

# FACTORS THAT MOTIVATE TO USE COMPUTER MEDIATED COMMUNICATION (CMC) ON FACULTY RESEARCH PRODUCTIVITY IN SRI LANKAN

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## ABSTRACT

*One of the basic goals of universities is to provide enabling environment for the conduct of research and dissemination of knowledge for societal/national development (Ani, 2013). Over the last two decades, the Internet and related computer-mediated communication (CMC) technologies have become increasingly central to scientific work. CMC is a process in which human data interaction occur; through one or more networked telecommunication systems. It is imperative that the use of CMC in research is one of the major shifts in processes of scientific knowledge production. Therefore, a sound understanding of how academics use the CMC in their scholarly activities is important. However, there is a dearth of studies on the relationship between the use of CMC and research productivity in university academia from a theoretical perspective. No evidence was found on the impact of the use of CMC on academic productivity in Sri Lanka and therefor this research contributes on to the possible impact of CMC on academic research productivity. Thus this paper has examined some of the literature on motivation and performance of academics in the CMC environment. Based on the literature and some initial interviews, a draft framework has been devised by integrating the Vrooms Expectancy model (Vroom, 1978) and Task Technology Fit model (Goodhue and Thompson, 1995). Future research will further test this framework to determine effectiveness as a tool to assist not only Sri Lankan Universities to recognize and provide needs of academics to achieve productivity increases in research and also the present study will offer suggestions to the policy makers in Sri Lankan universities to develop a long term effective motivation strategy to increase the research.*

## KEYWORDS

Computer mediated communication, Research productivity, Information communication Technologies



## INTRODUCTION

Research is aimed at creating knowledge (Williams, 2003; Dundar and Lewis, 1998; Henthorne, Latour and Loraas, 1998), and university academics play a key role in knowledge creation. Universities being key institutions of knowledge creation, they are encouraged to create more quality research through the creation of a grading system based on the quality of its research (Jin and Jin, 2014). In order to facilitate this, policy for internal promotion, tenure and reward systems in most higher education institutes are based on quality of research (Kotrlik et al., 2002; Read, Rama and Raghunandan, 1998).

Research output has two main components: knowledge creation (research) and knowledge distribution (productivity) (Gonzalez and Martins, 2017; Gaston, 1970). While knowledge creation requires commitment and had work into research, knowledge distribution requires publications in professional journals and conference proceedings, publishing books, gathering and analyzing original evidence, working with post-graduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties, obtaining patents and licenses, writing of monographs, developing experimental designs, producing works of an artistic or creative nature, engaging in public debates and commentaries (Creswell, 1986). Concurrently ICT promoters argue that the Computer Mediated Communication (CMC) will improve and provide a great support on scholarly productivity, increase technology transfer, and widen information access. CMC is the communication produced when human beings interact with one another by transmitting messages via networked computers (Herring, 2001a) and further (December, 1996) defines CMC as "any use of computers to transmit, receive, store, and organize information passed from one individual or group to another" (page number) and that aspect of CMC is adapted for the current study. Computer mediated communication (CMC) will play a crucial role in enhancing the speed and quality of such activities and documented evidence of development of CMCs are reviewed below.

### • GROWTH OF CMC GLOBALLY AND SRI LANKA

There has been a rapid growth and improvement in the diffusion of technologies that have been designed to handle information and aid communication (Muinde, 2009) and they are dramatically transforming the world, enabling innovation and increasing productivity, connecting people and communities, and improving standards of living opportunities across the globe (Dutta and Mia, 2011). It creates a more accessible world, resulting in increased freedom of expression, increased access to information, and a reduction in remoteness (Dutta et al., 2015). The availability of ICT, its ease of use and the numerous immediate needs it can meet have turned it into a key player, both culturally and socially (Benó, 2009). It is clear that the Internet and other advancements in information technology (IT) have

changed the work place (Dewan and Kraemer, 2000) all over the world and has also changed of the research culture of universities.

In Sri Lanka, the National Computer Policy for Sri Lanka (COMPOL) was initiated in 1983 identifying key areas of development in the use of computers which gave pride of place for CMC development. Later it was formulated as the Computer and Information Technology Council of Sri Lanka (CINTEC), termed the Council for Information Technology - by a Parliamentary Act No. 10 of 1984, to function directly under the then President. Eventually, CINTEC was transferred to the Information and Communication Technology Agency of Sri Lanka (ICTA) by the ICT Act No. 27 of 2003. The aim of ICTA is to set out the e-Sri Lanka vision to harness ICT as a lever for economic and social advancement.

According to (Ranasinghe, 2004) adaptation of computer related communication in Sri Lanka began in 1960, and except for a few selected government institutes such as the Department of Census and Statistics, has grown very slowly. However, this process was accelerated since 1991 with the establishment of Sri Lanka Telecom (SLT) and the initiation of SLT Internet service facility in 1996. Since then most of the public sector and private sector organizations; education, health, banking, travel & tourism, manufacturing industries adopted Internet and its features. Simultaneously, computer ownership at household level was increased rapidly in Sri Lanka. According to the Statistics Sri Lanka (2014), at least one computer is available in 22% of households of the country. That is one out of every five households is having a computer. This percentage is about 36% in Urban Sector and Rural and Estate Sector show 20.4% and 4.6% respectively. Over the survey periods from 2004 to 2014 overall percentage has increased sharply from 3.8% to 16.6% householders who own computers. At the same time, it is observed that the computer literacy level is also increased from 2014 – 2016; the urban sector shows the highest computer literacy rate, 38.5% among residential sectors and the rural and estate are 26.1% and 9.9% respectively (Computer Literacy Statistics, 2014). The same report further shows that, among the provinces with the highest level of computer literacy is reported from the Western province (38.5%) while the lowest percentage is reported from Eastern province while the awareness of computers in rural sector reported the lowest level and urban sector shows the highest. Further, it is observed a significant difference between urban/rural with respect to access to the computer and the Internet in Sri Lanka, and use of e-mail by households are also similar to above results.

### • USE OF CMC TOOLS BY ACADEMICS

A positive association between the use of CMC and related tools in publishing productivity has been found through various studies (Winkler, Levin and Stephan, 2010); Vakkari, 2008); Barjak, 2006; (Venkatesh, Ackerman and Morris, 2000a); (Walsh et al., 2000a); Kaminer and Barunstein, 1998; Cohen, 1996; Hesse et al., 1993. These studies reveal that the use of CMC is positively associated with the improvement of research productivity for publications, conferences and working



papers, while also controlling for discipline and country. Further, some argue that CMC tools improved research work by providing access to resources, facilitating the sharing of files, data and ideas (Vakkari, 2008; Walsh et al., 2000), increase of distributed teams, internet-based means of communication are becoming important for all processes of collaboration: decision-making, task allocation and coordination and the exchange of resources (Winkler et al., 2010; Vakkari, 2008). Another interesting finding of those studies was the clustering of the researchers in terms of their communication activity and email use (Barjak, 2006). Vannatta (2000) confirm that institutions of higher education are comfortable with using technologies such as email, web searching, and word processing. (Kozma, 2003) added that integration and use of technology in institutions of higher learning are not clearly focused. According to Samaradiwakara (2011) institutions of higher education use CMC to process, communicate, create, store, disseminate, manage, and share information. She went on to say that, institutions of higher education use mostly common computer programs to create, analyze, process, store, and deliver data. Some of the programs are spreadsheet programs, presentation packages, word processing packages, statistical packages, page making packages, and electronic discussion groups (EDG). Others are electronic mail, World Wide Web (WWW), video conferencing, telnet, and bulletin board system. For instance, they use reading materials and computer slides from websites as highlighted by (Amanortsu, Dzandu and Asabere, 2013). In the last couple of years, involvement of CMC in collaboration of scientists in key areas is known as e-science. E-science offers better collaborative science support, i.e. the ability to have broader interactions through the sharing of data, experimental approaches and both intermediate and final results in systems that will maintain a history of the data, processes, outcomes and conversations among scientists (Wright et al., 2007).

#### • CMC AND RESEARCH PRODUCTIVITY

There has been a considerable discussion about the impact of use of computer and network technology and/or Information and Communication Technologies (ICTs) on academia (Ngoben, 2010). ICT has become the essential factor for educational development in the current century (Kozma and Anderson, 2002); (Goodison, 2003); (Kangro and Kangro, 2004); (Hennessy, Ruthven and Brindley, 2005); (Kennedy et al., 2008); (Inan, Bayindir and Demir, 2009). It supports teaching, learning, and a range of activities in education and can enhance the quality of academic activities in universities in a number of ways, from offering a source of knowledge (Brown, 2002), motivation (Rienties et al., 2010), establishing lifelong learning habits (Schollie, 2001), establishing online learning (Sridhar, 2005), mobile learning (Oliver and Goerke, 2007), offering a tool for research (Tingling, Parent, and Wade, 2003; Oduwale, 2004; Hinson, 2005), offering means of interaction (Adika, 2003; Applebee, Clayton, Pascoe, and Bruce, 2000; Luambano and Nawe, 2004; Oduwale, 2004), improving the delivery of library services (Younis, 2002; Siddiqui, 2003a,b), offering

a source of academic databases and e-books (Vicente, Crawford, and Clink, 2004; Petrick, 2004).

Russell (2004) presents that scientists in developing countries have been slower to adopt ICTs because of the lack of telecommunications, power, and institutional infrastructure; hence it may affect the research productivity. However, the current trend of the Sri Lankan university academia is adopting CMC at a high level to increase efficiency and effectiveness of their teaching research and administrative activities. The use of electronic resources has increased highly among university academics in Sri Lanka, during the last decade (Arachchige and Karunaratna, 2012). Most universities and academic institutions strive to develop an e-culture in their institutions by developing their infrastructure facilities as well as attitudes (Arachchige and Karunaratna, 2012). Sri Lanka shows a slow progress in publication of scientific papers during last five years (UNESCO and Schlegel, 2015, p.576) despite of the high increase in Infrastructure, internet accessibility electronic information access provided by the UGC it is observed that slow progress in publication of research output in Sri Lanka.

#### • FACTORS EFFECT ON RESEARCH PRODUCTIVITY

Research productivity is a highly researched area in the field of Education. However, the majority of those studies have focused on the factors which affect the research productivity (Creswell 1986; Teodorescu 2000; Brocato 2001; Bland et al. 2002; Keranen et al. 2012; Tafreshi, Naghi Imani, and Ghashlag 2013). With the rapid developments in CMC, various theoretical studies also have been carried out in order to ensure the impact of those factors on research productivity. There are many factors which have been found to be associated with research productivity. Demographic factors related to research productivity have been studied extensively; age, gender, marital status. From the gender viewpoint, there are significant differences between males and females on number of published articles and impact factors ; personality ; rewards , self-efficacy; and rank system (Tien and Blackburn, 1996); academics' attitudes desire to publish in ISI journals ; research skills and, competence research experience, training and research communication skills ; tenure and promotion requirements (Nuqui and Cruz, 2013); employed for long to engage in research (Nicholson, 2004), family-related factors (Sax et al., 2002) and found there is an association with research productivity. Institutional environment; leadership characteristics (Dundar and Lewis, 1998) campus information environment (Hadjinicola and Soteriou, 2006). According to them, the type of an institution determines the research productivity of a staff. Social factors (Blackburn, Behymer and Hall, 1978); academic environmental factors (Kuh and Whitt, 1988) academic culture , social institutional values, expectations, and norms is effect on research productivity institutional loyalty, faculty member's other duties (Jauch, Glueck and Osborn, 1978). Technology factors; compatibility, relative advantage, complexity, triability, and observability (Rogers, 1983); quality, locatability,



authorization, compatibility, ease of use/training, production timeliness, systems reliability, and relationship with users (Goodhue and Thompson).

It is apparent that there are many factors that affect the effectiveness and productivity of their activities. Among these factors, demographic factors, individual factors, sociological factors technological factors institutional and environmental are prominent.

### • THEORETICAL FOUNDATION

Use of motivation theories has enabled us to understand the relationship between motivation and job satisfaction, individual productivity, leadership styles, and personal characteristics. All motivation theories focus on three aspects namely how to energize, direct, and sustain behavior of an individual (Kini and Hobson, 2002). Motivation theories are the predominant base that researchers utilized to study the research productivity (Lertputtarak, 2008). Therefore the theories on motivation has been reviewed.

It was found many motivation theories such as Adams's equity theory, Vroom's expectancy theory (VET), reinforcement theory, and goal setting theory (Greenberg, 1999) in measuring outcome products in the theoretical literature. Out of various motivation theories included in literature, the VET is more scientific than other motivation theories and it directly related to the cognitive motivation and this theory helps to understand how individuals make decisions regarding various behavioral alternatives. Further, through the literature review conducted on theories on motivation confirmed that the expectancy theory provide better explanation of the motivational factors of individuals in various situations or settings as well as explanation of the motivation factors of the worker to his work (Lee, 2007). Also many researchers (Butler and Cantrell, 1989; Tien and Blackburn, 1996; (Blackburn and Lawrence, 2002); Williams, 2000; (Williams, 2003b); (Chen, Gupta and Hoshower, 2006): Lertputtarak, 2008) have used VET as the theoretical basis for their studies in measuring productivity similarly to the research environment. Therefore, VET is better to adapt for the current study because it views motivation and performance as critical aspects of concepts such as research productivity (Williams, 2000; Williams, 2003; Chen et al., 2006). Based on this understanding, this study will apply expectancy theory to study the research productivity of academics in Sri Lankan Universities.

CMC specific measures can have an impact on an individual's motivation towards productivity since Internet and related CMC technologies are becoming increasingly central to scientific work. Also, Literature reveals that there may be the technological facto that effect on research productivity. Therefore, in connecting CMC in to the research productivity it is apparent that there appears the concept of 'technology adoption'. It means that if someone does not motivate to use CMC for research activities he/she won't accept technologies. However, the use of CMC in research productivity cannot be discussed through a single theoretical basis.

Theories related to knowledge production and theories used in technology adoption have to be better connected to explain the problem of the current research. Therefore, the theoretical foundation to explore the knowledge production in terms of CMC will be discussed to find a firm theoretical basis.

There are many theories in the literature that can be used to study the adoption of technology in the higher education context. Some of technology acceptance and use theories are: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Diffusion of Innovation (DOI), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Planned Behavior (TPB), and Task Technology Fit (TTF). All of those theories/models seem to concentrate rather strongly on individual attribute of the users and of the technology, neglecting attributes of the environment and of the supported tasks that in researcher's opinion is of high importance to understand IT adoption processes. For the current study, there should be a fit between the task and technology to adopt the technology and this idea of fit is more comprehensively elaborated in the Task-Technology-Fit model (TTF) of (Goodhue, 1995a).

TTF model has four key constructs namely Task Characteristics, Technology Characteristics, which together affect the third construct Task-Technology Fit, which in turn affects the outcome variable, either Performance or Utilization. Tasks are broadly defined as the actions carried out by individuals in turning inputs to outputs in order to satisfy their information needs. Technology includes a wide range of information technologies, such as hardware, software, data, user-support services or any combination of these. Therefore, TTF will be best suited for the study since it analyses the performance level on research productivity when academics adopt CMC.

In conclusion, an understanding of all these concerns with VET joining TTF will provide a solid base to explain how individuals perform using CMC towards research productivity. But, there is no single, unified, universally accepted theory for particular problem and need to conceptualize for the best solution and need to research them. Therefore, researching these concepts enabled the researcher to determine which would be the most appropriate means of predicting CMC use towards knowledge production behavior of university academics in Sri Lanka in order to improve the research productivity through CMC use in the academia.

### • RESEARCH PROBLEM

CMC based technologies has become a major shift in the knowledge production in academia and had a remarkable effect over the research agenda during the past two decades. In line with the benefits derived from new CMC based technologies; researchers in universities are in a highly favorable position to be more creative, innovative and productive in the production of knowledge. At the same time, even though the technologies are enabling the academics to conduct research easier and faster many researchers found low research productivity among academics of Sri



Lanka. Therefore, a critical issue emerges with these three concepts; steady growth of CMC based technology facilities in academia, lower rate of research productivity and relationship between research productivity and CMC use. Therefore, it is worthwhile to explore this issue in line with how it happens and how can be upgraded the situation based on a strong theoretical underpinning.

### • PURPOSE OF THE STUDY

The aim of this paper is to examine the effect of CMC adoption on academic research productivity. This aim is achieved through the following objectives:

- 1 To investigate the related factors that effect on research productivity in the Computer Mediated communication environment (CMC) of Sri Lankan academics
- 2 To propose a model which best describes the factors effect on use of CMC for academics' research productivity in Sri Lanka.

The scope of this research is reduced to research productivity instead of being concerned with academics is usually associated with research rather than with teaching or with community service.

### RESEARCH DESIGN

The content analysis was applied to a sample of documents obtained from extensive literature review on three sources of information: 1.) databases and libraries linked to scientific research and 2) key journals peer reviewed 3.) Google scholar regarding keywords: computer mediated communication (CMC), information technology, Information communication technology ICT, faculty productivity, research productivity and publication productivity. The conceptual framework of the study is based upon the Vroom's Expectancy Theory (VET) and Task Technology Fit (TTF) which provide the basis of how academics use computer-mediated communication (CMC) on the research productivity.

### KEY FINDINGS

Based on the prior literature review, numerous studies investigating academic research productivity have been identified. Several factors such as individual, institutional, technological factors, Task related factors were found to be associated with research productivity that leads to the use of CMC. The theoretical model was developed in an attempt to determine factors that drive academics to research productivity in the CMC environment. This paper proposes a theoretical framework based on eminent theories/models of motivation and technology acceptance together with the findings from prior research (see Figure: 1).

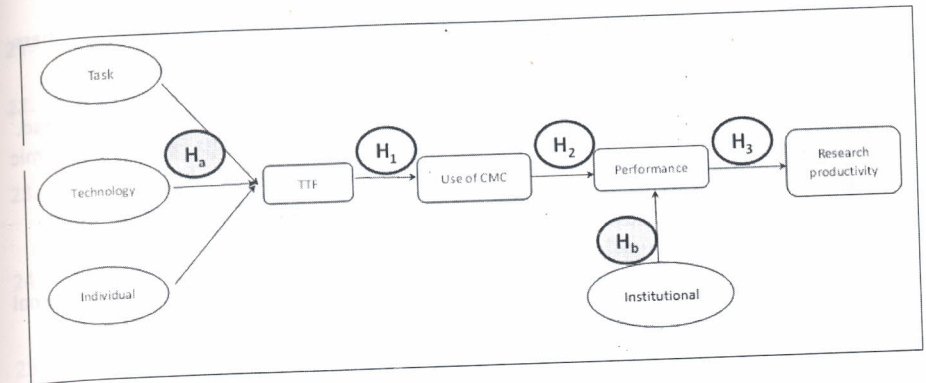


Figure 1: Proposed theoretical model based literature compiled by author

### CONCLUSION

This paper has examined some of the literature on motivation and, the use of technology adoption among the university academics. The goal of Universities in Sri Lanka is to increase research output, to assist with the economic growth of the nation. To this extent, the Sri Lankan government and both placing on emphasis on research productivity. Based on the literature and some initial interviews, a draft framework has been devised. Future research will be further test this framework to determine its effectiveness as a tool to assist not only Sri Lankan universities to recognize and provide needs of academics to achieve productivity increases in research. Outcome of this study is an integrated model constructed for the purpose of identifying factors motivating the research productivity of Sri Lankan academics' in the CMC environment.

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