills. Second, getting credit is said to be more difficult for women because there was a lack of trust in the relationship between women and entrepreneurship. And last, the domestic role women would have to fulfill also negatively influenced the assessment of the female entrepreneur.

Females are generally given different roles in societies than males. Specifically this holds for power levels, authority, responsibilities, values and activities. These differences are subsequently responsible for the, in some countries more than others, gendered division of: labor, access to resources, and a traditionally male dominant control regarding decision making (Ncimbi, 2002). As Coleman (2002) finds in ones study focusing on constraints faced by female small business owners, there are typical characteristics belonging to female-owned businesses. These character-

istics are: reduced prospects of lucrativeness, small size and inability to provide covering collateral when applying for loans.

The so called gender gap in entrepreneurship is, despite increasing numbers of women entrepreneurs worldwide, still present to date. Empirical research into the position of women in entrepreneurship and subsequently into national economic growth has been performed by the Global Entrepreneurship Monitor (GEM). Multiple GEM studies, examining the rates of entrepreneurship in over 40 nations worldwide showed that in all countries the rates of men entrepreneurship succeeded that of women's. the actual gap showed to be significant and systematic and varied by a nation's GDP as well as religion (Allen et al. 2007). Later GEM reports revealed a similar picture in terms of women's partake in entrepreneurship. In the latest report (Kelly et al. 2011) the data covered 59 countries and in only one country (Ghana) women played a larger part in entrepreneurship than men. Amongst the countries investigated there were found to be very different rates of women entrepreneurs per country. Percentages varied between 1.5 percent of the female population (ages 18 to 64) being entrepreneur up to 45.4 percent. An important trend in the study results of the GEM 2010 women report (Kelly et al. 2011) is that the more factor driven an economy is the more women are involved in entrepreneurship. The GEM reports use three stages of national economic development. The stages, based on Porters typology of phases of economic development (Porter & Schwab, 2008), range from the poorest factor driven economies to efficiency driven economies and end at the most advanced innovation driven economies.

Within the factor driven economies, where nations compete primarily based on unskilled labor and natural resources, women have a relatively more positive attitude towards entrepreneurship, a lower fear of failure and are more likely to start up a business (Kelly et al. 2011). In line with the aforementioned finding is that the percentage of women entrepreneurs turns out to be higher in nations where the general income per capita is relatively low (Allen et al. 2007; Kelly et al. 2011). This implicates that women in less developed economies are more often than their male counterparts motivated through necessity to become involved in a start-up.

In Tanzania women are predominantly active in informal, micro level low growth segments. Often women in Tanzania, who are generally poorly educated, become involved into entrepreneurial activities out of necessity. Businesses of choice are according to Stevenson & St-Onge (2005): food processing, Sewing, farming, crafts and small scale productions/manufacturing.

Also the framework of Bourdieu (2001) has been used (in a Tanzanian context by Tundui, 2012) in explaining gender difference in small business. Bordieu (2001) argues that the reproduction of the social structure is stemming from a person's habitus. The habitus is something which is developed through childhood socialization and can be explained as a system of lasting and transposable dispositions and meaning giving perceptions and practices. Bourdieu (2001) uses the habitus to explain how humans have exemplified past structures of masculine domination into unconscious patterns of perception and indebtedness. In other words, a gendered view of the world subconsciously becomes part of a person's habitus during early and ongoing processes of socialization.

The historical structures of masculine order subsequently can be of major influence in societies were women are subjected to patriarchal weights which negatively influences the position of the women entrepreneur. In Tanzania, the socialization processes (habitus) have always been male dominated. Tanzanian women are generally subordinates to men and thus the society can be called patriarchal (Jagero & Kushoka, 2011). Women's motivation to be involved in entrepreneurial

activities is Tanzania is often related to providing family support (Nchimbi, 2002). The male motivation is on the other hand more often related to revenue. Both these motivations show that there exists to some extent a different (gendered) perception of entrepreneurial success (Jagero & Kushoka, 2011). Furthermore, Tanzanian women were found to favor slow growth of their micro enterprises and instead of focusing on increasing one enterprise to become relatively large they preferred to have multiple micro-ones (Stevenson & St-Onge, 2005).

Humanness

Before one can even begin to understand to what extent national culture can be supportive and favorable towards entrepreneurial activity, it must be clarified in what perspective, and in which setting, culture will be treated in this paper.

When focusing on Sub-Saharan Africa in terms of national culture, it soon becomes apparent that cultural heritage is a very important aspect in business/management practices. Generally this African region is highly collectivistic with a paternalistic orientation where the importance of clan interests over individual needs are common (Wanasika et al. 2011). Research into the actual differences between western and Sub-Saharan African countries shows that it is of utmost importance to embrace the indigenous values and norms (Mangaliso,2001) as well as to understand the humanistic values who are meaningfully different from the western world (Karsten & Illa, 2005). The leaders or managers in Sub-Saharan African countries have great responsibility towards their extended families. what follows is that tribes or ethnic groups are more important than reward systems based on performance, resulting in both nepotism and paternalism (Wanasika et al. 2011).

One specifically important African socio- cultural philosophy, common in most Sub-Saharan African countries is Ubuntu. The word Ubuntu comes from the Xhosa expression "Umuntu ngumuntu ngabantu" which is translated as a person is a person through other persons (Karsten & Illa, 2005). In terms of translating Ubuntu into English the literature uses 'Humaneness' (Mangaliso,2001) or 'Humanness' (Sigger, Polak & Pennink, 2010).

It can be defined as a widespread spirit of caring for your extended family and community where harmony, respect and approachability are important values (Mangaliso, 2001). Humanness reflects the family atmosphere and the relationship between individuals and their social surroundings. Furthermore, humanness emphasizes on working together and being beneficial towards the entire community. An important implication of a Humanness-like culture is that money, power and formal position, aspects which are fairly important in the western-world, are not pivotal in determining a person's status in society. Interaction, recognition and sharing with others on the other hand are (English, 2002).

Mgibi (1997), who is in the literature referred to as the founder of the conceptualization (management practice) of the humanness philosophy (Sigger, Polak & Pennink, 2010) , advances five key social values to create ones conceptual framework. The framework is otherwise known as the collective finger's theory which can be best explained using the African proverb 'a thumb, although it is strong, cannot kill aphids on its own' (Mbigi & Maree, 1995, Cited Poovan, du toit & Engelbrecht, 2006). Henceforth, the metaphorical fingers should be interpreted as individuals who interact collectively towards a goal where each of the individual fingers denote the key values of importance to establish and uphold a collective culture. The five closely related dimensions of

humanness based on Mbigi's (1997) work are; Survival, Spirit of solidarity, compassion, respect and dignity. These dimensions were later used by Sigger, Polak & Pennink, (2010) to develop a measurement tool related to the philosophy of humanness. The aforementioned authors were the first to develop a questionnaire enabling scholars to conduct empirical research since the level of humanness now is measurable. Today, this is the only known and validated metric in this line of research.

The dimensions of Humanness

The first dimension, survival, is in the literature seen as the heart of the humanness concept (Sigger, Polak & Pennink, 2010). The sharing of resources and common strengths is how many African people survived the often difficult living conditions and distress and this is how a strong collective psyche was formed. Sharing the little you have with other members of the community creates a strong and shared will to survive. Sharing one's expertise and resources and commonly focus on the benefit of the group is important in creating strong communities. As Mbigi (1997) explains, the effectiveness of organizations should be increased when the individual team members can entirely rely on each other. Brotherly care, as opposed to individual self-reliance, is essential in the survival of the community (Poovan, du toit & Engelbrecht, 2006). The extend family where people are living in tends to raise a strong feeling of coexistence (Mangaliso, 2001). Subsequently, coexistence is what makes the people work together and depend on each other. The survival dimension is also argued to be accountable for a strong degree of kinship in communities and organizations (Mangaliso, 2001). Furthermore, The survival dimension can be called closely related to the solidarity dimension as it consistently includes feelings of collective responsibility and working together to reach mutual goals.

Solidarity is de result of the combined efforts of the individuals working closely together in their community (Poovan, du toit & Engelbrecht, 2006). In accomplishing difficult tasks as a community, the people's personal interests are subordinate to the needs of the community. The spirit of solidarity can be translated into various collective ceremonies all contributing to a sense of belonging and trust (Sigger, Polak & Pennink, 2010). Also the cohesion between members in a specific team or enterprise can increase, yielding empowerment and better team work results (Broodryk, 2006). The people within the community all believe that by working together and being solidary towards each other, significantly more can be accomplished than when working on an individual basis. Especially more difficult tasks/problems are believed to be better taken care of when approached collectively (Broodryk, 2006). Furthermore, because solidarity is more important than specific goals, time is also perceived as being less important.

Finally, The compassion dimension is all about understanding the troubles and concerns of the people within the community and also sensing an urge to help whenever necessary (Mbigi, 1997; Poovan, du toit & Engelbrecht, 2006). During childhood Africans are brought up with a strong sense of interconnectedness, implicating that only through giving and sharing one can eventually receive (Mbigi,1997). Due to this interconnectedness and compassion people are highly willing to help members both within and outside their communities (Poovan, du toit & Engelbrecht, 2006) In addition, by means of compassion members in a community or team develop a shared vision (Sigger, Polak & Pennink, 2010). Poovan, du toit & Engelbrecht (2006) argue the compassion dimension to be the basis for a culture of sharing and caring.

The model

With the humanness philosophy being a significant part of Tanzanian (management) culture (Sigger, Polak & Pennink, 2010;) and the influence culture is said to have on EO (Kreiser, Marino & Weaver 2002; Runyan et al 2012), research into the relationship between the humanness dimensions and the dimensions of EO should be able to give a better insight into how cultural values influence entrepreneurship in Tanzania. Coming from a LED perspective, where the focus lies on the local actors and their specific entrepreneurial actions and activities (Pennink, 2013), this study aims to better understand how the qualities of the local community, in terms of their cultural values, influence their entrepreneurial activities as defined by the orientation. The EO is used given its relevance and status of being the most applied metric in research focusing on entrepreneurial behavior in the strategy and entrepreneurship literature (Runyan et al, 2012). Nonetheless, an adopted version of the original concept seems more appropriate in the specific context of this study. The main reason being the difference in scale. Since the original instrument usually is applied on larger enterprises (top managers) and not on the owner mangers of micro / small scale businesses. Furthermore, the original scale has not specifically been designed for developing countries. Hence, which is in the literature considered to be a gap (Wales, Gupta & Mousa 2011; Frese, Brantjes & Hoorn, 2002). In addition, given the patriarchal culture were Tanzanian women are raised and go through their process of socialization (Jagero & Kushoka, 2011), also gender will be integrated to be able to better understand how the gender gap (Allen et al. 2007) is of influence on Tanzanian entrepreneurial orientation.

In order to scrutinize the influence of Humanness of the EO of Tanzanian entrepreneurs, the model below (model 1) has been developed. The model is designed to be able to give an answer to the main problem statement: To what extent do culture, in terms of humanness, and gender influence entrepreneurship as defined by entrepreneurial orientation in the micro and small business sector.

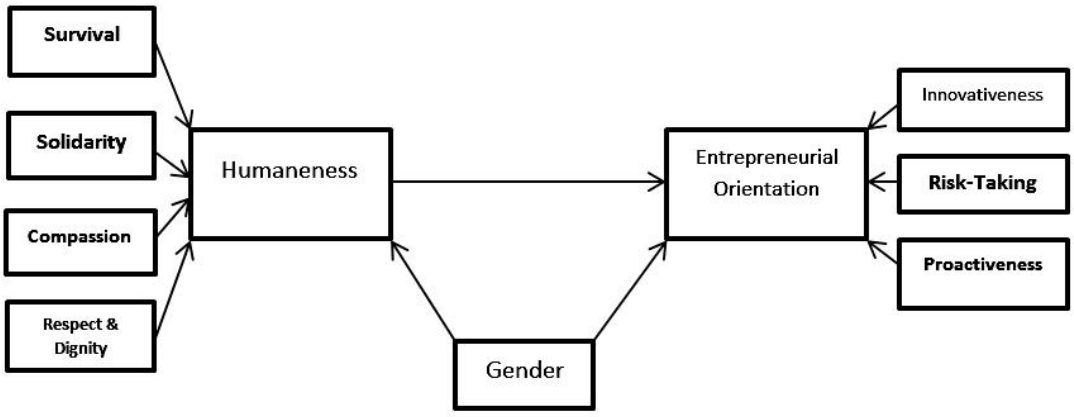

Figure 1 Main research model

Based on the theoretical analysis of this study it becomes apparent that one of the most important characteristics of humanness is the interdependence between people and the strong feeling

of community (Sigger, Polak & Pennink, 2010). Consistent to these key aspects of Humanness is the claim of Wanasika et al. (2011), that in Sub-Saharan African countries collectivism is highly important and the interest of the clan supersedes individual needs.

The importance of the humanistic values and norms in the Sub-Saharan African culture are argued to be a significant part of their culture and is highly relevant in matters of business. (Mangaliso,2001). The importance of the Humanness values in Sub-Saharan African countries (Karsten & Illa, 2005) and in the context of this study in Tanzania in particular (Sigger, Polak & Pennink, 2010), become especially relevant when relating them to entrepreneurship. As argued by Kreiser, Marino & Weaver (2002) and Runyan et al (2012), the cultural values of a particular business environment are of significant influence on the EO, especially when it concerns a developing country (Krauss et all 2005).

The EO Concept uses three dimensions to measure to what extent a firm (in this study represented by the owner/manager) is more or less entrepreneurially oriented which in the former case is likely to improve its competitive advantage and business performance (Rezaei, Ortt & Scholten, 2012). Higher scores on the EO scale thus indicate the owner/manager to be more competitive and relatively more successful in terms of business performance. As it is argued that cultural values indicate the degree to which a society considers entrepreneurial behaviors to be desirable (Hayton, George & Zahra, 2002), and the humanness values claim the interests of the community to go before individualistic success it seems fair to assume a negative relation exist between humanness and EO. Strengthening this assumption is the fact that the degree of EO is higher when a firm is more aggressive towards the competition and is constantly looking to outperform its rivals (Knight, 1997). Henceforth, which is not in line with the humanness values, since the people's personal interests are subordinate to the needs of the community (Poovan, Du Toit & Engelbrecht, 2006). In addition, research shows that especially in Sub-Saharan African countries competitors are treated as potential cooperators instead of rivals (Krauss et all, 2005).

Overall, given the expected negative relationship between Humanness and EO, this paper argues that the owner/ managers who score higher on the humanness scale will be less Entrepreneurially oriented.

Method

In order to obtain relevant data for this study, field research has been conducted in Dar es Salaam, Tanzania. The main reason Tanzania has been selected is because the existence of humanness has already been shown in this country by multiple researchers (Sigger, Polak & Pennink, 2010; Scholtens, 2011). This justifies using the Humanness scale in this country setting. Coming from the aforementioned established and validated scale this study then continues to look for relations the concept has to other concepts which in this case is the EO. Another reason Tanzania has been selected is because it very well fits the criteria of being a developing country, something where this study is specifically focusing on given its link to LED. Furthermore, the EO literature also argues more research is needed in a sub Saharan developing country perspective (Wales, Gupta & Mousa, 2011). Another, more practical, reason to explain the choice of Tanzania is due to the contacts which were already established in Dar es Salaam which increased the feasibility and likelihood of succeeding. This lastly mentioned aspect gave the author access to a small network of relevant business people working in the private sector. Before distributing the actual questionnaires various

local experts, generated from this existing network, were consulted in order to gain justification regarding the questions asked, language, general information, and distribution.

The questionnaires were distributed using various channels. First of all an NGO (IBUTTI) was consulted which has a quite extensive network of small entrepreneurs and also organizes networking events and trainings. During two of their events questionnaires have been distributed to entrepreneurs /managers working in various types of industry. Subsequently, some of the contacts made during the events led to access into other networks of entrepreneurs/managers. Secondly, various contacts via the Institute of Finance Management (IFM) were used to find suitable respondents. Finally, questionnaires have been randomly distributed in the city center where multiple entrepreneurs/ managers have been approached and asked if they were willing to participate.

Of the in total 200 questionnaires distributed, 139 were returned. Hence, yielding a response rate of 69.5 %. Of the 139 returned questionnaires seven participants were ignored because they were not from African descent. Finally, of the remaining 132 questionnaires used for analysis, 75 are male (56.8%) and 57 are female (43.2%). With the number of male respondents being higher than the female respondents the literature seems to correspond with the results in practice. As theory argued that entrepreneurship in Tanzania is still male dominated and an estimated 43 % of micro and small businesses are owned/managed by women (Stevenson & St-Onge, 2005).

Both the degree of Humanness as well as the level of EO are measured using a questionnaire including 42 questions covering both concepts and seven general questions. The first concept (Humanness) uses the questions developed by Sigger, Polak & Pennink (2010). In addition, taking into account the suggested adjustments of both Scholtens (2011) and Boom & Pennink (2012). The scale has been developed as a measurement tool for Humanness. The scale uses a total of 33 questions to cover the four dimensions; survival, solidarity, compassion & respect/dignity. The other concept (EO) is measured using an adopted version of the EO scale (Covin and Slevin, 1989). This particular scale is in the literature widely used to measure entrepreneurial orientation. The three original dimensions; Innovativeness, risk taking and proactiveness are used covering 3 questions per dimension.

Given that the original questions are more focused on larger firms/enterprises and this study specifically focuses on micro and small businesses, the questions have been adopted accordingly with the help of local experts.

For both concepts a five-point Likert scale is used to rate the individual items. 1 indicates strongly disagree and 5 strongly agree. All negative questions have been reversed in order to be able to perform correct comparisons. Furthermore, all dimensions have been grouped into seven scales representing both Humanness and EO. The items per dimension are summed and divided by the number of items in order to calculate the means for the individual dimensions. The same has been done in order to get the total mean scores for both concepts. In terms of rating the means the following rating has been used. When the score is lower than 2.4 there is a low level of Humanness and a negative EO. Between 2.5 and 3.5 a moderate level of both Humanness and EO is present. Scores higher than 3.6 indicate a high level of Humanness and a high EO.

Besides gender, which is the most important control variable in terms of this study, also three other variables will be introduced given their relevance to the research in general. First of all, the questionnaire will have an item asking whether or not the respondents have a registered or unregistered business. Using this as a control variable gives us insight into the relevance of registering a business and to what extent this either positively or negatively influences the orientation of en-

trepreneurs in a development country. The second variable will be the age of the owner/manager. This variable is tested using four age groups. These results eventually increases our understanding of which age group have higher EO scores and if the score increases or decreases when the age increases. Finally, the level of education will be measured and used as a control variable. In order to measure this variable the respondent is asked to choose from five different levels of education. Using the level of education as a control variable learns us more about how schooling increases or decreases the level of EO.

Scales & measures / Means reliability

Table 1 presents the means and standard deviations for both concepts and individual dimensions. For the Humanness dimension all scores are above 3.6 indicating a high mean level of Humanness among the respondents. Focusing on the EO means, only the dimension innovativeness scores high whereas the other two dimensions even as the general EO score is considered moderate. In terms of the standard deviations, the high scores indicate that the scores are not closely distributed to the mean. A possible explanation for such a large deviation can be sought in the fact that within the group of respondents there is a considerable difference in the age of the entrepreneurs as well as their level of education and size of the firm. In addition, this means that the sample size has been fairly random and the opinion of people seems to vary heavily depending on their background.

Table 1: Means and standard deviations

	N	Mean	Std. Deviation
Humanness	129	3.992	.862
Survival	131	4.231	.790
Solidarity	130	3.724	.922
Compassion	127	4.203	.811
Respect & Dignity	127	3.811	.928
Entrepreneurial Orientation	132	3.486	1.011
Innovativeness	131	3.77	1.035
Risk-taking	132	3.33	.941
Proactiveness	132	3.357	1.058

Based on the normal q-q plots the data seems to be normally distributed. Furthermore, the internal consistency or inter item reliability has been calculated using Cronbach's alphas. The alphas have been calculated for both constructs and each dimension individually. This paper accepts a Cronbach's alpha of 0.6 or higher as an intrinsically correct and reliable scale.

Table 2 presents all alpha's and shows that all items are reliable to use in the study except for the risk-taking dimension of EO. This dimension shows a Cronbach alpha of 0.434, which is below the 0.6 threshold. When analyzing all Cronbach's alphas when an item is deleted however, it shows that when the third risk item will be deleted the new Cronbach Alpha becomes 0,612,

which is an acceptable value. This basically shows that the other two items left in the dimension together represent a better measurement of the dimension than when combined with the third.

When focusing on all the other dimensions of both constructs in terms of item deleted, the data indicates no large improvements of the alphas in all cases (except risk-taking). There are only few items which improve however only with 0.01 and 0.02 which is such a minimal effect that leaving the items as they are is more practical. For the risk-taking dimension however, the third item will be deleted (risk 3) in order to increase the reliability of the scale.

Table 2: Cronbach's Alphas

	Cronbach's Alphas	Nr. Of items
Humanness	.910	33
Survival	.694	8
Solidarity	.716	7
Compassion	.754	8
Respect & Dignity	.810	10
Entrepreneurial Orientation	.843	9
Innovativeness	.658	3
Risk-taking	.434	3
Proactiveness	.792	3

A Factor analysis[1] has been performed in order to assess the validity of the scales used in this research. In addition, they are performed using the Principal components analysis in combination with the Varimax rotation method.

Starting with the Humanness scale, first it has been determined that the data is suitable to perform factor analysis on. Based on the Kaiser-Meyer-Olkin measure, which should be greater than 0,6 and Bartletts test of sphericity, which should be significant, both conditions are met. Based on the Kaiser criterion, there are eight components which have been extracted with a score above 1,0 on their Eigenvalues. Together these components explain 64,19% of all variance. When using the eight suggested components in a rotated component matrix it becomes clear that not all items seem to load in ways they are expected and no clear pattern emerges. A reason for this might be that the Kaiser criterion tends to extract too many components (Pallant, 2005). Therefore the aforementioned author argues to use a parallel analysis which would be yielding a more accurate result.

The parallel analysis is based on the calculation of average Eigenvalues from randomly generated correlation matrices. Nonetheless, the calculation is tailored based on the number of variables and subjects of this research. When performing the analysis, the number of components is determined by comparing the randomly generated numbers to the results of the Eigenvalue totals. All totals which are higher than the ones in the random set should be retained.

[1]The reason the factor analysis has been performed after calculating the Cronbach's alphas is that we wanted to use the same Humanness scale as used by Sigger, Polak, Pennink (2010) Scholtens (2011) & Boom and Pennink (2012). The aforementioned authors already proved the validity of the instrument. When changing the items again based on the outcomes of the factor analysis of this study the setting keeps on changing which is inefficient when comparing the results of the Humanness scale to previous and/or future studies.

The specific analysis shows that the number of components accepted becomes four. This is also the number of component used in previous research using the same scale. Together these four factors explain 49,19 of all variance. Furthermore, the factor analysis shows no further evidence to change the composition or loading of the dimensions. Hence, no communality items are found below 0,3 indicating that no items are expressively, negatively influencing the efficiency. Therefore this study will continue to use the four component structure as it is.

Also for the EO scale a factor analysis has been performed. First of all the Kaiser-Meyer-Olkin measure and Bartlett's test of sphericity are both positive with the former being 0.863 and the latter significant. The initial Eigenvalues show that, based on the Kaiser criterion, there are two components which have been extracted with a score above 1,0 on their Eigenvalues. Together these components explain 64,14% of all variance. Next to the Kaiser criterion also a parallel analysis has been performed for the EO scale. And also based on this analysis two factors are assigned to best measure EO.

In terms of the best loadings to the two factors, the new rotated component matrix shows the best combination of factors. The most efficient way of composing both factors designed to measure EO will first of all be to use only two components instead of the original three. In order to get the highest loadings to both components the matrix shows Innovativeness and Risk-taking should be combined into one. Furthermore, one of the Innovativeness items has a higher loading under the second component. In other words, one item will be added to Proactiveness. With one risk item being previously omitted due to a negative influence on the Cronbach Alpha, this leaves the new EO scale now to be consisting out of two components (Innovativeness/Risk-Taking & Proactiveness) covering a total of eight items (questions).

The table below (table 3), shows the new Cronbach's alphas. Compared to the previous Cronbach's alphas the new arrangement increased the alpha's and thus increased the inter item reliability of the EO scale. In terms of the Cronbach's alpha's when item deleted there now is no further need to delete any item in order to increase the alpha's.

Table 3: Chronbach's Alphas based on new item arrangement

	Cronbach's alpha	No.of items
Entrepreneurial	.861	8
Innovativeness & Risk-taking	.797	4
Proactiveness	.805	4

Results

Before looking at the correlations between the two central concepts in this study first another important comparison will be made. Because this study also focuses on gender differences in terms of entrepreneurship, an independent- samples T-test is performed to be able to see if the mean scores of men and women differ. Based on the results of the Global Entrepreneurship Monitor (GEM), it is expected that the EO of women is significantly different than the EO of men. In addition, the EO of women is expected to be lower than the EO of men because studies show men are generally more involved in entrepreneurship (Allen et al.2007). In addition, specifically for Tanzania, research shows that approximately 43 percent of the micro and small businesses were owned by women (Stevenson & St-Onge, 2005).

Furthermore, it will be interesting to see to what extent the humanness scores differ in terms of gender and compare the results to previous studies focusing on measuring Humanness.

First the t-test has been performed for the mean scores of Humanness. The results in table 4 show that there are no significant values found for the Levene's test. This indicates that the variances are approximately equal. Looking at the results of the t-test, for all variables the t values are statistically significant. This means the null hypothesis may be rejected and thus there is a significant difference in the mean scores between man and women. In addition, all female mean scores are higher than the scores of males. This means that based on the empirical results of this study, women appear to have a higher level of Humanness than men. When comparing this result to both the studies of Sigger et al. (2010) and Scholte (2012) who also look into gender differences, there seem to be different outcomes. Both the aforementioned studies namely do not find any statistically significant difference between the scores of males and females whereas this study finds all variables to be significant.

Table 4: Independent samples t-test, Humanness

	Gender	N	Mean	Sig. (Levene's test)	Sig.(t-test)
Humanness	Male	**75**	3,841	,932	0,000*
	Female	**57**	4,190		
Survival	Male	**75**	4,109	,309	0,001*
	Female	**57**	4,389		
Solidarity	Male	**75**	3,596	,566	0,001*
	Female	**57**	3,908		
Compassion	Male	**75**	4,103	,722	0,004*
	Female	**57**	4,346		
Respect &Dignity	Male	**75**	3,578	,315	0,000*
	Female	**57**	4,099		

*Significant at the 0,05 level

Next to the gender comparison in terms of Humanness, the same kind of analysis has been done in terms of EO (table 5). First of all the results for Levene's test of equal variances shows to be not significant meaning that we may assume that the variances are approximately equal. Looking at the results of the t-test, none of the values are significant. This indicates that there is no statistically significant difference between the EO scores of man and women. This result does not correspond with the expectation of this study that the EO of man would be higher than that of women. A reason for this difference in results might be that, despite that the literature argues men being more involved in entrepreneurship and the country being patriarchal (Jagero & Kushoka, 2011), it is also a trend that in counties where the general income per capita is relatively low women tend to be more involved (often out of necessity) in entrepreneurship (Allen et al. 2007, Kelly et al. 2011). Furthermore, another study shows that there is a trend in developing countries, as well as in most Sub-Saharan countries, which shows the involvement of women in entrepreneurship is increasing (Tundui & Tundui, 2012).

Table 5: Independent samples t-test, EO

	Gender	N	Mean	Sig. (Levene's test)	Sig.(t-test)
EO	Male	**75**	3,605	,599	,130
	Female	**57**	3,796		
Innovativeness/Risk-Taking	Male	**75**	3,967	,707	,061
	Female	**57**	4,205		
Proactiveness	Male	**75**	3,243	,547	,345
	Female	**57**	3,387		

*Significant at the 0,05 level

Control variables

Before starting with the regressions a set of control variables will first be tested directly to the dependent variable to see which are the most important.

When using gender as a control variable in relation to Humanness there is a significant difference between men and women. Specifically, the Std. β belonging to the female control group is 364 higher than that of the male group ($p =, 000; R^2 = 133$). This result is consistent with earlier findings where the t-test results also show that women have higher scores than males.

the same analysis only now using EO as the depended variable, the regression results are insignificant. This indicates there is no statistically significant difference on the score of EO when controlling for gender. ($p =, 130$; Std. $\beta =, 133; R^2 =, 018$). Again, there is consistency since also using a t-test no statistically significant differences are found.

Besides the most relevant control variable, gender, also three others have been analyzed to see how this changes the regression. Specifically, these variables have been analyzed using EO as the dependent variable. First, the regression will be controlled for registered and unregistered businesses. In this respect, unregistered businesses score significantly lower on EO than registered businesses do (Std. $\beta =, -354; P =, 000; R^2 =, 125$). This means registered firms tend to have a higher EO and a higher EO is in the literature related to increased levels of success. Therefore the registration of small individual firms might be something which should be stimulated among entrepreneurs in Tanzania.

The second control variable is age. The age category was already grouped into four age groups. In order to test the influence of age in EO dummy variables have been created and the regression is done using the age group 20-30 (youngest) as the test (default) variable. In all age categories there is no sign of statistically significant increased (or decreased) values of EO when belonging to a certain age group.

The last control variable used in this report is level of education. Similar to the age groups, the level of education is divided into groups. The test variable in this case is primary school. When looking at the differences compared to one level higher, in terms of education, there is no statistical significant prove that participants who attended secondary school have a higher EO score ($p =, 236$). For the next two levels higher however, there is statistical significant evidence the EO score is higher than compared to having only attended primary school.

Specifically, for the category 1^{st} degree/university bachelor the Std. β is $, 427(p =, 001)$ meaning that people in this category score higher on the EO scale than people with only primary school. Also for the next (and highest) level of education there is a positive significant Beta: Std. $\beta =, 546(p =, 001)$. This specifically means Tanzanians who have a master's degree (or post graduate) tend to score higher on the EO scale than people who only attended primary school.

Based the above results of the various control variables, the age group variable will not be added to the regression equations in the next section. This because there is no sign of statistically significant increases or decreases in the value of EO. Because all other variables seem to have a significant influence, the final set of control variables will be : Registered/Unregistered business, gender and the level of education. Regression

Regression

analysis starts with a one-on-one regression between the main concepts Humanness and EO. Subsequently, hierarchical multiple linear regression analyses is performed between Humanness and the dimensions of EO, between the dimensions of Humanness and EO and finally on the third level between all dimensions of both concepts. In addition, in all regressions the final set of control variables, as presented earlier are included.

The results of the one-on-one regression show that the model has reasonable explanatory power. With the R^2 being ,322 and the F value ($F = 9, 830$) with a significance level of $p =, 000$ the null hypothesis, that he model has no explanatory power, can be rejected. Specifically, the results indicate that 32,2% of all variability in EO can be explained by the variance in the presence of Humanness. In terms of the direction, the Beta indicates ($\beta =, 239$) that for each standard deviation unit of presence of Humanness ,239 is positively influencing EO. When applying a confidence level of $p < 0, 1$ it can be argued there is a weak statistically significant relation between the tested variables ($p =, 095$).

The one-on-one regression uses the grouped mean of the independent variable's dimensions. In order to analyze the independent influence of the four dimensions of humanness a multiple regression analysis has been performed. Based on the results of the multiple regression the R^2 is ,360 which is significant with $F = 7, 572(p =, 000)$. This means that 36% of all variability in EO can be explained by the presence of Humanness.

The regression results show that two of the four humanness variables have a negative influence, whereas it was expected all variables would have a negative influence on the EO. The influence of survival is the greatest of all humanness variables and is positive. In addition, the survival variable shows to be significant at the $p < 0, 1$ level ($p =, 062$). Furthermore, the other humanness variables are not significant. In terms of the control variables, gender has a statistically significant positive influence. That is, females tend to have a ,273 higher score on EO than males ($p =, 027$). Looking at the control for registered versus unregistered business the results show there is

statistically significant ($p =, 005$) evidence that unregistered businesses score ,530 lower on EO than registered businesses do. And finally in terms of education it can be argued that a higher level of education has a positive and significant influence on the level of EO.

Next, both the sole and multiple regressions for Humanness and the EO dimensions will be described. Starting with the sole regression, the expected result would be a negative relation between the two variables. The results however show that there is a statistically significant positive result. This means that based on the results of this study people who have a higher score on humanness are likely to score higher on the Innovativeness risk taking variable of the EO scale ($p =, 003; \beta =, 430$). Furthermore the R^2 is ,328 meaning that 32,8% of the variability in Innovativeness/Risk-Taking can be explained by the Humanness mean.

When looking at the same relation using multiple regression, starting with the dimension of EO; Innovativeness/Risk-Taking, the model has even more explanatory power. First of all, looking at the results of the analysis of variances the model indicates the model proves to have explanatory power ($p =, 000$). The R^2 is 0,429 which indicates that 42,9% of the variability in Innovativeness/Risk-Taking can be explained by the Humanness dimensions.

Against the expected, again two Humanness variables show to have a positive influence on the EO variable Innovativeness/Risk-Taking. Especially survival proves to have a relatively high, and significant, positive influence on Innovativeness/Risk-Taking ($\beta =, 680$). Furthermore, there is a negative and significant ($p =, 017$) influence of Respect/Dignity on Innovativeness/Risk-Taking ($\beta = -, 446$). Hence, which is the only relation having an actual negative significant sign as expected based on the literature.

In terms of the control variables, the results are comparable to the first regression equation. Females again prove to have a higher EO score since the $\beta =, 297$ and significant ($p =, 012$). Furthermore unregistered businesses have a lower EO score based on this regression and the two highest level of education also tend to have statistically significant higher scores on EO.

Also proactiveness is analyzed starting with a sole regression followed up by multiple. The results of the sole regression again is statistically significant in terms of the ANOVA table ($p =, 000$) Therefore the null hypothesis can be rejected and thus the model has explanatory power. As argued in the literature, an important attribute of Proactiveness is aggressiveness towards the competition in order to achieve a better competitive positioning of the business(Knight,1997). This attribute is something which is not in line with the values and beliefs related to Humanness and therefore the expected result was a negative relation. Nonetheless, apparently the two attributes do not have a relation at all given the insignificant and close to zero beta. Specifically, the R^2 is ,264 indicating that 26,4% of the variability in Proactiveness can be explained by the total Humanness mean ($\beta =, 048; P =, 788$).

Continuing with multiple regression, results show an R^2 of ,270. This score indicates that 27% of the variability in Proactiveness can be explained by Humanness and the control variables. Furthermore results show that both solidarity and Respect/dignity have a negative influence on Proactiveness. Nonetheless, for both variables counts that they are not statistically significant. In addition, also the other two, positively influencing, Humanness variables are not significant. Looking at the control variables, the difference in gender has no statistically significant influence. What is significant on the other hand, is both the influence of being registered or not and the two highest levels of education also have a significant positive influence on the degree of EO.

Table 6: Summary regression outcomes[2]

Dependent variables	Independent variables									
	Humanness , total mean				Survival, Solidarity, Compassion, Respect/Dignity					
	R^2	F	β	Constant	R^2	F	Constant	β Survival	β Solidarity	β Compassion	β Respect/Dignity
EO	,322	9,830	,239***	2,438	,360	7,572	2,182	,365***	,107*	,223	-,234
Innovativeness/Risk-Taking	,328	10,107	,430**	1,968	,429	10,118	1,527	,680*	-,075	,295	-,446**
Proactiveness	,264	7,430	,048	2,908	,270	4,971	2,838	,051	-,140	,152	-,022

* significant at the 0,01 level ** significant at the 0,05 level *** significant at the 0.1 level

Final research model

Now that the regression results have been presented, the research model will be discussed and visualized based on three layers. The three layers help interpreting the specific influence each construct and subsequent dimensions have on each other. Model 2 shows the direct relation between Humanness and EO. Based on the literature review it is expected that the Tanzanian owner/managers will have high scores on Humanness due to the importance of culture. This leaves fewer room for more individualistic features such as competitiveness and performance which are related to having a high EO. The owner/managers in Tanzania are, because of the importance of Humanness (Karsten & Illa,2005), believed to lay emphasis on these values and less on EO aspects which are closely related to individualistic interest's and outperformance of competition. As the EO score will get higher when firms become more aggressive towards competition, and this school of thought is said not to be part of the culture present in Tanzania (Poovan, du Toit & Engelbrecht,2006), the study expects the relation between Humanness and EO to be negative.

In terms of general results, the scores of the Tanzanian managers on Humanness are indeed categorized as high and the scores of EO are labeled moderate (see table 1). In terms of direction however, in general the sign is rather positive instead of an expected negative relation. In addition, the beta is ,239 and significant at the $p < 0,1$ level. This indicates the influence of Humanness on EO is positive meaning that this data does not support the proposition that owner managers who have a higher (mean) score on the Humanness values will show a lower degree of EO.

The second layer (Model 3) presents how the individual dimensions of Humanness influence EO. Besides, the model also shows how the Humanness mean influences the individual dimensions of EO. Again the expectation is the relationships to be negative. The individual Humanness dimensions, in combination with the control variables, together explain 36% of all variability in EO meaning there are possibly multiple other factors influencing EO. In terms of the variability in Innovativeness/Risk- Taking, 32,8% can be explained by the Humanness dimensions. And finally 26.4% of the variability in Proactiveness which can be explained by Humanness.

[2]All regression analyses have been tested for multicollinearity using the variance inflation factor (VIF) test. The study uses 5 as it's critical value. All VIF scores are below this critical value meaning there is no reason to assume results are influenced by multicollinearity. In addition also all models have been tested for auto correlation using the Durbin Watson test. All scores are within the 1.7 to 2.3 range which indicates no or ignorable auto correlation.

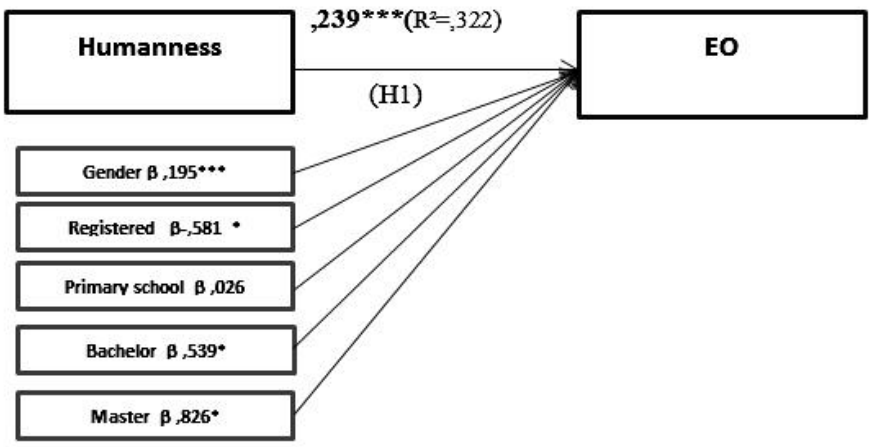

Figure 2: One-on-one relation Humanness & EO

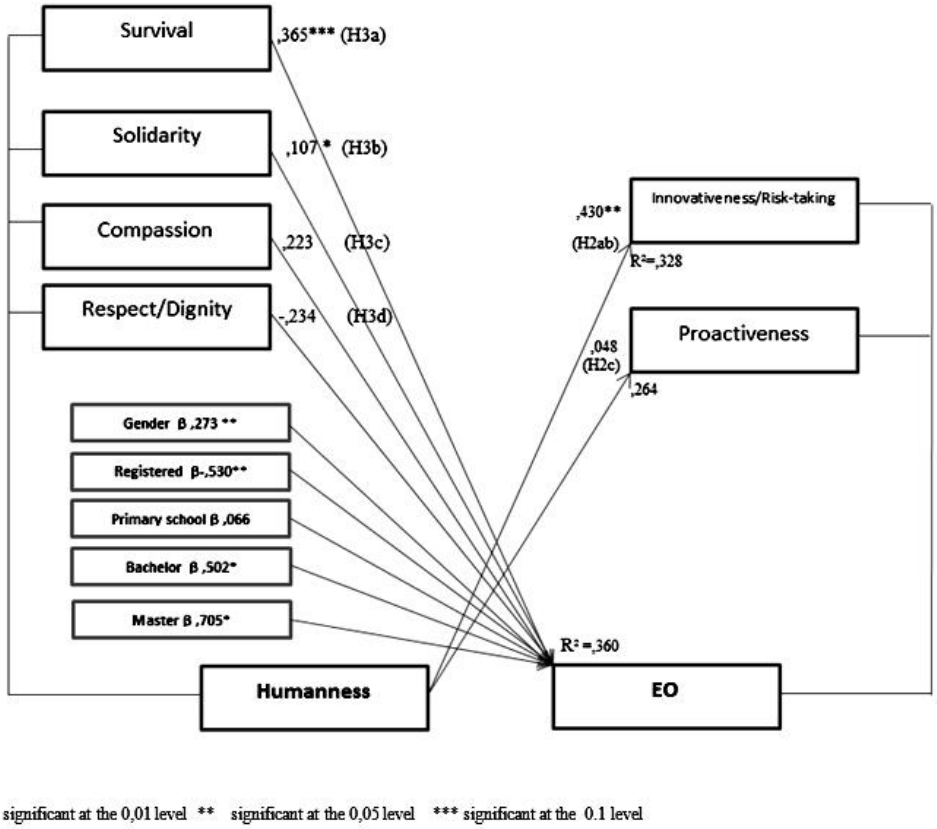

Figure 3: Multiple relationships Humanness & EO

Finally, the final layer of the model (Figure 4) shows the relationships between all individual dimensions of both constructs.

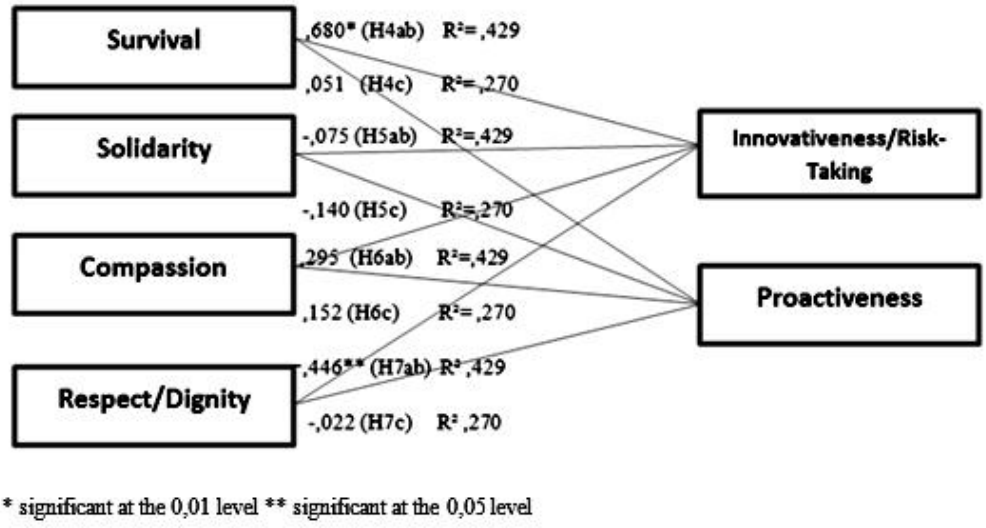

Figure 4: Individual relations Humanness & EO[3]

Discussion

Coming from a LED perspective, this study aimed at focusing on a specific group of local actors by looking into their specific entrepreneurial orientation and research how cultural values influence their entrepreneurial mindset. The exploratory design of the study made it possible to test an adopted version of the EO scale, and subsequently see to what extent this scale is influenced by the (management) culture of Tanzania. In a broader context this tells us more about the influence culture has on entrepreneurship, in a developing country setting. This section will elaborate on the results and will try to give more meaning to them. Furthermore, both the practical and academic value of this study will be discussed as well as the study's limitations and suggestions for further research.

First of all, the relationship between (management) Culture, as defined by Humanness, and Entrepreneurship, as defined by EO, has been empirically researched in this paper. Based on data collected in Dar es Salaam, a series of analyses have been performed producing multiple new insights into the aforementioned relation. The general results regarding the actual presence of both Humanness and EO tell us that for the first concept a high presence has been measured and for the latter a moderate. When comparing the presence of Humanness to previous studies also measuring Humanness, the results can be called consistent as both the studies of Scholtens (2011) and Sigger, Polak & Pennink (2010) find a high ($\mu > 3,6$) level of humanness in Tanzania. The high presence of Humanness indicates the concept of Humanness to be an important part of their (management) culture.

The moderate degree of EO cannot be compared to previous studies as this is the first time the concept is used to measure entrepreneurial orientation in its adapted state and in a developing

[3]All regressions in figure 4 have been performed with the same control variables as used in figure 4. For a better overview of the results the control variables have not been visualized in the model.

country. However, given that the level is moderate and not low means entrepreneurial orientation is relevant in a developing country and the results of this study might serve as a first benchmark for future EO research.

After some changes were made to the initial arrangement of items within the EO concept the model statistically proved to have a better loading which improves the reliability of the measurement instrument. Given that this study used the adopted EO scale for the first time it makes perfect sense some of the items were deleted, combined and/or changed dimension. Future research now has to prove the significance of the current setting.

In general the study gives an answer to the question to what extent (management) culture influences the entrepreneurial orientation of micro/small business owners. Equally relevant in this question is the role of gender. The study expected to find higher levels of EO among the male respondents because studies show men are generally more involved in entrepreneurship (Allen et al.2007). In addition, for Tanzania, data indicates that entrepreneurship is primarily male dominated (Stevenson & St-Onge, 2005). Nonetheless, most regression results show the score of females to be significantly higher. A possible explanation for this result might be the reason why women are involved in entrepreneurship in developing countries. In most cases, in regions where the income per capita is relatively low, this is out of necessity. (Allen et al. 2007 ; Kelly et al. 2011). This means that increasingly both men and women have to start up small businesses to make a living which makes them both more equally involved in entrepreneurship and in this specific study females score higher based on some of the regressions. Nonetheless, based on the t-test, the results are not statistically different between man and women. In addition, trends show that the gender based figures on entrepreneurship are more equal in developing countries (Tundui & Tundui, 2012. Hence, which can be called consistent to the results of this study.

Another important aspect in terms of the gender comparison is the fact that this study finds that women have a higher level of Humanness than men. This is inconsistent with previous findings (Sigger et al. 2010; Scholte, 2012) related to gender differences in relation to Humanness.

Because in all of the humanness dimensions the group/community and brotherly care are more important than individual interests or success (aspects related to a high EO), the study argued that a negative relation would be present between Humanness and EO. The results show however that some of the relations turn out to be positive, others only weak and only one is significantly negative as expected. This result indicates that on the general concept level attaching value to the strong cultural belief of Humanness does not seem to have a negative effect on a person's EO. Therefore it is most likely not specifically decreasing competitiveness and success in entrepreneurship.

The solidarity dimension, which is not negative in sign but positive and significant, is built on the idea that the people believe that only by working solely together as a group things can be accomplished (Broodryk, 2006). This idea clearly conflicts with having a high EO, which is more, focused on individual success by being proactive and searching for new ideas and market asymmetries. Despite this conflicting element, the empirical findings seem to prove otherwise since the relation is significantly positive. In addition, focusing on the individual relations there is a positive relation between Solidarity and both separate dimensions of EO, nonetheless neither one of them is statistically significant.

Even with the insignificance, the negative sign might very well still implicate that only focusing on what is working for the group as a whole has a negative influence or is delaying the

entrepreneurial orientation of people working in Tanzania. This subsequently then probably has negative effects on a firms competitiveness and success. Henceforth, given that high EO scores are related to increased levels of business performance and success (Rezaei, Ortt & Scholten, 2012).

Another interesting finding is that the regression model predicts that for every one point increase in Survival the degree of Innovativeness/risk taking will significantly increase ($\beta = ,680; p < 0,01$). This means that owner managers who are based on their culture used to share expertise and rely on each other in order to survive are positively influencing their level of being innovative meaning they take initiative and are willing to take more risk. This outcome shows that a developing country, which is built on a basis where there was nothing and people had to rely on each other to survive, builds to some extent a strong level of confidence which makes room for initiative and increased levels of risk-taking.

Given that the individual Humanness dimensions together explain 36% of the variability in EO makes that there are a lot of other factors which influence EO. This means that more research is needed into what influences the entrepreneurial orientation of owner/managers in developing countries such as Tanzania. As it appears culture, as defined by Humanness, does seem to have an influence however culture is far broader than only Humanness. In this regard, other cultural metrics might have to be used and combined with Humanness in order to get an even better insight into how (management) culture influences entrepreneurship.

Conclusion

This study uses the adopted version of the EO scale for the first time. As no other (known) metrics exist in measuring entrepreneurial orientation in developing countries, this study succeeded in taking a first step. Of course, being only used in just one developing country makes it not yet an instrument which can be compared to the original EO scale measuring the orientation in developed western countries.

Nonetheless, the scale can be used as a benchmark and based on the results of this study can be used to also measure the EO in other developing counties. Once multiple studies have been conducted using the same scale the actual reliability of the scale can be confirmed.

In terms of the Humanness scale, it seems to be a good instrument to measure (management) culture in Tanzania (and perhaps other sub-Saharan countries). The results were high indicating that it is really an important aspect of the business culture in Dar es Salaam. What is more, the scale succeeds in measuring culture in Tanzania and is therefore in this respect a better instrument as more renowned conceptualizations of national culture such as Hofstede (1980) and Trompenaars (1994).

As for the role gender plays in EO, some of the results indicate no significant differences exist, yet some of the regressions do find an increased EO of females compared to males. Nonetheless, given that the literature argues entrepreneurship to be more male dominated the results of this study emphasize that the role of females, coming from a strong patriarchal culture, is increasingly becoming important in Tanzanian entrepreneurship. Furthermore, women do seem to have a higher level on the Humanness dimensions which is not in accordance with previous studies. This could indicate that women in Tanzania are more closely attached to their cultural beliefs than their male counterparts.

A possible reason might be in the influence of the Western world and perhaps men are more often than women participating in Western influenced schooling/education. Subsequent, longitudinal, research is necessary to give meaning to the different level of Humanness measured between men and women.

Looking at the actual relation between Humanness and EO the study found that in general there is a slightly positive influence of humanness in relation to EO. Thus where a negative relation made perfect sense on paper, the reality does seem to be different. Tanzanian business/owner mangers are, as it appears, not slowed down or hindered by their strong cultural beliefs into having a high entrepreneurial orientation.

In terms of limitations, this study knows a few. First of all, the individual concepts used in this study both have a western influence to them which might bias the actual representation of both features measured. For the Humanness scales this is only limited given that multiple studies already confirmed its validity and reliability. For the EO scale however, it is based on a typically western list of questions designed to measure EO. To increase the validity and reliability in a Sub Saharan country, the help of local actors has been used to make sure the questions make perfect sense in the cultural setting present at location. In order to improve and fine-tune the instrument however, studies must be repeated in other developing countries to see whether the EO scale is a valid instrument to measure entrepreneurial orientation.

Another, minor, aspect in terms of the actual scales is language. In the case of this study, the local experts advised that the questionnaire as it was written would be clear enough for the language level of the respondents. Nonetheless, during the process in some situations it became noticeable participants having minor difficulties with interpreting the questions. In this respect, future studies might consider to always offer two versions of the questionnaire. One in the English language and one in the mother tongue. This would probably contribute to a lesser degree of response error.

A final limitation is that because the total number of owner/mangers of SME's living in Dar es Salaam was difficult to estimate we aimed for a sample of around 200. Despite having distributed 200, the final results delivered 139 questionnaires. This might have resulted in a minor bias. Besides, given that the questionnaires were distributed in only a few networks (and fairly random in the streets) there could be some response bias as people coming from the same networks might not be a good representation of the whole population. In addition, in order to achieve a good representation of all of Tanzania, also other cities should have been approached. Unfortunately however, this study was limited by time and financial constraints.

In terms of future research, this study advises to continue to research the possibilities of the adapted EO measurement instrument. With this study being the first to use the scale specifically to measure EO in a developing country, other countries must follow in order to give more meaning to the metric. Next to further developing the EO scale, also the relation (management) culture has to entrepreneurship requires further investigation. As this result shows, there are evidently a lot of other (cultural) factors playing a role in being more or less entrepreneurial and hence having a high EO. Once more knowledge has been gathered in terms of the role of (management) culture plays in entrepreneurship also country comparisons can be made facilitating in-depth understanding into the difference between Western and non-Western business cultures.

Overall, the study concludes no negative significant relation exist between the two main concepts and only 36% of the variance in EO can be explained by the influence of Humanness.

Nonetheless, some of the positive relations are significant meaning that the results can be respectively used to improve the EO scores of Tanzanian owner/managers. What is more, the study succeeds in concluding that the influence of gender in entrepreneurship is more equal than expected. That is, women, in a developing country such as Tanzania, seem to have the about the same (and in some results even higher) level of entrepreneurial orientation than men do. In terms of the measurement of Humanness, the results show that although the individual Humanness dimensions seem to be very much alike, significant differences do exist when exploring relationships with other constructs.

Finally, the explorative nature of the study and the introduction of a western entrepreneurship metric applied in a developing country setting, makes that future studies can now start using the EO scale in other developing countries in order to improve and fine-tune the instrument. This than builds to the knowledge needed for an even better understanding of entrepreneurship and its relation to culture.

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The 5th INTERNATIONAL CONFERENCE ON DEVELOPMENT POLICY - TRANSFER OF TECHNOLOGY FOR SUSTAINABLE GROWTH AND DEVELOPMENT: LESSONS AND EXPERIENCES

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