

**ASSESSMENT OF SUB-ASSISTANT AGRICULTURE  
OFFICERS' LEVEL OF ICT USE IN RELATION TO  
THEIR PERFORMANCE IN AGRICULTURAL  
EXTENSION SERVICE**

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THEIR PERFORMANCE IN AGRICULTURAL  
EXTENSION SERVICE**

by

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### **CERTIFICATE**

This is to certify that the thesis entitled, “**ASSESSMENT OF SUB-ASSISTANT AGRICULTURE OFFICERS’ LEVEL OF ICT USE IN RELATION TO THEIR PERFORMANCE IN AGRICULTURAL EXTENSION SERVICE**” submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka in partial fulfilment of the requirements for the degree of **Master of Science (MS) in Agricultural Extension**, embodies the result of a piece of bona-fide research work conducted by **MD. SHAMEEM KAWSAR BADHAN, Registration no. 13-05302** under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

I further certify that any help or source of information, received during the course of this study has been dully acknowledgement by him.

Dated: JUNE, 2020

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**Devoted to  
My Mother and  
Departed Father**

## A C K N O W L E D G E M E N T S

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## **ABBREVIATION AND ACRONYMS**

AEO	Agriculture Extension Officer
AIS	Agriculture Information Service
AVE	Average Variance Extracted
CMC	Computer-Mediated Communication
DAE	Department of Agricultural Extension
DOI	Digital Object Identifier system
ICT	Information and Communication Technology
IoT	Internet of Things
IS	Information System
I-S-P	Institutional, Social and Personal factors
IT	Information Technology
MoA	Ministry of Agriculture
MMS	Multimedia Message Service
MST	Media Synchronicity Theory
NOP	New Organizational Practices
PLS-SEM	Partial Least Square-based Structural Equation Modeling
SPSS	Statistical Package for Social Science
SAAO	Sub-Assistant Agriculture Officer
SAU	Sher-e-Bangla Agricultural University
SCT	Social Cognitive Theory
SIoT	Social Internet of Things
SISP	Strategic Information System Planning
SNS	Social Network Sites
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
UAO	Upazila Agriculture Officer
WWW	World Wide Web

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**Md. Shameem Kawsar Badhan**

## **ABSTRACT**

Information and Communication Technology (ICT) plays a vital role in agriculture service delivery, which enables extension personnel to disseminate information and advice to farmers. The Department of Agricultural Extension (DAE) acts vital roles through the front-line extension professional- Sub-Assistant Agriculture Officers (SAAOs). It is thus critical to develop performance of SAAOs in using ICTs. However, little known about ICT use to the job performance of SAAOs in extension service delivery. Therefore, the key concern of this study was to assess the level of ICT use to the performance of SAAOs. Attempts were also made to determine the factors that contribute to ICT use as well as to their performance in agricultural extension services. A theoretical model was developed based on Institutional, Social and Personal factors (I-S-P) developed by Lewis *et al.* (2003) which *illustrates* ICT usage factors in case of an organizational context. Data were collected from 159 SAAOs of seven upazilas of Jashore district using structured interview schedule during 31<sup>th</sup> July-22<sup>th</sup> August, 2019. Data were analyzed by Partial Least Square-based Structural Equation Modeling (PLS-SEM) using Smart PLS v2.0 M3. Results revealed that, two moderator variables e.g., perceived usefulness and extent of ICT use had positive significant influence on SAAOs' performance, and jointly explained 34% of the variance. Job facility and social support were used as the predictor of perceived usefulness and only social support had positive significant influence and explained 17.4% of variance. While self-efficacy, inter-personal communication and perceived innovativeness were the three predictors for extent of ICT use, all of them were found to be positively significant and explained 44.9% of variance. To conclude, this study sufficiently offered several practical and theoretical recommendations about proper and effective structuring of use of ICTs in agricultural extension service delivery and those would be helpful for the policy makers or for further research.

# CHAPTER I

## INTRODUCTION

### 1.1 General Background

Information and Communication Technology (ICT) is the backbone of any digital initiative and it covers the vast area of information, communication and telecommunication technology. Bangladesh is successfully leveraging this rising penetration and has earned \$800 million in 2017 by exporting ICT products and services (BASIS, n. d.). On top of these, the total number of Internet subscribers has reached 99.984 million at the end of February 2020 (BTRC, 2020), can be seen as a consequential blessing of the recent progressive steps taken by the government and the growing ICT sector.

ICTs refer to technologies such as the Internet, Intranets, Extranets, ERP (Enterprise Resource Planning) and other such technologies that cover the spectrum from basic infrastructure implementation to technologies that improve services and operations in an organization (Gupta *et al.*, 2008). In recent years, growth of the ICTs has had a substantial impact on the way local, state and national governments' function. It focuses on technologies that helps in communication, retrieval, processing, storage and transfer of contents electronically (Uguru, 2001). In other literature, computers, Internet, mobile phones as well as traditional electronic media such as radio, TV, Newspaper (Ajani, 2014) were also considered as ICT tools.

ICTs are the well-established phenomenon that is beyond any description. Easy information access is needed more to facilitate better agricultural production, processing and marketing to maintain a real-time dissemination of effective information (Jones, 1997). In that case, ICTs are the proven tool to deliver necessary information to the client-end effective to both developed and developing countries like Bangladesh. In fact, ICTs' potentiality is with enabling effective knowledge sharing among the users. ICTs help its users to create, store, manage and transmit data, information and knowledge (Rao, 2007) and bridges the gap between people and places. Reports suggested that ICTs can function as an efficient means of knowledge sharing which refers to as "*the interactive process of making the right information available to people at the right time in a comprehensive manner in order to act judiciously and enrich the knowledge base*" (Nath, 2001).

Agricultural extension establishes communication networks between the farmers and the agricultural support service which include research institutes, input supply agencies, marketing department and credit organizations. On the other hand, extension has a vital role in solving the agro-economic and social production problems they face are appreciated by research institutions (Benor *et al.*, 1984). An extension service promotes useful and remunerative technological changes among the farmers and keep agricultural research and other rural services well informed of the farmers conditions and needs.

With the objective of improving the quality of rural life, the Department of Agricultural Extension (DAE) is playing a vital role in assisting farmers to improve productivity and increase their income by promoting appropriate farming practices. Under such a situation transfer of technology becomes a challenging job for the individuals working under DAE in any development program. As the front-line professionals, Sub-Assistant Agriculture Officers (SAAOs) play a vital role in transfer of technology as they are directly involved with farmers who teach and disseminate production information and recommendations. Being the grass root level extension workers of the organization SAAOs directly work with the farm community.

The number of extension workers are very low in accordance to the number of farmers in an area. So, each extension worker has to support a number of farmers and they need to work in fairly large areas. It is so difficult for the extension workers to communicate with the bulk of farmers. The distance travelled by an extension worker to visit the farmers has an effect on the number of farmers, farmer group and communities that are covered by extension workers in the study area. Therefore, communication gap between the extension worker and the farmer is a common consequence. Extension workers often fail to make regular visits to farmers' farms considering the numbers of farmers that they work with in an area. However, this gap could now be reduced through innovative use of ICT tools such as computers and the Internet, mobile phones, and tabs.

The performance of SAAOs is not merely based upon dealing with physical and material aspects pertaining to different job areas but also upon their behavioral components like knowledge, skill, satisfaction, attitude towards job, level of information technology use and other economic and socio-psychological aspects. In this regard, Leagan (1961) stated, "*the success or failure of program for promoting change lies in the hands of the personnel meaning them and will be determined by their*

*ability.*” Development of agricultural sector is of prime importance for our country. Therefore, to accelerate the pace of economic growth and development application of ICTs could be a better proposition. Globally, the development of ICTs has proven its potentials not for enhancing development efforts, but also virtually reduced the distance and turned the world into a global village (O’Farrell, 2003). Besides that, the number of devices or equipment of communication is increasing in a very rapid speed. Now a good proportion of farmers have their own TV set and cable TV is also getting available day by day in rural parts of Bangladesh. Extension communicators are more intensive than previous years. Moreover, in case of time-sensitive extension service delivery, ICTs can greatly assist field level extension workers to seek, process and disseminate appropriate innovation information and improves his or her performance in job related activities. Therefore, as a front-line professional, the SAAOs must consider ICTs as not just a knowledge sharing tool but a system of effective time management to gain the organizations’ goal faster than before.

## **1.2 Statement of the Problem**

SAAOs, as the frontline officers in extension service, work in the block level as the lowest administrative unit and transfer technologies to the local farm area. A successful completion of extension service is mostly dependent on the performance of SAAOs yet their performance is related to their knowledge, technology know-how, skills, communication expertise, etc. For the effective and efficient technology transfer, they are provided with digital devices and internet facilities funded by the government and interpersonal communication is now possible with higher officials like Agricultural Extension Officers (AEOs), Upazila Agricultural Officers (UAOs). With the advancement of Web 2.0, social communication media like Facebook, Twitter and Blogs for information sharing is easy and functional and it is getting popular exponentially day by day. Nowadays, with the help of digital information sources, extension workers can get and disseminate information quickly to the local farmer.

However, there are questions about the effectiveness of field workers when it comes to public services. Also, ICTs have the criticisms in case of unnecessarily use thus the effectiveness in workplace. Studies confirmed that village level extension agents are one of the important sources of information of farmers, they certainly do not the most efficient in terms of costs and coverage (Arokoyo *et al.*, 2002). In case of capacity building with the use of advanced ICTs in industry, agency & community stakeholder

is critical for extension services, found in the study of the State Extension Leaders Network (SELN) (2006, p. 3). So, it is important to ensure the performance is increased through the proper use of ICTs in extension field.

Performance of an organization depends largely on the individuals' performance (Leagan, 1961). The factors that influence development of individuals' performance to achieve organizational goal. Factors influencing development of performance of an individual to achieve organizational goal with the use of ICTs through proper management of time and effort in knowledge sharing to root level are what concerns this study. As the grassroot level extension worker, SAAOs' better performance is a highly positive factor towards the achievement of DAEs' vision. Thus, it is very important to assess the level of ICTs use to the performance of SAAOs in agricultural extension services and ensure better transfer of new innovation to the farm level effectively and timely. For that, it is pertinent to know the answer of the following questions:

1. What are the factors influencing the SAAOs' level of ICT use in relation to their job performance?
2. To what extent the level of ICT use by SAAOs is related to their job performance?
3. What are the contributions of the factors to SAAOs' level of ICT use related to their job performance?

### **1.3 Objectives of the Study**

Based on the problem statement made in the section 1.2, the following objectives have been formulated to guide the research:

1. To determine the factors that influence SAAOs' level of ICT use in relation to their job performance in agricultural extension service,
2. To determine the level of ICT use by SAAOs in relation to their job performance in agricultural extension service,
3. To explore the contribution of the selected factors to SAAOs' level of ICT use in relation to their job performance in agricultural extension service.



#### **1.4 Significance of the Study**

Agricultural development largely depends on the interactions between farmers and extension services. ICTs could provide a faster delivery of extension support service to the rural clients. It is expected that with the study of SAAOs' ICTs use in the professional field will show the present status of ICTs use in the extension services and it will help to identify the prevailing factors for ICTs intervention in Agriculture industry. Hence, determination of level of ICTs use and their contributing factors are time demanding research that might help policy makers and development planners to design and develop more ICT-enable extension tools for enhancing extension workers' performance at work, and ultimately positively influence rural development. Furthermore, it can help to fulfill the agenda of the Government of the People's Republic of Bangladesh to process of digitalization of government services. Lastly, findings of this study and the methodology used in this study will hope to inspire other researchers to conduct further investigation in future.

#### **1.5 Scope and Limitations of the Study**

The present study was undertaken with a view to assess the level of ICT use to the performance of SAAOs' in agricultural extension services and to explore the contribution of the factors to SAAOs' job performance. This study creates a scope to investigate SAAOs' level of ICTs use for extension service. Further, the study creates a way to measure SAAOs' performance in delivering extension support to the farm clientele. In order to present the study manageable and meaningful following limitations have been considered throughout the study:

1. The study was confined to eight upazilas under Jashore District.
2. Though numerous factors found to influence level of ICTs use in relation to job performance, only few deemed important and consistent with the study context were considered for this study.
3. It was not possible to collect data from the extension workers who were absent during data collection day as it was performed based on availability.
4. This study utilized self-reflected perpetual variables which may influence certain interpretations of the findings.

5. Considering the time and resources constraints, only cross-sectional data were used to test the model but longitudinal data might be a possible alternative to test the hypothesized relationship.

### **1.6 Assumptions of this Study**

The researcher made the following assumptions undertaking this study:

1. SAAOs incorporated into the sample of the study were sufficiently able to fulfil the quarries outlined by the researcher.
2. The outfitted data were right and representative of the population and free of any biasness.
3. Views and opinions included in the sample were representative of all the SAAOs of Bangladesh.
4. Work environment and facilities provided by the organization to the SAAOs are similar throughout the study area.
5. Data furnished from the respondents were normally distributed.

### **1.7 Definition of the Terms**

This study intended to assess extension professionals' ICTs use to the job performance and the salient factors that might affect their ICTs use behavior of individuals under DAE. Before further discussion, some key concepts and definitions of the terms are presented in this section.

<b>Concept</b>	<b>Definition</b>
<p><b>Perceived usefulness</b> (Davis, 1989)</p>	<p>The degree to which a person believes that using a particular system would enhance his or her job performance.</p>
<p><b>ICT self-efficacy</b> (Compeau and Higgins, 1995)</p>	<p>People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances.</p>

**Perceived innovativeness**

(McKnight *et al.*, 2002)

Confidence or optimism regarding adoption of new ideas or technologies.

**Job facilities**

(Bradlow *et al.*, 2001; Grover *et al.*, 1996)

Perceived physical facilities in the Job sector

**Social support**

(Gibson and Birkinshaw, 2004)

A combination of the items developed for support and trust in organization.

**Inter-personal communication**

(Templeton *et al.*, 2002)

The extent of communication and that exists between organizational members.

**Job performance**

(Campbell, 1990)

Job performance relates to the act of doing a job. Job performance is a means to reach a goal or set of goals within a job, role, or organization, but not the actual consequences of the acts performed within a job. Job performance is not a single action but rather a “complex activity”. Performance in a job is strictly a behavior and a separate entity from the outcomes of a particular job which relate to success and productivity.

## **CHAPTER II**

### **REVIEW OF LITERATURE**

The goal of this Chapter is to review the after-effects of a portion of the prior examinations and prominent articles having relevance to this topic. The researcher attempted to aggregate required findings by studying corresponding theses, writings, periodicals, professional and academic journal repositories using the Internet. To address the study objectives, this study reviews the existing literature which deemed relevant to the phenomenon of interest such as Information System (IS) related literature, Information and Communication Technology (ICT) use and beliefs studies, and proposes a theoretical understanding of the current investigation into three sections. The first section is concerned with the review of literature of the Institutional, Social and Personal factors (I-S-P) that has the main role to develop our theoretical model with the derivation of independent and mediator variable in case of ICTs use for performance enhancement. The second section presents the conceptual framework, how the variables play the relation and supports the framework and hypothesis development for this study. Third section highlights the control variables proposed for this study.

#### **2.1 Institutional, Social and Personal Factors (I-S-P) of Human Belief**

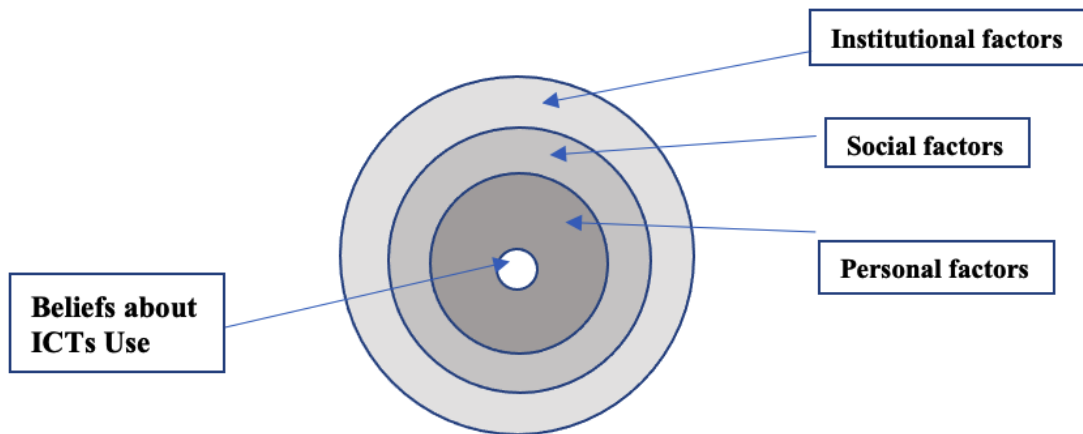
Several theoretical bases support the conceptual framework for this study. Figure 2.1 presents a graphical representation, which essentially suggests that an individuals' beliefs about ICTs use are influenced by three dominant sources of factors at varying distance from internal psychological processes: institutional, social and individual factors. It is important to point out that the factors themselves are causally related. Here, Lewis *et al.*, (2003) suggested that it is useful, from a conceptual perspective, to begin to develop a taxonomy of such factors by categorizing them on the basis of how distal they are from the target of ICTs usage, viz., the individual user.

##### **2.1.1 The construction of salient factors of ICTs use**

Perceptions about the characteristics of technology are all the way same across individuals from the same group. Indeed, individuals perceive a new technology from the vantage point of their own internal cognitive processes and try to use them. Pragmatically, such examinations are warranted because while beliefs are internal, psychological constructs and their determinants are external variables that may be controlled through appropriate managerial interventions. There is considerable support

in the literature for the importance of beliefs in technology acceptance behavior. Such beliefs have been utilized to both explain system usage (Adams *et al.*, 1992; Moore and Benbasat, 1991) and usage intentions (Davis *et al.*, 1989; Mathieson, 1991). In general, ‘perceived usefulness’ (*beliefs concerning instrumental outcomes associated with technology use*, whether it will be useful or not) and ‘perceived ease of use’ (*beliefs that technology use will be relatively free of cognitive burden*) have recurred as highly salient predictors of key acceptance outcomes in prior empirical examinations of technology acceptance behavior in human. In this research, we are focusing on ‘perceived usefulness’ and ‘extent of ICTs use’ as mediator variables and ‘job performance’ as the dependent variable. In our research framework (Figure 2.2), consistent with the theoretical arguments underlying TAM (Davis *et al.*, 1989), we will assess the job performance of SAAOs with independent and mediator variables. When individuals perceive the technology to be relatively free of cognitive effort, they will view it as releasing important cognitive resources that may be productively applied to other activities. In other words, they are more likely to perceive the technology to be useful in their work activities.

What causes individuals to construct relevant use of information technology? In order to sort out the range of factors that shape these mental models, Lewis *et al.* (2003) proposed the conceptualization of concentric three factors on ICTs use (Figure 2.1), starting with the most proximate set of factors: personal factors. Next lies a more distal set of influences, namely those emanating from the social milieu within which the individual is situated and that is social factors. Finally, the most distal set of influences are the result of institutional forces that surround the individuals living environment, the institutional factors. It is important to point out that the theory is focused on the use of ICTs by individuals basically within an organizational context and in less extent on the personal use of ICTs for non-work-related activities that might occur e.g., at home. Finally, the study’s goal is to demonstrate the relevance variables belonging to all three antecedent categories within a single empirical study.



**Figure 2.1 Institutional, Social and Personal factors on ICT Use (Lewis *et al.*, 2003)**

### **2.1.1.1 Institutional factors**

Institutions do not operate in a vacuum; they operate in a context where there are existing factors in which may influence the relationship between factors. These factors have to be controlled. These factors are within the control of institutions' ability to manipulate so as to achieve its objectives. Such factors may include strategy, structure, size, union, culture, leadership, resources, facilities and others within reach of management (Galbraith, 2002). Every organization has a unique internal and external environment where these factors play a critical role in overall performance of the organization.

Institutional factors have been theorized in literature to be potentially important determinants of empowerment and performance in an organization (Greenwood and Suddaby, 2006). Institutional factors are the process by which structures, schema, rules, norms, and routines become established as guidelines for social behavior (North, 1990; Scott, 2004). Drawing on proposition of institution theory (Meyer and Rowan, 1991; Suchman, 1995) the performance increases legitimacy because it shows how well a firm is fulfilling its roles to develop society. In this regard, Greenwood and Suddaby (2006) concurs that institutions set the conditions under which the process of empowerment works. Employees in organizations are governed by a number of such institutional factors, the most prominent among them being structures, strategies, organization culture, facilities, leadership, practices and policies. Galbraith in his findings published in 2002 concurred that these factors play a crucial role in the overall performance of the organization. North, in 1990, further enlightens that institutions reduce uncertainty

by providing a structured facility to everyday life by providing structured communication system, strategies and organizational environment suitable for employees.

Further, organizations survive and succeed through interaction between them and their environment (Scott, 2004). Arguably, most related literature has looked at profit making organizations in developed western countries which have advanced and clear structures, culture and strategies. In view of theoretical studies depicting the importance of institutional factors on the operation of an organization, it is important to understand the relative effect these institutional factors have on the relationship between employee empowerment and performance in an organization especially in a developing country scenario.

The role of institutional factors in influencing individual behavior toward technology has long been a subject of interest in Information Systems (IS) research. As noted over two decades ago, "*Management Information Systems (MIS) can and does fail where organizational factors are ignored by system designers*" (Robey, 1979). In the effort to understand technology use, numerous constructs have been studied, including user training (Fuerst and Cheney, 1982; Leonard-Barton, 1987; Raymond, 1988; Sanders and Courtney, 1985); knowledge management (Boynton *et al.*, 1994; Pennings and Harianto, 1992); and organizational support (Delone, 1988; Leonard-Barton and Deschamps, 1988). The organizational support can be termed as the facilities provided by the organization, for instance job facilities. Collectively, those studies suggest that institutional factors have a highly significant influence on individuals' intention technology use in job sector. Among the range of institutional factors proposed in prior work, our research model focuses on job facilities provided by the organization for the digital advancement to imprint the ICTs perceived usefulness of individuals on their job performance.

Although prior research has unequivocally established the importance of organizational support for technology use (Igarria, Guimaraes, and Davis, 1995; Igarria *et al.*, 1997). However, institutional theory provides the conceptual underpinnings of how and why the thoughts and actions of individuals within organizations are significantly influenced by the prevailing organizational norms, values, culture, and history. Scott in 1995 and previously Orlikowski in 1992, identifies three ways in which the institutional milieu

influences individual cognition and subsequently behavior: through processes of signification, legitimization, and domination.

Signification implies that individuals use information from the institutional milieu to understand how they should form their beliefs about new technologies that are introduced into the organization. Legitimization is suggestive of the validation of specific beliefs and actions of individuals: messages emanating from top management are used as normative templates to reassure oneself about the organizational legitimacy of beliefs and actions. Finally, domination reflects the notion that the institutional milieu regulates individual beliefs. To the extent that organizational workers seek to comply with organizational directives emanating from top management, they will develop cognitions that are consistent with the institutional context. In other words, the attitudes of top management are likely to influence the perceptions and attitudes of organizational workers (Massey *et al.*, 2001). This logic is also embedded in Orlikowskis' (2000) notion of technology-in-practice: essentially, she argues that individuals' use behavior is deeply influenced by the institutional context within which that behavior is enacted.

In large organizations, the influence of job facilitation, individual support, norms, rules play out at multiple levels. Individuals in these organizations experience two primary sources of influence to perform better: top management at the enterprise level and the senior management of the departmental unit to which the individual belongs. While top management signals the importance of the technology to the enterprise through their funding and resources provisioning actions, local or departmental management also influences individual behaviors by reinterpreting and reinforcing the signals emanating from enterprise management (Leonard-Barton, 1987). Indeed, the day-to-day cognition and behavior of organizational actors like SAAOs are as much influenced by messages and directions relayed by their immediate supervisors like AEO or UAO under DAE as those communicated by top management. Thus, studies that incorporate institutional support in case of job-related ICT facilities was considered as an independent variable for this study. In the next section, the relation between institutional factors and job performance and their mediation will be discussed.



### 2.1.1.2 Social factors

Various conceptualizations of social factors have been offered in the IS literature. One dominant conceptualization, embedded in studies based on behavior models from social psychology such as TRA (Theory of Reasoned Action) and TPB (Theory of Planned Behavior), is that of subjective norm (e.g., Mathieson, 1991; Taylor and Todd 1995; Thompson *et al.*, 1991), defined as the "*perceived social pressure to perform or not perform the behavior*" (Ajzen, 1991). A second conceptualization, emerging from research on the adoption and diffusion of communication technologies, draws upon social information processing theory to suggest that information conveyed via individuals' social networks influences their cognition about a target technology (Fulk, 1993; Schmitz and Fulk, 1991).

Drawing upon Kelmans' (1958) theoretical arguments, the researcher suggested that this factor is manifested via the psychological pathways of internalization and identification via internalization, the individual incorporates the opinion of an important referent as part of his own belief structure: in essence, the referent's beliefs become one's own. Via identification, the individual seeks to believe and act in a manner similar to those possessing referent power. Therefore, compelling messages received from working groups act as the social support from the very close contacts are likely to influence ones' cognition about the expected outcomes of ICTs usefulness.

In this thesis, conceptualization of social factor was drawn upon the work of Fulk (1993) and Schmitz and Fulk (1991). Fulk argued and empirically demonstrated that the extent to which salient others view technology use as valuable that has a positive influence on one's own perceptions of usefulness. In other words, if a peer, supervisor, or some other actor in a relevant organizational network believes that a technology is useful, through a process of shared cognition, that technology seems very useful to the individuals who is the receiver of the information. However, Fulks' (1991) conceptualization did not include a measure of the importance of the referent to other, also referred to in the TRA tradition as "*motivation to comply*." Doubtlessly, the potency of the social support will vary, depending on the significance an individual assign to internalizing another's beliefs or ideas identifying with them.

### 2.1.1.3 Personal factors

The final and most proximate factor on an individual's cognitive interpretations of information technology is factors related to the person. Although prior research has tested the influence of numerous individual factors on technology use outcomes (e.g., Agarwal and Prasad, 1999), some constructs that have received consistent support as important factors are self-efficacy, personal innovativeness, individuals' communication, skills, learning behavior, etc. in an organization.

In the study conducted recently in 2017 by Franco and Garcia found that the individual factors as the internal resources may have positive relation with the farm performance beside the other factors they studied under certain organization.

This thesis has already framed up how the variables of this research were determined and the relations of different variables in this context has elaborately described in the next sections in a conceptual framework.

## 2.2 The Conceptual Framework and Hypothesis Development

Conceptual framework is the foundation for understanding the research issues and linkage among different variables. It helps as guiding principles for analyzing the research issues. It also helps easy visualization of the relationship between the dependent, independent and mediator variables. Drawing on the factors presented in earlier sections, this section presents the research model (Figure 2.2) and hypothesis of this study.

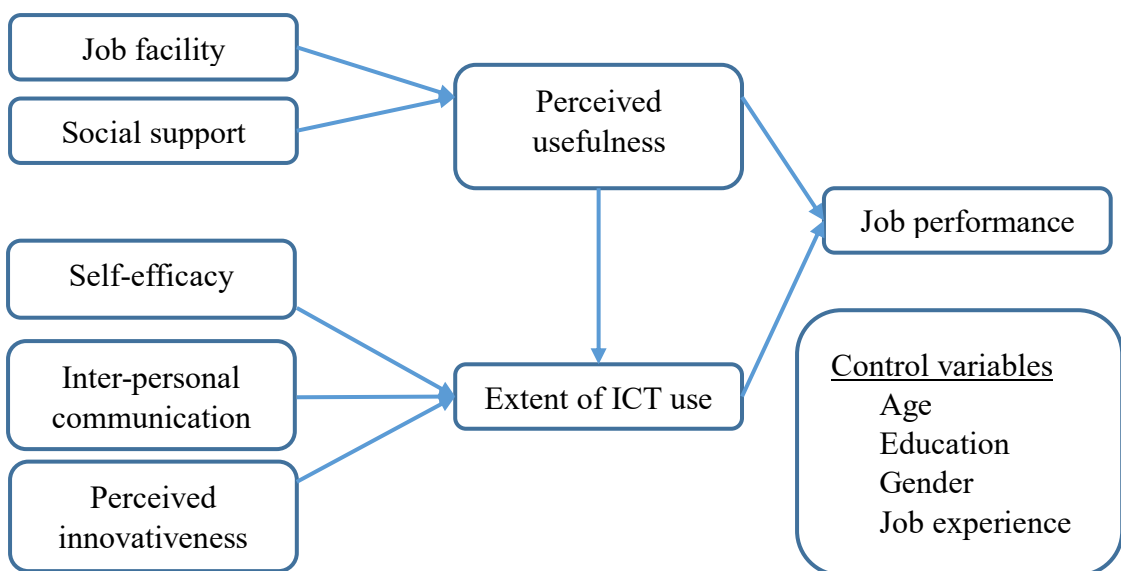


Figure 2.2 Conceptual Framework of this Study

### **2.2.1 Job facility and perceived usefulness**

Job facilities in the organization is the overall facilitation of the employees, their tasks and all other matter related to the structure of the organization. It includes the place of the job, working terms and condition, hierarchy in the organization and any other amendments or change brought by organization. Robbins (2001) advocates that working conditions will power job satisfaction, as employees are concerned with a comfortable physical work environment. In turn this will render a more positive level of job performance. Miller *et al.* (2001) forwarded their view that employees get benefited by work environment that provide sense of belonging. Parvin (2011) also established in her research at Pharmaceutical industry in Bangladesh, that working environment played an important role in the employee's performance. The employees are the most important asset in all organizations. A good working facility reduces sick leave, lowers turnover rates and increases efficiency of individual. Important facilities in the organization is building workplace layout, workstation set-up, furniture, providing necessary training etc. Moreover, in case of ICTs the facilities sum up into different systems discussed later.

Within these extremely dynamic settings, companies (e.g., Plantronics, 2014) start referring to "Smart Work" as a set of organizational interventions aiming to fully release the innovation potential of their employees, providing them with higher levels of autonomy in the choice of their working spaces, time and tools, and asking in return a strong commitment in achieving corporate goals. According to Mann (2012), the interventions over which practitioners are focusing their attention seem based upon three complementary elements: ICT element, HR (Human Resources) element and layout element.

The first one refers to the improvements of the organizations' digital backbone (*ICT element*). The development and diffusion of digital technologies (especially those supporting communication, collaboration and social network creation), along with the increasingly pervasive dissemination of powerful and easy-to-use mobile devices (Ahuja *et al.*, 2007), support working groups in easily sharing files, information and ideas (Chudoba *et al.*, 2005). In such a way, all employees of an organization can efficiently and effectively interact in real time even if scattered into disperse settings (Kim and Oh, 2015) or tele-working from home (Sewell and Taskin, 2015).

The second element (*HR element*) refers to the HR practices made available to employees in order to actually exercise their flexibility (Coenen and Kok, 2014). Specifically, training programs for the middle and top management, training for the end users, new communication plans, new management by objectives processes systems, projects of cultural change tend to affect the behaviors of the employees and their attitude toward risk taking to adopt technology and perceived innovation (Cameron and Green, 2015).

The third element refers to the changes accomplished in the physical workplace (*layout element*). Recent works emphasize the importance of promotion strategies in spatial reconfiguration of the office layout (Elsbach and Bechky, 2007) to increase employees' productivity and better manage their work-life balance (Ahuja *et al.*, 2007). Therefore, particular office reconfigurations may lead to innovative ways of collaborating (Smith, 2013).

In the context of job facilities, training plots an important attention in IS research. Several studies showed that user training does influence users' skills and their acceptance of IT (Venkatesh *et al.*, 2003, Nelson & Cheney 1987, Thong *et al.*, 1994), but there was no direct relationship between the amount or quality of user training and actual ICTs use. Nelson and Cheney (1987) explicated a causal chain from amount of training to user abilities to actual ICTs use, and finally, to user satisfaction with the system, but even they found no direct relationship between training and the level of ICTs usage. Along the same lines, qualitative case studies conducted by Lepore *et al.*, in 1989, showed that training was one factor that mattered in shaping users' ICTs acceptance, but the importance of training was moderated in different settings by factors such as users' occupational status (i.e., professional versus clerical employees) and specifics of the implementation strategy (i.e., top-down versus bottom-up implementation). Harrison and Rainer (1992) found that user training had an effect on ICTs usage, but users' prior computer experience and age were more important determinants of ICTs acceptance and use. It may be that training is relevant to shaping group attitudes and intentions to use ICTs, and that the latter factors, in turn, influence how employees use ICTs in their day-to-day work.

Khan *et al.*, (2017) did a research in Bangladesh and mentioned that SAAOs get digital tab, internet packages from DAE and they use mobile devices to get information that

farmers have been receiving necessary information from SAAOs and also Internet. These are the ICT facilities that fires up the information flow.

There is a detailed research found as the proven source of how organizational facilities is related with the perceived usefulness in broader conception. Igbaria after the research of 1993 also did another research in 1995 with Iivari and found that there is a direct positive relationship between supports or facilities provided by an organization i.e. job facilities and perceived usefulness in the field of computer technology use in an organization. Organizational technology facilities are influential in promoting the usage of the system by offering substantial learning programs which increase the sense of self-efficacy and perceptions of ease of use, providing a wider selection of technology usefulness may be a dominant factor of different types of software tools potentially useful in users' jobs supporting in a wider variety of business tasks, and encouraging users to use the system. The findings also expanded saying perceived usefulness had a strong positive effect on usage suggests that individuals are likely to accept a new technology because of the functions it performs for them.

*H<sub>1</sub>: SAAOs' perceived job facilities is positively associated with their perceived usefulness of using ICTs*

### **2.2.2 Social support and perceived usefulness**

Social support refers to the perception of members of a certain group or organization, that they are being helped, responded to, and cared for, by others in the group or organization (Crocker and Canevello, 2008). Social support is always intended (by the provider of the support) to be helpful, thus distinguishing it from intentional negative interactions (for example, social undermining behaviors such as angry criticism and hassling). Whether the intended support is perceived or experienced as helpful by the receiver, is an empirical question. However, the perception that others are available and ready to provide social support is known to acquire a more positive emotional state and a more positive attitude while facing problems, even if one had not received an assistance (Cohen and Wills, 1985; Cohen, 2004). On social media platforms these days, the user receiving shared information, perceives others as being caring and helpful when they provide useful personal or product information. After receiving such information, the user is more likely to acquire or share valuable information with others. Technical support, for example, are known to be enhanced by friendship and trust

among social media users via their frequent sharing of supportive information in an organization thus it seems to be useful to the receiver (Bai *et al.*, 2015; Liang *et al.*, 2011).

Studies have revealed that social support may exist in three forms: emotional, tangible, and informational (Schaefer *et al.*, 1981). Emotional support includes intimacy and attachment, reassurance, and being able to confide in and rely on another. All of which, contribute to the feeling that one is loved or cared about, or even that one is a member of the group, not a stranger. Kim *et al.* (2008) found that the emotional support provided by others in the group might reduce stress. And there are a lot of studies happened to find that the reduction factors of techno stress increases use of that particular technology. However, emotional support is present when workshop participants perceive themselves as being cared for or empathized with, based on the information provided by their peers.

Coming next to tangible support that involves direct aid or services such as taking care of needy person. In the context of this study, it refers helping the colleagues or getting help from them in case of technical help as well as support to or from them.

Lastly, information support involves offering advice on how to approach a problem as well as useful information and direction. Coulson (2004) found that information, particularly factual evaluation information, posted in response to queries by members of a group of an organization might help to solve problems. Indeed, social support improves the relationships between participants and promotes content generation among actual users of ICT tools in the organization.

Today a large number of social media platforms have been developed that smooth the progress of sharing information and generation of content in an online context (Chen *et al.*, 2011a). There are a number of platforms that facilitate these activities, such as Wikipedia, Facebook, YouTube and Twitter. Researches revealed that individual apply different social media tools, such as online forums and communities, recommendations, ratings and reviews, to interact with other users online and share information. In fact, individuals are attracted online to exchange information and receive social support in information generation and sharing (Ridings and Gefen, 2004).

Recently reviews are one of the key areas that have emerged from social media, facilitates information generation about new technology. User reviews are widely

available for products and services, generating great value for both consumers and companies (Nambisan, 2002). It is easy to get enough information about an ICT tool such as an app or software service from Google playstore with the enormous reviews and this can enhance users' perceived usefulness by confirming trust and beliefs. In fact, consumers are actively encouraged by firms to rate and review products and services online (Bronner and de Hoog 2010). These activities produce electronic word of mouth. This word of mouth, produced through social media, helps consumers in their use of technology (Pan and Chiou, 2011). Research shows that customer reviews have grown quickly on the internet (Chris *et al.*, 2008). Amazon.com is a good example of using customer reviews, with almost 10 million available (Do-Hyung *et al.*, 2007). Online communities and forums are other examples of social media. Online communities are now a place to share information and gain knowledge about products and services (Chen *et al.*, 2011b) helping users to get enough information to use the services before using it. Recommendations are another tool widely used by potential users. Research has shown that potential users are more interested in other users' recommendations rather than merely vendor-generated product information (Ridings & Gefen 2004). Hence, such interactions, provided through social media, help increase the level of trust and reduce perceived risk thus increases perceived usefulness.

Virtual worlds as electronic environments are another important development of Web 2.0, a new way of generating and sharing information on the internet (Mueller *et al.*, 2011). They facilitate human interactions for social support or individuals' experience sharing. One of the main characteristics of virtual worlds is learning by doing, which enables users to learn and practice in the virtual space (Mueller *et al.*, 2011). However, with the widespread use of social media where individuals can easily post information and accounts of their experiences, the quality of content posted by anonymous users has become a challenge (Chen *et al.*, 2011a). The anonymity of some users is a concern in deciding on the quality of information provided and the content shared by consumers (Chen *et al.*, 2011a).

Motivated by the great success of social media (e.g., Facebook and Twitter), there is a strong interest to use social networking to improve the communication among different Internet of Things (IoT) (Xu *et al.*, 2014). From a social networking stance to establish social relationships among intelligent objects, a new paradigm, Social Internet of Things (SIoT), is recently proposed. By improving the level of trust between objects

that are “friends” with each other, objects can start new acquaintances, exchange information, exploit other objects’ capabilities, and collaborate toward a common objective (Atzori *et al.*, 2014; Kang *et al.*, 2014). There have been many studies noting the potential of social media in the workplace. For example, Jackson *et al.* (2007) studied internal corporate blog use in a global IT company, reporting that blog users benefited through the formation of informal social networks, convenient communication and knowledge transfer. Skeels and Grudin (2009) found that social network sites (SNSs) are widely adopted by Microsoft staff.

Media synchronicity theory (MST) by Dennis *et al.* (2008) suggests that synchronicity exists among people when they work together at the same time with a shared focus. MST contends that tasks are sets of fundamental microlevel communication processes, which are composed of two fundamental processes: conveyance and convergence. Conveyance processes focus on the exchange of vast quantities of new information, while convergence processes involve reaching a common understanding of preprocessed information. When a variety of media with different capabilities are employed to complete a task, communication performance will be enhanced, thus leading to better task performance.

Social capital denotes the resources embedded within an individual’s or an organization’s network of relationships, including both interpersonal relationships and the resources rooted in the relationships (McFadyen and Cannella Jr 2004). For the members of a network, the social capital benefits include broader sources of information and opportunities that are otherwise unavailable. According to uses and gratifications theory, consumers use media with different motivations in order to satisfy their social and psychological needs. Functioning mainly as social networking tools, the most evident motivation for people to use social media is the need for social interactions to obtain support and a sense of belonging, while social capital stems from social interactions among individuals (Nahapiet and Ghoshal, 1998). While participation is a key feature of social media, it is important to identify the motivations underlying the voluntary communication behavior in virtual communities.

People’s behavior is a product of their social network (Bandura, 1989), and the influence of social capital antecedents on individuals’ participating in virtual communities has been widely studied (Chiu *et al.*, 2006; Ganley and Lampe, 2009). Social capital benefit is explored by knowledge transfer, which can be regarded as a



process of task-related communication. The knowledge transfer ability from one unit to another has been recognized as a dominating contributor to organizational performance (Epple *et al.*, 1996; Baum and Ingram, 1998).

Network ties represent the breadth and strength of the relationships, and the communication frequency among employees (Chiu *et al.*, 2006). Unlike traditional physical contacts, social media enables informal social interaction across space, time and organizational boundaries. By connecting people with common interests and background, the deployment of social media in the workplace is helpful to discover potential ties, to maintain professional networks and to strengthen ties with colleagues. Prior research has provided abundant evidence that social media use helps build network ties. As suggested by DiMicco *et al.* (2008), the main motivation of employees using internal social network sites (SNSs) is to “build stronger bonds with their weak ties and to reach out to employees they do not know.” Jackson *et al.* (2007) also found that work-related benefits of using blogs center on creating, maintaining and strengthening ties.

Virtual communities based on social media are groups of people brought together by common interests and goals. Shared vision represents the collective goals and aspirations of the organization members within an organization, which can be achieved through collaboration (Wagner 1995).

Social capital has been proven to be a key antecedent in shaping cooperative interaction, reducing conflicts within the organization, developing successful solutions and increasing the effectiveness of individuals (Nahapiet and Ghoshal 1998; Morris *et al.*, 2002). In dynamic and uncertain environments, network ties partly guarantee resource reciprocity and availability, exceeding formal institutional support (Arias, 1998). Trust cultivates a focus on future conditions, decreasing the anxiety that the other party will act opportunistically (Wang, 2007). Shared vision facilitates an organization’s members to share and integrate resources, smoothing cooperation and coordination actions. Network ties, shared vision and trust are expected to improve the work performance of individuals, both in terms of effectiveness and efficiency.

Cao *et al.*, in 2016 published a study investigating whether and how the use of social media at work can enhance employees’ work performance and found that social media can promote the formation of employees’ social capital indicated by network ties,

shared vision and trust, which, in turn, can facilitate successful knowledge transfer. Benefiting from the characteristics of connecting people and cultivating social capital, social media have the potential to flexibly support knowledge transfer beyond organizational boundaries.

Some applications of social media are not related to work directly, but their social characteristics can foster social capital among employees that helps to obtain work-related knowledge, which leads to enhanced work performance. Cao *et al.* (2016) in their findings also conclude that social factors beyond communication i.e., social support, will also affect task performance. Further, social capital partially mediates the relationship between social media as well as technology use and knowledge transfer, indicating that the organizational adoption of social media does not guarantee that knowledge transfer will occur spontaneously.

With these wave of literature supports, the hypothesis we argued in this study:

*H<sub>2</sub>: Social support is positively associated with respondents' perceived usefulness of using ICTs for their work*

### **2.2.3 Self-efficacy and extent of ICT Use**

Self-efficacy has its theoretical roots in Banduras' (1977) Social Cognitive Theory (SCT), which posits that by watching others perform a behavior, an individual's perception of his own ability to perform the behavior i.e. self-efficacy, is influenced as well as the outcomes that he or she expects to occur. Bandura in his study defines self-efficacy 'expectation as the conviction that one can successfully execute the behavior required to produce a desired outcome.' In subsequent works, researchers found that self-efficacy tailored to a computer or information technology context is an important determinant of a variety of user perceptions of technologies. For instance, in a study of the relative merits of different training approaches, Compeau and Higgins (1995) argued that IT self-efficacy influences outcome expectations, which they subsequently found to comprise of two distinct constructs: performance outcomes, including items very similar to those found in perceived usefulness, and personal outcomes, relating to an individual's expectations of an enhanced status within an organizational environment. Venkatesh and Davis (1996) and Agarwal *et al.* (2000) posited and found empirical support for a significant relationship between ICTs self-efficacy beliefs and the perceptions about use of a specific technology.

There are a number of existing literatures that have revealed the influence of self-efficacy on one's ICTs usage (Olfman and Mandviwalla, 1994; Compeau *et al.*, 1999; Johnson and Marakas, 2000). Besides, self-efficacy also is seen as one of the factors that was found as one of the dominant contributors towards ICTs usage (Venkatesh and Davis, 2000; Venkatesh *et al.*, 2003 and Lewis *et al.*, 2003). However, there are also some studies that disagreed with what have been found by studies mentioned above when they found insignificant relationship between self-efficacy and ICTs usage (Bolt *et al.*, 2001 and Gallivan *et al.*, 2005).

Self-efficacy derives from the area of motivational research and students' self-beliefs (Bandura, 1997). The objective of studying self-efficacy is primarily to understand peoples' expectations about their ability to achieve a goal, solve a problem, or complete a predefined activity (Yang & Cheng, 2009). Schunk *et al.* (2014) showed that self-efficacy is an important variable to understand peoples' tasks choices, their effort, and achievement. In general, self-efficacy is related with technical ways of achievement (Schunk *et al.*, 2014). However, self-efficacy reflects on self-beliefs, and research shows that some students are overconfident about their abilities; others underestimate their abilities, whereas some students have more a more realistic understanding of their own abilities (Moore and Chang, 2009).

Bandura (1997) argues that the strongest predictor of self-efficacy is probably the previous personal experience from a task or an activity. When students participate in an activity, they may find that they can master the task on their own or together with others. These mastery experiences and the ways in which students interpret their capabilities contribute to weakening or strengthening their self-reliance and self-efficacy (Usher and Pajares, 2008). Research has shown prior successful experience with digital technologies in which they can lead to higher levels of ICTs self-efficacy (Cassidy and Eachus, 2002). However, this depends on how the students perceive and attribute their use of technology (Joo *et al.*, 2000).

Bandura (1997) emphasized the existence of domain-specific self-efficacy beliefs. In other words, individuals' perceptions of their capabilities and expectations about their performance within a specific domain such as ICTs may differ from their perceptions in a domain outside of the ICTs context. ICT self-efficacy is therefore related to the students' beliefs about their own ICT literacy (Tømte and Hatlevik, 2011; Hatlevik *et al.*, 2013).

Recent research shows that users' access to ICTs and their experience using ICTs are positively related to ICT self-efficacy (Tondeur *et al.*, 2011). Moreover, the intensity of individuals' self-efficacy is positively correlated with their ICTs use (Meelissen & Drent, 2008). On the other hand, less experience of ICTs means less touch with ICTs and lower self-efficacy in case of ICTs use (Palmer *et al.*, 2014).

*H<sub>3</sub>: ICT self-efficacy is positively associated with the extent of ICTs use by the SAAOs*

#### **2.2.4 Inter-personal communication and extent of ICTs use**

As people in organizations use technology to accomplish tasks, they do not use just one ICTs. There are different communication options, and many tasks require ongoing communication that unfolds over time. For example, people often send an e-mail and then upon receiving no reply, they use the telephone to follow-up with that same person. When they reach their intended recipient, they say, "I just sent you an important email, do you have any questions?" Not only does this example likely ring true with most peoples' experiences but also prominent scholars in interpersonal communication (e.g., Walther & Parks, 2002), psychology (Hesse *et al.*, 1988), and management (Boczkowski & Orlikowski, 2004; Saunders & Jones, 1990) have called for further study of the phenomenon of technology use in case of interpersonal combination. Walther and Parks (2002) explain stated, "Communication efficiency may rest on sequences or combinations of ICTs rather than isolated choices about a discrete medium."

Flanagin and Metzgers' (2001) study also found that the similarity of ICTs use in inter-personal communication process across the organizations clustered into three categories: (a) unmediated interpersonal communication, mostly served by face-to-face communication; (b) mediated interpersonal communication, mostly served by e-mail, telephone, and Internet-conversations; and (c) mass communication, mostly served by information retrieval and exchange on the Internet, books, magazines, and newspapers. Face-to-face communication was ranked the highest at fulfilling needs. When face-to-face communication was supplanted by mediated ICTs, Flanagin and Metzger (2001) suggested that this was due to mediated ICTs' abilities to connect people across distances. Furthermore, face-to-face communication was not significantly better than virtual communication when people want to be entertained or to pass the time. Flanagin

and Metzger's (2001) findings provide considerable guidance in grouping ICTs and tasks. Though face-to-face communication is a uniquely useful communicative technology is supported by previous communication research (e.g., Daft & Lengel, 1984, 1986, Short *et al.*, 1976; Olson & Olson, 2000).

Although face-to-face communication does seem to be helpful for fulfilling many needs, prior research suggests that it is not always ideal (Walther, 1992; Walther & Parks, 2002), or possible (Olson & Olson, 2000). In their summarizing piece 'Distance Matters', Olson and Olson claim that although face-to-face communication is very important for collaboration, "we should not fall into the trap of singling out face-to-face interactions as the gold standard." They suggest that we examine the features of face-to-face communication to see if there are ways to approximate the current collaborative characteristics of face-to-face communication that function well in remote interactions. Furthermore, face-to-face communication lacks built-in memory, access to text, multiple addressability (unless in a group setting), reprocess ability, and reviewability, features that are important for many tasks (Clark and Brennan, 1991; Dennis and Valacich, 1999; Markus, 1994; Sproull and Kiesler, 1991). In that sense, ICTs allow what is often called computer-mediated communication (CMC), which offers many of the features that face-to-face communication lacks. E-mail and computer conferencing systems, where communication occurs by encoding text messages, are considered types of CMC (Walther, 1992). The textual nature of these messages makes them quite unique. Although e-mail is used frequently in organizations today and it provides textual information, e-mail is not the only ICT capable of fulfilling these functions.

Documentation tasks, those requiring textual data, did not appear in Flanagin and Metzgers' (2001) study, yet there is considerable evidence that documentation needs play a role in both discrete and successive ICT use. This consideration also changes how the mediated ICTs defined as e-mail and telephone in Flanagin and Metzgers' study should be treated in a successive use condition. Although both of these ICTs have the ability to connect people across distance, the features inherent in each of these ICTs suggest that they might be used differently to follow-up communicative attempts. For this reason, mediated ICTs capable of conveying textual information are separated conceptually from those capable of communicating only oral information.

A common objective in organizations is to improve audience interest to facilitate persuading others. Capturing attention is a problem because today many organizational members receive many e-mails a day to read all (Oetl *et al.*, 2018), still meet face-to-face with others, use the mobile phone and search the Internet. In this over-communicative environment, people must think strategically about using ICTs to capture the attention of others and communicate them. Mass media and health communication researchers have spent decades on this issue of attention. Health campaigns cannot succeed in changing individuals' behaviors without achieving widespread exposure to their messages (Hornik, 2002; Rimal *et al.*, 1999; Rogers and Storey, 1987). Exposure can be maximized through the use of multiple channels (Backer and Rogers, 1993; Flora *et al.*, 1997; Rogers and Storey, 1987). In the health communication literature, channels are typically conceptualized as either mass media or interpersonal in nature, and campaigns are urged to adopt a mixture of both (Backer and Rogers, 1993; Rogers and Storey, 1987). Prior research in interpersonal communication has shown that using CMC over extended periods of time allows people to form strong impressions of their communication partners in an organization (Walther, 1992).

Interpersonal communication with peers such as friends, coworkers, or even strangers has long been considered as crucial driver of opinion formation and persuasion (Hovland and Janis, 1959; O'Keefe, 1990). The two-step flow of communication model implicated interpersonal relations as an intervening process reinforcing or attenuating mass media effects: Building on the finding that personal influence had a greater effect than media in changing people's minds during electoral campaigns, Katz and Lazarsfeld (1955) proposed that person-to-person communication functions as a "relay" between those who consume mass media and those who do not, leading to a two-step influence from mass media over so-called opinion leaders, who serve as transmitters to less involved followers. The authors argued that the influence of person-to-person communication on opinions can be greater than media effects since interpersonal influence is often perceived as nonpurposive, flexible, trustworthy, and potentially rewarding (e.g., providing social acceptance when the influencee complies with the promoted view).

In the social support and perceived usefulness sections we have already discussed the use of social media in communication under the organizational structure in case of ICTs

use. To expand that in case of inter-personal communication and ICTs use, it needs to mention some other aspects of this communication. Communication process constitutes channels for information and resource flows, influencing both access to parties for exchanging knowledge and anticipation of value through information exchange (Nahapiet and Ghoshal, 1998). First, network ties facilitate inter-personal social interactions and reduce the amount of time and effort required to access knowledge sources, thus leading to greater intensity, frequency and task performance (Larson, 1992). Second, concerning interaction of reciprocity, individuals who have built strong communication will actively engage in knowledge contribution and exchange activities (Chow and Chan, 2008). Given that intimate personal relationships will result in favorable actions and ensure the reliability and richness of knowledge, people are more inclined to exchange ideas and resources with those with whom they have close relationships (Luo, 1997). Prior research has revealed that in virtual communities, inter-personal communications are positively associated with the extent of ICTs or media use (Chiu *et al.*, 2006).

*H<sub>4</sub>: Inter-personal communication is positively associated with the extent of ICTs use by the SAAO*

### **2.2.5 Perceived innovativeness and extent of ICT use**

Perceived innovativeness is mainly the perceived degree of newness and improvement over existing alternatives (Lowe and Alpert, 2015). Perceived innovativeness is a formative construct comprising a combination of (1) an overall measure determining how new the product is perceived to be, and (2) the extent to which the innovation would change consumption patterns (Olshavsky and Spreng, 1996). Other investigators include an item asking respondents how different the innovation is from products they currently know about (Moreau *et al.*, 2001). Alexander *et al.* (2008) measured perceived innovativeness using two items to reflect the benefits of the new product, and two items to reflect the impact of the product on their consumption experience. Including perspectives from studies which use managers as raters of consumers' perceptions, the literature still seems unclear on this issue. In general, innovativeness from the consumer's perspective (although measured by managers) has been viewed along two broad dimensions, defined by some as novelty and meaningfulness (Sethi *et al.*, 2001), and defined by others as superiority to the customer and adoption difficulty (Lee and O'Connor, 2003).

In a conceptualization of personal innovativeness, Agarwal and Prasad (1999) point out that in order to predict individual behavior toward an innovation, the construct must be domain specific as opposed to global in nature. They treat personal innovativeness in the domain of information technology as an individual propensity that, in general, is associated with more positive beliefs about technology use. Drawing upon Rogers' theory of the diffusion of innovations (1995), they argue that individuals develop beliefs about new technologies by synthesizing information from a variety of channels, including mass media and interpersonal channels. For the same exposure to different types of channels, individuals with higher personal innovativeness are expected to develop more positive beliefs about the target ICTs and use more.

Explaining and predicting user adoption of new technology has a long history of attention in both academia and practice. While, perceived innovativeness construct can be also seen as the state of mind resulting from a gestalt of mental enablers and inhibitors that collectively determine a person's predisposition toward using new technologies (Lin and Hsieh, 2007). Demirci and Ersoy (2007) added that through his research, found there are a number of characteristics that having compliance with the acceptance of new technologies or services resulting in interaction through technology. Thus, the term perceived innovativeness refers to people's propensity to embrace and use new ICTs for accomplishing goals in organization (Parasuraman, 2000). Lin and Hsieh (2007) showed that the higher the perceived innovativeness of customers, the higher the satisfaction level and usage intentions generated when using technologies and people intent to use technologies more in organizations.

Over the past decade, there has been growing recognition that employees learn to perform their jobs and to use technology through the guidance and insights offered by more experienced coworkers (Brown and Duguid, 1998). For instance, one work group may develop higher innovativeness in learning and exploration of new technologies on the job, whereas another group may evolve specific norms to avoid using that specific technology, or possibly even to sabotage the technology. George *et al.* (1995) examined such contrasting scenarios where two work groups that were each expected to use ICTs in their jobs use the technology in different ways. Their findings suggest that the same technology, when introduced into different settings e.g. perceived innovativeness, will be appropriated in very different ways, resulting in distinct patterns of use shaped by



individual conditions, perceived innovativeness etc. (Alavi *et al.*, 2002; Orlikowski & Robey 1991).

From the theoretical accumulated expansions, we argue that,

*H5: Perceived innovativeness is positively associated with the extent of ICTs use by the SAAO*

### **2.2.6 Perceived usefulness and extent of ICTs use**

Perceived usefulness towards ICTs usage can occur when a person believes that utilizing a certain technology will assist him to increase his or her job performance. People will prefer to utilize an application if it will aid them to intensify their task performance (Davis, 1989). For organizational members ICTs can be considered as useful when it helps the members of an organization in performing their daily and administration tasks such as writing letters, doing budgeting, power point presentation, reading newspaper, diffusion of innovation and so on.

Meso *et al.* (2005) have emphasized that perceived usefulness and perceived ease of use have greater reliability of the technology use and easier access to ICTs are among the important catalyst for better confidence thus create a better usage of ICTs. When community perceived that ICTs are useful, it will create a sustainable usage of ICTs. ICTs can be perceived useful if it involves low cost, has the ability to reach wider market and able to gather large information within a short time (Laudon and Laudon, 2000; Ongori, 2009).

Furthermore, the available literatures related to ICT usage provide evidence on the influence of perceived usefulness on intention to use ICT (Argawal and Prasad, 1999; Hu *et al.*, 2003; and Venkatesh and Morris, 2000). Besides, there are also extensive research that proved whether or not perceived usefulness has influence on ICT usage (Venkatesh and Davis, 1996).

Davis *et al.* (1989) defined perceived usefulness as ‘the prospective user’s subjective probability that is using a specific application system will increase his or her job performance within an organizational context. Subramanian (1994) reaffirmed two belief measurements, perceived usefulness and perceived ease of use, using a new data set for two different technologies, and found perceived usefulness, and not perceived ease of use, had a direct effect on usage behavior employing Structural Equation Modelling (SEM).

The concept of perceived usefulness of ICTs refers to recognizing the value of digital technology for example solving a problem or doing a task which was originated from the TPB and TAM. Davis and colleagues introduced the TAM to “explain the intentions of using a technological innovation” (Šumak *et al.*, 2011). TAM can therefore be used to “predict the likelihood of a new technology being adopted” (Turner *et al.*, 2010). Perceived usefulness of ICT concerns users’ beliefs that the use of ICT is beneficial and that ICT can be helpful for achieving goals (Davis *et al.*, 1989; Cho *et al.*, 2009). Recent research (Cheung & Vogel, 2013; Liaw & Huang, 2012) indicates the both the prior usage of ICTs and the intention to use ICTs are correlated with perceived usefulness of ICT. In the present study, we therefore consider perceived usefulness to be variable that is related to users’ use of ICT.

Moreover, perceived usefulness focuses on the benefits of ICTs; corresponding assessments of the construct are therefore formulated positively, such that higher levels of perceived usefulness indicate positive perceptions of ICT. Another key issue related to positive outcomes of ICT is the students’ self-efficacy about their own capabilities (Chai *et al.*, 2016; Rohatgi, Scherer, & Hatlevik, 2016).

Research has shown that the extrinsic motivation factor (usefulness) was found to have a positive direct effect on the behavioral intention to use computer technologies (Igbaria, 1993). From previous evidences, perceived usefulness emerged as the major determinant of ICTs acceptance and use (Adams *et al.*, 1992; Gefen & Straub, 1997; Liaw, 2002; Szajna, 1994, 1996; Taylor & Todd, 1995; Venkatesh & Davis, 1996).

*H<sub>6</sub>: Perceived usefulness is positively associated with the extent of ICTs use by the SAAO*

### **2.2.7 Perceived usefulness and job performance**

Davis (1989) referred perceived usefulness as the ‘*degree to which a person believes that using a particular system could enhance his or her job performance.*’ Perceived usefulness has a significant correlation with usage behaviour (Compeau and Higgins, 1995). Studies support when a system high in perceived usefulness users possess positive beliefs regarding their performance using that system. In a study of ICTs perceived usefulness for disaster readiness, researchers found that the higher perceived ICT usefulness in individuals’ behavior, the more the positive user-performance relationship with disaster preparedness (Dorasamy *et al.*, 2011).

According to Emami *et al.* (2018), staff performance is a point to which the work associated activities anticipated of an employee and how perfect those responsibilities were expected to be accomplished. Therefore, this study describes staff performance as a degree to which, if an employee uses a computer, it will increase his effectiveness and diligent performance.

Abdullahi *et al.* (2018) also support the view that if ICTs can be used properly, it will increase the general performance of staffs in an organization in terms of productivity and value. The main conclusion of his study is that both the perceived usefulness and intention to use the ICTs facilities in improving staff performance, contribute positively, to a behavioral intention to use the technology. Thus, the hypothesis

*H7: Perceived usefulness of ICT use is positively associated with SAAs' job performance*

### **2.2.8 Extent of ICT use and job performance**

There are number of studies that discuss adoption of Information Technology (IT) in organizations in developed and developing countries (Lucchetti and Sterlacchini, 2004; Love *et al.*, 2004; Beheshti, 2004; Jeon *et al.*, 2006; Morikawa, 2004). Beheshti (2004) in his study on the impact of ICTs on organizations in United States of America discovered that information technology can be used to create competitive opportunities for the organization. In similar vein Ritchie and Brindley (2000) studied the significance of ICTs in the growth of organizations in Australia. They concluded that adoption of ICTs increases the performance of the organization. Shiels *et al.* (2003) found that characteristics of the firm and industry sector are contributing factors to the adoption and exploitation of ICTs by micro level organizations. Kapurubandara *et al.* (2006) have categorized internal and external barriers that impede adoption of ICT by organizations in a developing country. The internal barriers include owner or manager characteristics, firm characteristics, cost and return on investment, and external barriers include, infrastructure, social, cultural, political, legal and regulatory. Lal (2007) investigated the adoption of ICTs in organizations in Nigeria and found that one of the major factors inhibiting ICTs diffusion and intensive utilization is poor physical infrastructure. In developing countries some of the ICTs challenges include legal and regulatory issues, weak ICT strategies, lack of research and development, excessive reliance on foreign technology and ongoing weaknesses in ICTs implementation (Dutta

*et al.*, 2003). Large amounts of research have examined that management play a critical role in an organization innovation adoption (Cerpa and Verner, 1998; Earl, 1993). Mabert *et al.* (2006) found that senior executives were very involved throughout the Enterprise Resource Planning (ERP) implementation, from the outset to completion, and also established clear priority.

The characterization of the 21st Century as the information age has brought with it an unquestionable number of challenges for businesses. The challenges range from ethical consideration to technological advances to methods of communication or communicating a message to a global community forcing companies to evaluate business strategies and focus. Each of these concepts is a component of what becomes overall organization performance as well as productivity. Allen (2008) stated that productivity is the relationship between the amount of input needed to produce a given amount of output and the output itself understanding what defines specific inputs and outputs will differ from organization to organization. Kempilla (2003) stated, that the ICTs use can influence productivity. Amadi (2005) opined in contrast, understanding what behaviors and ICTs create negative productivity was also important. The following summarizes the opinions and findings of research participants, which serves as the starting point for further discussion of these concepts.

According to Wong *et al.* (2011), interpersonal skills, personal development, teams, leadership, time management, focus, rules and solutions were either positive or negative workplace affecting productivity. The majority of executives cited attitude as the most positive workplace affecting productivity and un-accountability and carelessness as the most negative IT original values affecting productivity previous studies agreed there are positive and negative connotations associated with an employee's workplace performance.

Many firms have experienced recently a reorganization of their workplace. New Organizational Practices (NOP) have been adopted such as job rotation, delayering, self-directed work-team, just-in-time and total quality time management system (Osterman, 2000; Cappelli and Neumark and Cappelli, 1999; Ashkenazy *et al.*, 2001; Bloom and Van Reenen, 2007). These practices are based on workers' involvement with the organization. Reenen (2011) provides empirical evidence that changing management practices as NOP improve productivity. Moreover, other papers have shown that performance associated with ICTs use depends strongly on the adoption of

new organizational practices (Greenan and Mairesse, 1996; Criscuolo and Garicano, 2010).

An important literature has studied the consequences of these organizational changes on firms' performance and skill requirements. Shaw *et al.* (1997) on a small sample of steel finishing lines, Lynch and Black (2002) on a larger panel of US firms, Caroli and Reenen (2001) on French and British data, Bertsek and Kaiser (2001) on German business-related services firms, Greenan and Mairesse (1996) on French firms, Arvanitis and Loukis (2009) on Swiss and Greek firms, using either industry or firm-level data, display a positive impact of new work practices upon firms' productivity and workers performance especially when they are combined with information and communication technologies. Most of this literature assumes productivity as the main measurement of workers' and firms' performance and assess the question at the industry or firm level. But, to our knowledge, no applied empirical research has tried to examine whether the complementarity is also valid with individual performance at agricultural extension services.

Kennedy (2004) stated that, influence of workers job performance will reshape out society and will continue to be a dynamic force in future generations. It is important that social workers understand the role that technology plays in shaping the lives of clients and the services that are delivered. These rapidly developing technologies, and the individual that utilize them, are producing virtual networks of greater size and value. Today's internet sites produce vast social networks that provide opportunities for professionals and employers to advertise and communication to effectively use social networks, whether need to understand the capabilities of these networks, and how they can be effectively understood, managed and utilized within a digital environment.

Technology innovations are encouraging a trend towards the digitization of the world is information and knowledge, essentially creating stores of the accumulated human experience and increase individual performance. Coyle (2009) asserted that, ICTs have become integrated into the modern global society, serving a whole range of functions and purposes with such growth are extensive arguments that internet access is a human right because it is necessary to fully participate in today's ICTs reform as the use of ICTs continues to grow, it is important to realize the importance of convergence and low convergence shapes the transmission of information and services delivery. This

concept refers to the coming together of information technologies make possible to communicate in the shortest possible time.

Schonfield (2008) stated that the internet and other telecommunication networks have an enormous impact on defining the future of human interaction, and to date, these changes have largely been positive across social contexts. Moreover, Bargh and McKenna (2004), opined that, the field of work needs to understand how these changes are influencing and will continue to influence all aspect of social life. As it is related to work, it is critically important that such a research agenda builds an understanding of both the positive and negative impacts of ICTs and human interaction.

Landers and Goldberg (2014) stated in his study that ICTs have replaced the traditional equipment used by office managers which are now considered obsolete and office professionals' task are now modified and well documented. Office activities and functions are today being undertaken by electronic and computer-based technologies leading to office automation and a paperless office. Goldberg, in his remark, stated that the emerging growth of information communication technology and drastic change in office operations is posting serious changes to office managers and thus stimulating the performance of the workers.

Due to the multidimensional effects of ICTs, the correlation between the usage and user performance in some research shows mixed results at best. On the one hand, a part of the research concludes that there is no evidence for a key role for ICTs educational organization and that the students may use ICTs to increase their leisure time and consequently have less time to study (Sendag & Odabas, 2009). On the other hand, many other researchers seem to be evolving toward a consensus that an appropriate use of this technological material in learning process can have significant positive impact on users' achievement (Carle & Miller, 2009; Enriquez, 2010; Sari, 2014; Serradell-Lopez & Castillo-Merino, 2014).

With all these literature supports, finally we argue that,

*H<sub>8</sub>: ICTs use has the positive relationship with the job performance of the SAAO*

### **2.3 Control Variable**

Besides the variables (Figure 2.2) that had been considered for this study, there might have other variables potentially influence SAAOs' job performance such as age, gender, education and job experience. These variables might have some impact to the variables used in the model yet that had been out of the scope of this research. Therefore, these variables were considered as the control variables rather predictor variables for the study.

## **CHAPTER III**

### **METHODOLOGY**

Methodology and techniques utilized in this study are discussed in this chapter. It is arranged into three sections. The primary section outlines the research design. The second section depicts the measurement of variables. Lastly, the third section depicts the strategies applied in data analysis.

#### **3.1 Research Design**

##### **3.1.1 Locale of the study**

Jashore district was purposively selected as the study area for three reasons. Firstly, it is the first district in Bangladesh recognized as the digital district of the country (Embassy of Bangladesh Washington D. C., 2012). Secondly, the researcher got the benefits in collection of data from upazilas under the district as the socio-economic and farming condition was well-known to him. Lastly, the author had a good access to the potential respondents and agriculture officers. However, as the potential respondents from the sadar upazila are somewhat less connected to the farming community, seven upazilas out of eight upazilas namely Abhaynagar, Bagherpara, Chaugachha, Jhikargachha, Keshabpur, Manirampur and Sharsha were selected as the locale of the study.

##### **3.1.2 Population and sampling frame**

This study is concerned with the job performance of SAAOs through the use of ICTs. Therefore, all the SAAOs from the selected seven upazilas were constituted the population of this study. The total number of SAAOs working under Jashore district was 239 constituted the population of the study. Using a sample size determination formula from *surveysystem.com* with 5% confidence interval, 159 respondents were determined as the sample of the study. Respondents were chosen using proportionate random sampling technique. In order to measure the job performance of the respected SAAO, data were collected from the immediate officer (either AEO or UAO) of the respected upazila. All the upazila agriculture offices were informed before about the study and data collection was carried on based on their availability during the period of 31 July, 2019 to 22 August, 2019.



**Table 3.3.1 Population and sample of the study**

<b>Upazilas</b>	<b>Population</b>	<b>Sample size</b>	<b>Pre-test sample</b>
Abhaynagar	22	14	0
Bagherpara	31	21	0
Chaugachha	33	21	0
Jhikargachha	35	23	1
Keshabpur	30	21	1
Manirampur	56	41	3
Sharsha	32	18	0
<b>Total</b>	<b>239</b>	<b>159</b>	<b>5</b>

### **3.1.3 Instrument for data collection**

Since the reasons for the study were to test the hypotheses and measure the variances, a cross sectional survey was used for this study. Henceforth, data was gathered utilizing an organized meeting plan. The beforehand prepared interview schedule was pre-tested with five (5) respondents who were not included in the final data collection list and vital adjustments like customization of items under constructs, editing up the questionnaire were done. In most instances, closed form questions were used. Approved interview schedule of each construct with their sources were placed in English version of the interview schedule as attached in the Appendix-A and Appendix- B.

### **3.1.4 Variables of the study**

Four variables were used for this study:

- i. Dependent variable:** It is a variable that is the outcome or result or impact of different factors. This variable is frequently known as a criterion or reliant variable. The estimation of the reliant variable relies upon the estimation of alternate factors, that is, autonomous factors. In this study, job performance of the SAAOs was considered as the dependent variable.
- ii. Independent variable:** These variables are regularly called as indicator variables or predictor variables. In this study, five independent variables were: job facility, social support, ICT self-efficacy, interpersonal communication, and perceived innovativeness.
- iii. Mediator variable:** It is a variable that explains the relationship or provides a causal link between other variables. This is often known as intervening variable

that accounts for the relation between the predictor and the criterion variables. Here, perceived usefulness and extent of ICTs use by SAAOs were used as mediator variable.

- iv. **Control variable:** It is a variable that the researcher does not want to test in a study and therefore controls its effect on the other variables to be studied. Here, age, education, gender and job experience were four considered as the control variables.

### 3.2 Measurement of Variables

#### 3.2.1 Measurement of independent variables

##### 3.2.1.1 Job facility

Job facility refers to perceived physical facilities in the job sector. For this study, modified job facility scales were adopted from Grover *et al.* (1996). The respondents' responses were captured by using a 5-point rating scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

<b>Items</b>	<b>Score Assigned</b>
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

##### 3.2.1.2 Social support

Social support refers to a combination of the items developed for support and trust in organization. For this study, modified social support scales were adopted from Barrera *et al.* (2002). The respondents' responses were captured by using a 5-point rating scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

<b>Items</b>	<b>Score Assigned</b>
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

### 3.2.1.3 ICT Self-efficacy

The modified version of ICT self-efficacy scales (Compeau & Higgins, 1995) were used for this instance. The respondents' responses were captured by using a 5-point rating scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

<b>Items</b>	<b>Score Assigned</b>
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

### 3.2.1.4 Inter-personal communication

Inter-personal communication refers to the extent of communication and that exists between organizational members. For this study, modified inter-personal communication scales were adopted from Hajli (2014). The respondents' responses were captured by using a 5-point likert scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

<b>Items</b>	<b>Score Assigned</b>
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

### 3.2.1.5 Perceived innovativeness

Perceived innovativeness refers to confidence or optimism regarding adoption of new ideas or technologies. For this study, modified perceived innovativeness were adopted from McKnight *et al.* (2002). The respondents' responses were captured by using a 5-point rating scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

<b>Items</b>	<b>Score Assigned</b>
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

### 3.2.2 Mediator variables

#### 3.2.2.1 Perceived usefulness

Perceived usefulness refers to the degree to which a person believes that using a particular system would enhance his or her job performance. For this study, perceived usefulness scales were adopted from Hajli (2014). The respondents' responses were captured by using a 5-point likert scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

Items	Score Assigned
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

#### 3.2.2.2 Extent of ICT use

Extent of ICT use refers to the frequency of using ICT devices for accomplishment of a task. Extent of ICT use scale adopted from the modification of scale of Szabo *et al.* (2017). The score ranges from '0-4' for each. The respondents' responses were captured as follows:

Items	Extent of ICT use	Score
Mobile phone (voice call, SMS, MMS, video)	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0
Internet	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0
Computer/Laptop/ Tab/ Other communication device	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0
Union information service center	Frequently (1-2 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/month)	2
	Rarely (1-3 times/month)	1
	Not at all (No use)	0

Agricultural informational service (AIS) mobile app, Krishikotha Mobile App etc.	Frequently (1-2 times/day)	4
	Often (1-3 times/week)	3
	Occasionally (5-6 times/month)	2
	Rarely (1-3 times/month)	1
	Not at all (No use)	0
Krishi Call Center 16123, Agriculture Information and Communication Center (AICC), Online reporting system etc.	Frequently (1-2 times/day)	4
	Often (1-3 times/week)	3
	Occasionally (5-6 times/month)	2
	Rarely (1-3 times/month)	1
	Not at all (No use)	0

### 3.2.3 Measurement of dependent variable

Job performance is a means to reach a goal or set of goals within a job, role, or organization, but not the actual consequences of the acts performed within a job. The respondents' responses were captured by using a five-point likert scale (1-5) ranging from 'Strongly disagree' to 'Strongly agree' as follows:

Items	Score Assigned
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

## 3.3 Data Analysis

### 3.3.1 Editing

To omit errors raw data were reviewed properly. A careful scrutiny was made by the researcher when completing an interview for better facilitation of coding and tabulation of all data.

### 3.3.2 Coding and tabulation

To make a detailed coding plan, the researcher consulted with his supervisor and co-supervisor. In numerical score the responses were entitized. Then the responses were transferred to a master sheet for facilitation of tabulation. All data were tabulated according to the objectives of the research.

### **3.3.3 Categorization of data**

Unlike the traditional practice of categorization of respondents based on their responses, this study adopted a unique approach. For demographic variables (age, education, gender, job experience), respondents were grouped based on their characteristics. However, for the rest of the constructs, a weighted mean for each construct was computed. Thereafter, respondents were grouped into three categories (unfavorable, neutral and favorable) and five categories (not at all use, rarely use, occasionally use, often use and frequently use) in case of extent of ICT use construct based on their response scores.

### **3.3.4 Method of data analysis**

There are two phases that required for the data analysis i.e. validation and result phase. The reliability and validity of measurement items are established in the validation phase. Four tests need to be carried out to test the reliability and validity of the measurement model, internal consistency (composite reliability), convergent validity (average variance extracted), and discriminant validity and indicator reliability (Hair, *et al.*, 2014). Internal consistency is the value of Cronbach's alpha which assumes that all the indicators have equal outer loading on the relative constructs. Outer loading for each indicator be above 0.7 is expected. Internal consistency can also be measured by observing the value (0.60-0.70) of composite reliability of a latent variable. Convergent validity shows whether the indicator can converge or share a high proportion of the variation of the constructs. The common measure of convergent validity which is the grand mean of the squared loadings of a constructs' indicators is Average Variance Extracted (AVE). A value greater than 0.50 is regarded as a satisfactory AVE score, which says that the construct explains more than half of the variance of its indicators.

The distinctiveness of one construct from others and this can be examined by the cross-loadings of the indicators shown by discriminant validity. If the outer loadings of one indicator on the respective construct are higher than all of its loadings on other constructs assure that the construct has no discriminant validity problem. On the other

hand, for indicator reliability, a bootstrapping<sup>1</sup> procedure needs to be performed. If it shows that the indicator's weight insignificant should be removed from the model.

To validate the measurement items and test the structural model, Partial Least Squares (PLS)-based Structural Equation Modeling (SEM) was used for this study (Hair *et al.*, 2014). Two factors were considered when selecting this modeling approach over traditional statistical tools like SPSS (Statistical Package for Social Sciences). First, PLS-SEM is regarded as a second-generation statistical tool and therefore highly accepted to behavioral scientists and academics. Second, SPSS is limited in its ability to measure only multi-level path model. As the theoretical model of this study consists of five independent variables, two mediator variables, one dependent variable and four control variables, the confounding effect of one variable on other variables cannot be captured by SPSS and hence, SmartPLS v.2 M3 software application was used to test the model of this study.

In this study, five (5%) percent level of significance was used to test the significance level of each hypothesis. If the computed value of ( $\beta$ ) was equal to or greater than the designated level of significance, then the hypothesis was supported and it was concluded that there was a significant contribution of the independent variables to the dependent variable. And if the computed value of ( $\beta$ ) is smaller than the designated level of significance than the hypotheses was not supported. Therefore, it assumes no significant contribution of the independent variables to the dependent variable. The results of the reliability and validity tests were discussed in the chapter four.

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<sup>1</sup> A test that relies on random sampling with replacement

## CHAPTER IV

### RESULTS AND DISCUSSION

This chapter presents the results of this study into three sections. In the first section, respondents' characteristics and descriptive statistics of this study are presented chronologically followed by independent variables i.e., the factors influencing job performance of the respondents in case of ICTs use. Second section offers respondents' distribution based on their observed scores under each dimension. Third, reliability and validity of the measurement items followed by results of the proposed structured model for this study are provided in the last section.

#### 4.1 Respondents' Characteristics

In this section the respondents' characteristics and descriptive statistics are presented in Table 4.1 and Table 4.2. All the variables were categorized on the basis of their possible scores except age which was categorized based on the classification provided by the Ministry of Youth and Sports, Government of the People's Republic of Bangladesh.

**Table 4.1 Distribution of respondents according to their characteristics (N=159)**

Characteristics	Frequency	Percent	Observed Range	Mean	Standard Deviation
<b>Age (in years)</b>					
Young (up to 35)	65	40.9	27-53	38.02	6.136
Middle (36-50)	92	57.9			
Old (>50)	2	1.3			
<b>Gender</b>					
Male	128	80.5			
Female	31	19.5			
<b>Education (in years)</b>					
Minimum (up to 13)	11	6.9	12-17	14.96	1.473
Moderate (14-16)	98	61.6			
High (>16)	50	31.4			
<b>Job experience (in years)</b>					
Less (up to 10)	56	35.2	2-31	14.80	7.038
Moderate (11-20)	68	42.8			
High (>20)	35	22.0			



Based on the classification provided by the Ministry of Youth and Sports-Government of the People’s Republic of Bangladesh, Table 4.1 reveals that 40.9 percent and 1.3 percent of the respondents were young and old aged while 57.9 percent were middle aged with mean and standard deviation of 38.02 and 6.136 respectively. Table 4.1 also reveals that majority of the respondents (80.5%) were male and less than one-fifth of the respondents’ (19.5%) were female. Highest proportions of the respondents (61.6%) were moderately educated and 6.9 percent and 31.4 percent had minimum and high education respectively. Mean and standard deviation in case of education was 14.96 and 1.473. Lastly, distribution of the respondents according to their job experience were found almost identical with their age distribution with a mean of 14.80 years. The highest proportions (42.8%) of the respondents had moderate job experience while 35.2 percent had short and almost half of the proportion of moderate job experience i.e., 22.0 percent had medium job experience.

#### **4.2 Salient Factors of SAAOs’ Job Performance**

Respondents’ distribution based on the observed scores (detail explained in Section 3.3.3) of the salient factors of job performance through ICTs is presented in this section chronologically. Frequency distribution of result is exhibited here with descriptive interpretation (Table 4.2 and Table 4.3).

**Table 4.2 Descriptive statistics of the factors influencing job performance**

<b>Constructs</b>	<b>Min</b>	<b>Max</b>	<b>Wt. Mean</b>	<b>Std. Deviation</b>
Job facility	3.80	5.00	4.448	0.298
ICT Self-efficacy	3.00	5.00	4.047	0.419
Perceived usefulness	3.83	5.00	4.457	0.261
Perceived innovativeness	2.60	4.80	3.951	0.433
Inter-personal communication	3.80	5.00	4.375	0.242
Social support	3.20	5.00	4.012	0.376
Extent of ICT use	2.33	4.00	3.262	0.333
Job performance	3.50	4.75	4.160	0.244

**Table 4.3 Distribution of the respondents according to the factors**

<b>Constructs</b>	<b>Categories</b>	<b>Frequency</b>	<b>Percent</b>
Job facility	Low	0	0
	Medium	1	0.6
	High	158	99.4
ICT self-efficacy	Less	0	0
	Moderate	62	39
	High	97	61
Perceived usefulness	Low	0	0
	Medium	2	1.3
	High	157	98.7
Perceived innovativeness	Less	2	1.3
	Moderate	66	41.5
	High	91	57.2
Inter-personal communication	Low	0	0
	Medium	1	0.6
	High	158	99.4
Social support	Low	0	0
	Medium	71	44.7
	High	88	55.3
Extent of ICT use	Not at all	0	0
	Rarely	0	0
	Occasionally	2	1.3
	Often	99	62.3
	Frequently	58	36.5
Job performance	Low	0	0
	Medium	29	18.2
	High	130	81.8

#### **4.2.1 Job Facility**

Table 4.2 reveals that weighted mean that was computed for job facility was 4.448 when min and max score were 3.80 and 5.00 respectively. The standard deviation was 0.298. Table 4.3 reveals that highest proportion (99.4%) of the respondents had high job facility with a frequency of 158 out of 159, while few (0.6%) of them had medium job facility. None of the respondents reported low job facility which signifies that organization provides sufficient facilities in regards to ICTs to the respondents.

#### **4.2.2 ICT self-efficacy**

Table 4.2 reveals that weighted mean for ICT self-efficacy was 4.047 when min and max score were 3.00 and 5.00 respectively. The standard deviation was 0.419. Table 4.3 reveals that highest proportion (61%) of the respondents had high ICT self-efficacy

with a frequency of 97 out of 159, while more than one-third (39%) with a frequency of 62 had moderate ICT self-efficacy. None of the respondents were reported less ICT self-efficacy signifies that perceptions of one's ability to perform and use ICT related tasks and tools was positive and respondents had positive belief on their capabilities to organize and execute any task using ICTs even if they had not used it before.

#### **4.2.3 Perceived usefulness**

Table 4.2 reveals that weighted mean for perceived usefulness was 4.457 when min and max score were 3.83 and 5.00 respectively. The standard deviation was 0.261. Table 4.3 reveals that the highest proportion (98.7%) of the respondents had high perceived usefulness with a frequency of 157 out of 159, while only a few (1.3%) with a frequency of 2 had medium perceived usefulness. None of the respondents were reported low perceived usefulness signifies that respondents believe that using ICTs would enhance their job performance in agricultural extension service delivery.

#### **4.2.4 Perceived innovativeness**

Table 4.2 reveals that weighted mean for perceived innovativeness was 3.951 when min and max score were 2.60 and 4.80 respectively. The standard deviation was 0.433. Table 4.3 reveals that the highest proportion (57.2%) of the respondents had high perceived innovativeness with a frequency of 91 out of 159, while another proportion (41.5%) with a frequency of 66 had moderate perceived innovativeness. Very small proportion (1.3%) of the respondents with frequency of 2 were reported less perceived innovativeness. The result signifies that respondents were highly confident and optimistic regards to adoption of new ICTs.

#### **4.2.5 Inter-personal communication**

Table 4.2 reveals that weighted mean for inter-personal communication was 4.375 when min and max score were 3.80 and 5.00 respectively and the standard deviation was 0.242. Table 4.3 reveals that an overwhelming majority (99.4%) of the respondents had high inter-personal communication with a frequency of 158 out of 159, while very small proportion (0.6%) with a frequency of 1 had medium inter-personal communication. None of the respondents were reported low inter-personal communication signifies that there are good amount of communication exists between all of the organizational members using ICT tools and members felt comfortable to talk and share information and activities with coworkers.

#### **4.2.6 Social support**

Table 4.2 reveals that weighted mean for social support was 4.012 when min and max score were 3.20 and 5.00 respectively and the standard deviation was 0.376. Table 4.3 reveals that the more than half (55.3%) of the respondents had high social support with a frequency of 88 out of 159, while remain proportion after high social support (44.7%) with a frequency of 71 had medium social support. None of the respondents were reported low social support signifies that members maintained close social relationship using ICTs such as social media, internet and did extend professional network and had a good environment of support and trust existed in organization.

#### **4.2.7 Extent of ICT use**

Table 4.2 reveals that weighted mean for extent of ICT use was 3.262 when min and max score were 2.33 and 4.00 respectively. The standard deviation was 0.333. Table 4.3 reveals that highest proportion (62.3%) of the respondents had used ICTs often with a frequency of 99 out of 159, while more than one-third proportion (36.5%) with a frequency of 58 had frequently used ICTs. Very small proportion (1.3%) with a frequency of 2 occasionally used ICTs. None of the respondents were reported not at all or rarely use. The result signifies that respondents used ICT tools such as mobile phone, internet, computer and different agricultural informational services efficiently and on a regular basis and by using ICTs respondents performed better in agricultural service delivery.

#### **4.2.8 Job Performance**

Table 4.2 reveals that weighted mean for job performance was 4.160 when min and max score were 3.50 and 4.75 respectively and the standard deviation was 0.244. Table 4.3 reveals that an overwhelming proportion (81.8%) of the respondents had high job performance with a frequency of 130 out of 159, while nearly one-fifth of total proportion (18.2%) with a frequency of 29 had medium job performance. None of the respondents were reported low job performance which signifies that SAAOs took work seriously and did their duties effectively by adjusting themselves in case of changing circumstances and their performance was up to the mark.

### **4.3 Reliability and Validity of the Measurement Model**

PLS-SEM based analysis requires test of two models, measurement and structural models. Measurement model tests and reports reliability and validity of the

measurement items while structural model shows the path-coefficients of the hypothesized relationships. To test the measurement model, first indicator reliability was assessed by observing the outer loadings of the measurement items. Convergent validity of the constructs is assessed by the value of Average Variance Extracted (AVE) and the minimum requirements of AVE is 0.50. Table 4.4 reveals that all the constructs had high levels of AVE ( $>0.50$ ). Therefore, it can be concluded that the convergent validity of all the constructs were satisfactory indicates that the constructs explained all the variance among the indicators. Also, the consistency reliability (i.e., composite reliability) demonstrates that all the constructs had high levels of internal consistency ( $>0.70$ ).

In measurement model (Table 4.4) two constructs namely extent of ICT use and job performance was not measured because extent of ICT use was measured as a 'composite variable' (continuance scale) and job performance as a formative scale. Therefore, these two constructs were not measured in validation of measurement model.

Two steps were used to test the discriminant validity of the constructs. First, the cross-loadings of the indicators and second the Fornell-Larcker criterion (Fornell & Larcker, 1981). The cross-loadings of the constructs (Appendix-C) showed that the loadings of all the indicators on their respective constructs were higher than all of their cross loadings with other constructs. According to Fornell-Larcker criterion, if the square root of the AVE of each construct is higher than the construct's higher correlation with other constructs, it demonstrates discriminant validity. Table 4.4 indicates that the square roots (diagonal element in Table 4.4) of all the constructs were higher than their correlations with other constructs in the model. Therefore, it can be summarized that the cross-loadings and the Fornell-Lacker test provided support that the model had satisfactory discriminant validity. In addition to that, a Variance Inflation Factors (VIFs) test revealed that multi collinearity between the constructs was not a concern for this thesis.

**Table 4.4 Measurement model validation and bivariate correlations**

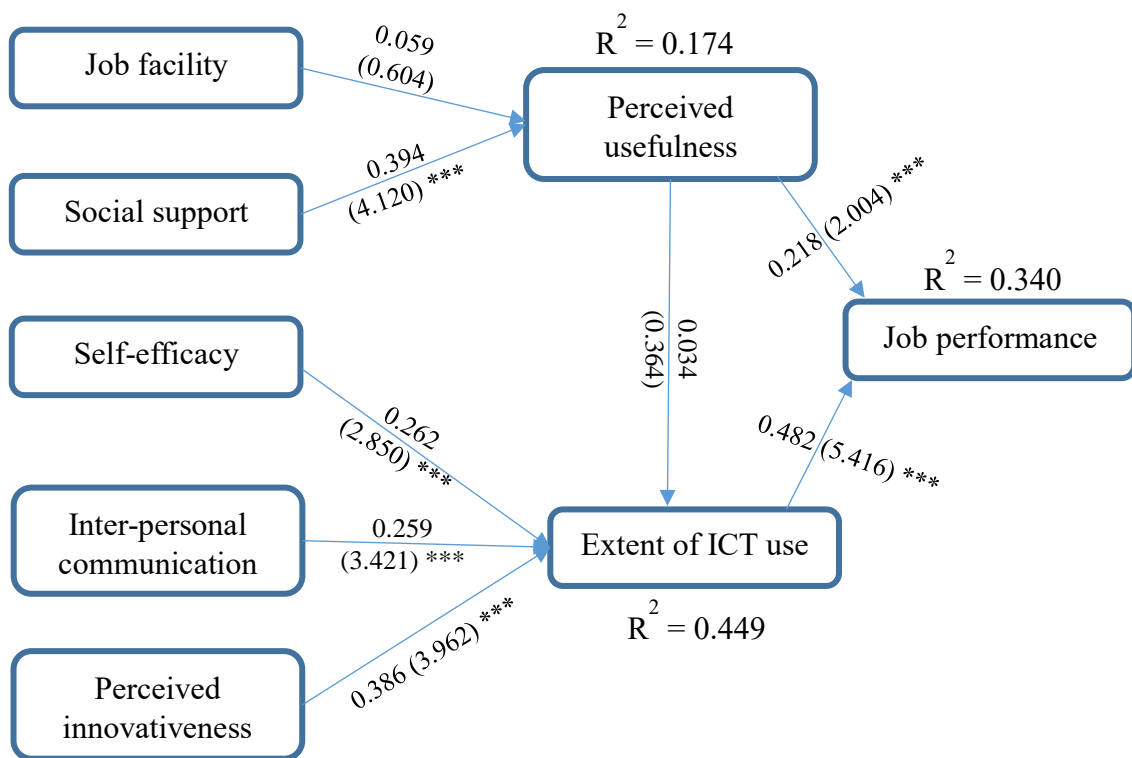
	<b>AVE</b>	<b>CR</b>	<b>IPC</b>	<b>INN</b>	<b>JobF</b>	<b>PoU</b>	<b>SE</b>	<b>SocialS</b>
<b>IPC</b>	0.564	0.720	<b>0.751</b>					
<b>INN</b>	0.609	0.823	0.140	<b>0.78</b>				
<b>JobF</b>	0.592	0.742	0.317	0.222	<b>0.77</b>			
<b>PoU</b>	0.626	0.770	0.142	0.389	0.193	<b>0.791</b>		
<b>SE</b>	0.825	0.904	0.218	0.525	0.218	0.283	<b>0.908</b>	
<b>SocialS</b>	0.540	0.779	0.247	0.475	0.335	0.412	0.555	<b>0.735</b>

Constructs: IPC (Inter-personal communication), INN (Perceived Innovativeness), JobF (Job Facility), PoU (Perceived Usefulness), SE (Self-efficacy), SocialS (Social Support)

- AVE = Average Variance Extracted
- CR = Consistency Reliability (Composite Reliability)

#### **4.4 Results of the Structural Model**

The theoretical model and hypothesized relationships were tested by using Smart-PLS v2.0 M3. The explanatory power of the model was assessed by the  $R^2$  of the dependent variable. Hypotheses were assessed by calculating the t-statistics for the standardized path co-efficient at the 5% level of significance. The model (Figure 4.1) predicts that job performance (i.e., dependent variable) of SAAOs in extension services was determined by their perceived usefulness and extent of ICT use (i.e., mediator variable). Perceived usefulness further contingent upon two factors, job facility and social support. Moreover, extent of ICT use has three antecedents i.e., self-efficacy, inter-personal communication and perceived innovativeness and there is a mediated influence of perceived usefulness on extent of ICT use revealed from the model proposed for this study.



**Figure 4.1 Results of the study model showing path co-efficient and variance**

Perceived usefulness and extent of ICT use were established as the two predictors of job performance of SAAOs extension related services and they had jointly explained 34% of the variance of job performance (Figure 4.1), while extent of ICT use was found to be the stronger predictor of job performance ( $\beta = 0.482$ ;  $p < 0.00$ ) compare to perceived usefulness ( $\beta = 0.218$ ;  $p < 0.00$ ) (Table 4.5). Thus, it proves that perceived usefulness and extent of ICT use were the key determinants of job performance of SAAOs' in agricultural extension service.

One of the two mediator variables i.e., perceived usefulness had two antecedent factors, job facility and social support, in the proposed model (Figure 4.1). Model explained 17.4% of the variance of perceived usefulness, while only social support was statistically significant ( $\beta = 0.394$ ;  $p < 0.00$ ) (Table 4.5) and job facility was insignificant with the perceived usefulness. Thus, it proves that social support in case of ICTs is a key determinant of individuals believe about a particular system i.e., perceived usefulness.

There were three factors i.e., self-efficacy, inter-personal communication and perceived innovativeness jointly explained 44.9% of the variance of extent of ICT use (Figure 4.1), while perceived innovativeness was found to be the stronger predictor ( $\beta=0.386$ ;  $p<0.00$ ) compared to self-efficacy ( $\beta= 0.262$ ;  $p<0.00$ ) and interpersonal communication ( $\beta= 0.259$ ;  $p<0.00$ ) (Table 4.5). Thus, it proves that self-efficacy, inter-personal communication and perceived innovativeness are the key determinants of extent of ICT use by the SAAOs in agricultural extension service. To the contrary of the expectation, perceived usefulness was found to be statistically insignificant with extent of ICT use for the target respondents. Perceived usefulness was a stronger predictor of technology use however over time, the relative significance of perceived usefulness maybe weaken at the post-adoption stage as users become habituated with the technology use. Further investigation is hence to be important to find the support of this assumption.

**Table 4.5 Results of the structural model path co-efficient with sig. levels**

<b>Relationships</b>	<b>Path co-efficient</b>	<b>t values</b>	<b>Sig. levels</b>	<b>P values</b>
Job facility→ usefulness	0.059	0.604	NS	0.57
Social support→ usefulness	0.394	4.120	***	0.00
Self-efficacy→ ICT use	0.262	2.850	***	0.00
Inter-personal comm→ ICT use	0.259	3.421	***	0.00
Perceived innovativeness→ ICT use	0.386	3.962	***	0.00
Perceived usefulness→ performance	0.218	2.004	***	0.00
Perceived usefulness→use	0.034	0.364	NS	0.73
Extent of ICT use→performance	0.482	5.416	***	0.00
NS = Not significant * $p<0.05$ ** $p<0.01$ *** $p<0.001$				



**Table 4.6 Summary of the proposed hypotheses**

No.	Hypothesis	Supported
H <sub>1</sub>	SAAOs' perceived job facilities is positively associated with their perceived usefulness of using ICTs	No
H <sub>2</sub>	Social support is positively associated with respondents' perceived usefulness of using ICTs for their work	Yes
H <sub>3</sub>	ICT self-efficacy is positively associated with the extent of ICTs use by the SAAOs	Yes
H <sub>4</sub>	Inter-personal communication is positively associated with the extent of ICTs use by the SAAO	Yes
H <sub>5</sub>	Perceived innovativeness is positively associated with the extent of ICTs use by the SAAO	Yes
H <sub>6</sub>	Perceived usefulness is positively associated with the extent of ICTs use by the SAAO	No
H <sub>7</sub>	Perceived usefulness of ICT use is positively associated with SAAOs' job performance	Yes
H <sub>8</sub>	ICTs use has the positive relationship with the job performance of the SAAO	Yes

#### 4.4.1 Discussion of the research findings

A total of eight hypotheses were proposed in this study, of which six hypotheses were supported. This section provides the discussion of the key findings as follows:

##### 4.4.1.1 Contribution of the extent of ICT use to the job performance

Extent of ICT use was found to be highest predictor ( $\beta = 0.482$ ;  $p < 0.00$ ) of SAAOs' job performance (Table 4.5) which constitute 34% of the variance jointly with perceived usefulness (Figure 4.1). The relationship between extent of ICT use and job performance was also supported by respondents' responses while data in descriptive analysis reported that an overwhelming majority (81.8%) of the respondents use ICTs highly compared to less than one-fifth (18.2%) of the respondents moderately use ICTs (Table 4.3). This result is also backed off by Karanja (2014) who reported that the majority of the respondent (98%) confessed the effectiveness of ICTs to improve work efficiency while only 2% were found not to be confident enough in ICTs' roles in improving work efficiency. The findings present a remarkable improvement in relation to the finding of a study by Kiplangat & Ochola (2005) showed only 38.2% of extension personnel acknowledged that modern ICTs improved work efficiency against 61.8% of the respondents who were undecided or thought otherwise. Lastly to mention, Agha *et al.* (2018) made a research on extension personnel and found that vast majority of the

extension personnel use mobile phone for getting farmers participation (85.6%) followed by advisory services (83.3%), awareness campaign (75.6%) and for the contingent service (45.6%) and helps in disseminating extension service thus increases performance. These works also supports our finding and indicates that ICT use influences job performance prolifically.

#### **4.4.1.2 Contribution of the perceived usefulness to job performance**

Perceived ease of use of ICTs was found to be strongly significant contributor of the extent of ICT use by extension professionals ( $\beta=0.218$ ,  $p<0.00$ ) (Table 4.5). The structural linkage between perceived usefulness and job performance by using a system has been tested in many instances. When people find a system very useful that enable them to use that system more. Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance. In this finding from distribution of the respondents, it was found that an overwhelming proportion (98.7%) finds high perceived usefulness and a few (1.3%) acknowledged it medium but none confessed low perceived usefulness (Table 4.3). This finding is also supported by previous research by Gupta *et al.* (2010) found that most of the employees in an organization found ICTs useful and had been using the computers (95%) and the Internet for more than 1 year (90%) performed more than those (3%) of the employees those were not using internet or ICT tools. There is an explanation and that is DAE has already made different initiatives to promote ICTs in extension service provided with ICT tools like tablet, monthly internet subsidy, e-Services etc. and SAAOs embrace ICTs as their own initiatives. Their interests translate to them viewing ICTs as easy to learn and useful for the service. It is therefore concluded that as extension professionals find it easy to use that positively impact their use of ICTs for building their capacity.

#### **4.4.1.3 Contribution of the social support to the perceived usefulness**

Among the determinants, social support was found to be the strongest predictor of the perceived usefulness ( $\beta=0.394$ ,  $p<0.00$ ) and explained 17.4% of the variance of perceived usefulness (Table 4.5). From the distribution of the respondents it was found that more than half of the respondents (55.3%) were high while less than a half proportion (44.7%) were medium in case of social support (Table 4.3). Social support is the combination of the items developed for support and trust under an organization.

The previous findings also support this study. From the findings of Bai *et al.* (2015), technical support is known to be enhanced by friendship and trust i.e., social support according to the definition, among social media users via frequent sharing of supportive information in an organization. Social support is one of the important preconditions in case of perceived usefulness as individuals get inspired of technology when they find it useful. Innovation can reach the boundaries of human mind with proper transfer of technologies thus a technology seems to be useful and person get to believe that tool will enhance their performance. There is a strong relationship between personnel working under DAE and greater extent of communication between individuals happened to be found in this study also. Thus, strong social sharing and frequent communication has huge boosts to the usefulness of ICTs. This indicates that without social support which extends ICTs usefulness to individual, the performance would be greatly compromised.

#### **4.4.1.4 Contribution of the ICT Self-efficacy to the extent of ICT use**

ICT self-efficacy was found to be the second highest construct of all the three which contributes the extent of ICT use by extension professionals ( $\beta=0.262$ ,  $p<0.00$ ) (Table 4.5). From distribution of respondent's responses, it was found that 61% of the total respondents had high self-efficacy responses with a frequency of 97 out of 159 while 39% of the total respondents had moderate self-efficacy (Table 4.3). The previous findings also support the results. Tondeur *et al.* (2011) found that self-efficacy had significant relationship with use of ICTs. Elsewhere, Meelissen and Drent (2008) mentioned that self-efficacy had a positive relationship with the respondents' ICTs use. Actually, self-efficacy indicates respondent's confidence in using various ICT tools. Result indicates that an individual with high level of confidence in operating different ICT tools enable them to use more ICT tools compared to a person with low level of confidence in using ICTs.

#### **4.4.1.5 Contribution of the inter-personal communication to the extent of ICT use**

Inter-personal communication was found to have the significant relation to the extent of ICT use ( $\beta = 0.259$ ;  $p<0.00$ ) (Table 4.5). Inter-personal communication indicates that the extent of communication that exists between organizational members. Members in an organization work as a body to achieve organizational goal. From the descriptive

analysis it was found that an overwhelming proportion of respondents (99.4%) acknowledged inter-personal communication high while only 0.6% had medium inter-personal communication (Table 4.3). These findings also supported by Gupta *et al.* (2010) that 70% of the employees of an organization use ICTs to interact with other employees within an organization. Oettl *et al.* (2018) found in their study that communication between members in an organization was highly significant in relation to the extent of ICT tool use and individuals used to try ICTs more in case of day-to-day job-related communication. Moreover, this supports our hypothesis (H<sub>4</sub>). One conceivable clarification of this relationship could be, with inter-personal communication among members in the organization, ICT tools are used as communicating media for faster and efficient transfer of information. Use of social media is increasing day by day and communication system are getting advanced simultaneously. So, oral or face-to-face communication is reduced in case of distance and after-office communication and ICT tools are taking that road.

#### **4.4.1.6 Contribution of the perceived innovativeness to the extent of ICT use**

Perceived innovativeness was found to be the highest contributor in relation to extent of ICT use ( $\beta = 0.386$ ;  $p < 0.00$ ) (Table 4.5). The structural linkage between perceived innovativeness and users' ICT use has been tested in many instances. Perceived innovativeness refers to the confidence or optimism regarding adoption of new ideas or technologies. An innovation is accepted and used more when perceived innovativeness is more. From distribution of the respondents, it was found that, more than half proportion (57.2%) of the respondents acknowledged high perceived innovativeness while 41.5% were moderate and very few had less (1.3%) perceived innovativeness (Table 4.3). The auxiliary linkage amongst perceived innovativeness and use of ICTs had been tried in numerous cases. Therefore, perceived usefulness was an essential property of a framework without which user may plentiful the framework to be utilized. Perceived innovativeness was highly significant in relation to extent of ICT use accepting hypothesis H<sub>5</sub>. A conceivable clarification of this relationship could be SAAOs' confidence or optimism when gets higher to a specific technology then use of that particular technology gets higher. It is therefore to conclude that favorable innovativeness finds a positive impact to their ICT use for sharing agricultural knowledge.

The study separately ran the analysis to determine the impact of control variables on SAAOs' job performance, if any. However, no significant influence was found and hence the result was not included in the model.

## CHAPTER V

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

The comprehensive aim of this study was to understand the influence of extent of ICT use by SAAOs' to their job performance in agricultural extension service. The study adopted a theoretical approach and based on one of the well accepted model of technology use, I-S-P model (Lewis *et al.*, 2003) incorporating with the essence of job performance evaluation, this study proposed a model which depicts SAAOs' job performance was positively influenced by their extent of ICT use which further contingent upon five independent and two mediator constructs. Data were collected using a cross-sectional survey methodology and analyzed by PLS-SEM using SmartPLS v2.0 M3. In this chapter, the summary of this study was presented.

#### 5.1 Summary of the Findings

Major findings of this study are summarized below:

##### 5.1.1 Selected factors influencing perceived usefulness

###### 5.1.1.1 Job facility

Highest proportion (99.4%) of the respondents had high job facility while less than 1 percent i.e., 0.6% had medium job facility. It was observed that none of the respondents found low job facility because facilities stated under this construct was sufficient and respondents found those facilities readily available to use in case of agricultural extension service. Thus, DAE provides sufficient facilities in workplace regards to ICTs to the respondents.

###### 5.1.1.2 Social support

More than a half (55.3%) had high social support while less than a half (44.7%) had medium social support. None of the respondents reported low social support because respondents maintained close social relationship using ICT tools e.g. social media, internet and had extended professional network. Thus, SAAOs under DAE got effective social support regards to adopt and use of an innovation in agricultural extension service.

## **5.1.2 Selected factors influencing extent of ICT use**

### **5.1.2.1 ICT Self-efficacy**

More than 60 percent (61%) of the respondents had high ICT self-efficacy while more than one-third (39%) had moderate self-efficacy. None reported less ICT self-efficacy was reported because perceptions of respondents had positive belief on their capabilities to organize and execute any task using ICTs. Respondents had favorable perceptions of his or her ability to perform and use ICTs i.e., ICT self-efficacy.

### **5.1.2.2 Inter-personal communication**

An overwhelming majority (99.4%) had high inter-personal communication while less than 1 percent (0.6%) had medium inter-personal communication. None of the respondents were reported low inter-personal communication because there are good amount of communications exists between members and they felt comfortable to talk and share information and activities with coworkers. Professionals under DAE had effective communications between members through modern ICT tools.

### **5.1.2.3 Perceived innovativeness**

Highest proportion (57.2%) had favorable perceived innovativeness while more than 40 percent (41.5%) had moderate perceived innovativeness. Also, more than 1 percent (1.3%) had less perceived innovativeness. The result signifies that respondents were highly confident in adoption of new ICT tools.

## **5.1.3 Selected moderators influencing job performance**

### **5.1.3.1 Perceived usefulness**

Highest proportion (98.7%) had high perceived usefulness while more than 1 percent (1.3%) had medium perceived usefulness. None of the responses had low perceived usefulness because respondents i.e., SAAOs had believed that using ICTs properly and effectively would increase performances in agricultural extension services.

### **5.1.3.2 Extent of ICT use**

A large proportion (62.3%) had used ICTs often while more than one-third (36.5%) had used ICTs frequently. A small proportion (1.3%) occasionally used ICTs. No responses recorded in case of rarely or not at all use of ICTs because ICT tools were used on a regular basis and respondents performed better in agricultural service delivery.

#### **5.1.4 Job performance**

An overwhelming proportion (81.8%) had high job performance while nearly one-fifth of total proportion (18.2%) had medium job performance. None responded less job performance. Therefore, SAAOs' job performance as marked by their supervisor officers i.e., AEOs or UAOs were praiseworthy in case of agricultural extension services.

#### **5.1.5 Results of the theoretical model**

There were eight hypotheses proposed in the model while six (6) out of eight were found to be statistically highly significant. A summary of the findings for the proposed hypotheses are posited as follows:

##### **5.1.5.1 Contribution of mediator variables to job performance**

Perceived usefulness and extent of ICT use were proposed as the two predictors to job performance of SAAOs and it was found that they had jointly constituted 34 percent of the variance ( $R^2=0.340$ ). Result revealed that the strongest contributor to the job performance was extent of ICT use ( $\beta = 0.482$ ;  $p<0.00$ ) and perceived usefulness was also found as a significant contributor ( $\beta = 0.218$ ;  $p<0.00$ ). These findings supported two hypotheses ( $H_7$  and  $H_8$ ). Extent of ICT use and perceived usefulness had positively contributed to job performance of SAAOs' in extension service delivery.

##### **5.1.5.2 Contribution of the exogenous factors to perceived usefulness and extent of ICT use**

Among two predictors, social support was found to be highly significant ( $\beta = 0.394$ ) while job facility was non-significant ( $\beta = 0.059$ ). Results of the model revealed that significant contributor constitute 14.7 percent of the variance ( $R^2 = 0.174$ ). Therefore, good relations, positive social network and members' technical support in an organization like DAE, helps SAAOs to believe that the use of ICTs will help them to perform better.

Perceived innovativeness was found to be the strongest contributor ( $\beta = 0.386$ ;  $p<0.00$ ) followed by ICT self-efficacy ( $\beta = 0.262$ ;  $p<0.00$ ) and inter-personal communication ( $\beta = 0.259$ ;  $p<0.00$ ). They had jointly constituted 44.9 percent of the variance of extent of ICT use ( $R^2 = 0.449$ ). From the descriptive statistics and path co-efficient values it can be concluded that perceived innovativeness, ICT self-efficacy and inter-personal



communication among members under DAE, acted as very influential factors in case of job performance mediated with extent of ICT use.

## **5.2 Conclusion**

Findings of the present study and the logical interpretation of other relevant facts prompted the researcher to draw the following conclusions:

- Social support was found to be significantly contributed to perceived usefulness of SAAOs. This fact leads to conclude that any arrangement made to increase the social support would ultimately increase the perceived usefulness.
- Both ICT self-efficacy and extent of ICT use have found to be positively contributed. Therefore, higher the ICT self-efficacy higher the extent of use of ICTs by SAAOs.
- Both inter-personal communication and extent of ICT use have found to be significant. So, it can be concluded that the higher the communication between personnel in the organization higher the extent of ICT use in agricultural extension services.
- Perceived innovativeness was found to be the strongest contributor to the extent of ICT use therefore it can be concluded that the higher the perceived innovativeness the higher is extent of ICT use.
- Perceived usefulness and job performance have found significant contributor. This fact leads to the conclusion that any arrangement made to increase perceived usefulness of the respondents would ultimately increase job performance of SAAOs.
- Extent of ICT use had found positive significance to the job performance of SAAOs therefore it can conclude that the higher the use of ICTs in extension delivery service the higher is the job performance.

## **5.3 Recommendations**

On the basis of the findings revealed from the study, the following recommendations are put forwarded that might guide the policy formulation:

### **5.3.1 Recommendations for the policy implications**

- Social support had a significant contribution on perceived usefulness in regards to ICTs. Therefore, it needs to ensure more interaction between coworkers using social media and should extend professional network using ICTs with

surrounding people through social networks. In addition to that, DAE could encourage front-level extension officials to increase use of various ICT devices for their work by providing incentives, mental support and appreciation.

- ICTs should be promoted as a platform for accessing and sharing agricultural information that can reach the rural level farmers and can afford to expand a system of connecting extension personnel e.g. SAAOs. Training facilities to use advanced technology for better agricultural production need to implement in farm level to guide local farmers as well as SAAOs.
- The Ministry of Agriculture (MoA) and other institutions like DAE who undertaking agricultural extension services should promote the use of new technology by managing up better training facilities for better innovativeness of SAAOs and increased perceived usefulness. Training should be interactive and a two-way communication is needed for the effective learning system.
- ICT self-efficacy had strong contribution to use ICTs in agriculture. Therefore, it was recommended that attempts should be taken by DAE to increase ICTs self-efficacy of the SAAOs through organizing basic and intermediate ICT trainings.

### **5.3.2 Recommendations for further studies**

- The study was conducted in Jashore district as the area is the first digital district in Bangladesh and was well known to the researcher. Among the eight upazilas based on the SAAOs work directly to the field level, seven upazilas were selected as the study area. Moreover, a cross-sectional survey methodology, as used in this study, is limited in generalizing the findings. Therefore, repeating this study at the other parts of the country and compare the results would be effective and helpful for policy formulation.
- Once selection of the variables, this study considered factors from I-S-P model (Lewis *et al.*, 2003), such as social support, job facility, perceived usefulness, inter-personal communication, perceived innovativeness, ICT self-efficacy, extent of ICT use while added enablers deemed important to the research context, such as satisfaction and continuance user intention. Age, gender, education and job experience were controlled in this study. Therefore, future

research might be undertaken to identify other determinants and their influence to technology use, particularly quality of agricultural service delivery.

- Theoretically, this study has already made at least two contributions. First, adding up I-S-P model. Second, the theoretical approach and statistical tools used in this study were so far unique in the discipline of Agricultural Extension. In fact, this study combined the notion of two disciplines, Agricultural Extension and Information Systems, in a single study.
- Unexpectedly, no significant relationships were found between job facility and perceived usefulness, perceived usefulness and extent of ICT use in the findings. So, further study is necessary to find out why these non-significant relations occurred.

## REFERENCES

- Abdullahi, A.D., Baharom, M.N., & Rahman, N.A. (2018). Perceived usefulness and intention to use technology for staff performance in tertiary institutions of Bauchi, Nigeria. *Asian journal of multidisciplinary studies*, 6(12).
- Adams, D. A., Nelson R. R. & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: a replication. *MIS Quarterly*, 16, 227-247.
- Agarwal, R. & Prasad, J. (1999). Are individual difference germane to the acceptance of new information technologies? *Decision Science*, 30(2), 361-391.
- Agarwal, R., Sambamurthy, V., & Stair, R. (2000). Research report: the evolving relationship between general and specific computer self-efficacy - an empirical assessment. *Information Systems Research*, 11. 418-430. DOI:10.1287/isre.11.4.418.11876.
- Agha, N., Ghanghas, B. S., & Chahal, P. K. (2018). Use of information and communication technologies by extension personnel to disseminate agricultural information. *Int. J. Curr. Microbiol. App. Sci*, 7(4): 1369-1376.
- Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, D. H., & George, J. F. (2007). IT road warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions. *MIS Quarterly*, 31(1), 1-17.
- Ajani, E. N. (2014). Promoting the use of information and communication technologies (ICTs) for agricultural transformation in Sub-Saharan Africa: Implications for policy. *Journal of Agricultural & Food Information*, 15, 42-53.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Alavi, M., Marakas, G.M., & Yoo, Y. (2002). A comparative study of distributed learning environments on learning outcomes. *Information Systems Research*, 13(4), 404-417.
- Alexander, D. L., Lynch, J. G. Jr., & Wang, Q. (2008). As time goes by: Do cold feet follow warm intentions for really new versus incrementally new products? *Journal of Marketing Research*, 45, 307-319.

- Allen, H. (2008). Using routinely collected data to augment the management of health and productivity loss. *Journal of Occupation Environment Medicine*, 50, 615–632.
- Amadi, V. L. (2005). An investigation into the role of private sector in Nigerian higher education: A case study of the University of Abuja. *International Journal of Research in Education*, 2(2), 113-122.
- Arias, J. T. G. (1998). A relationship marketing approach to guanxi. *European Journal of Marketing*, 32(2), 145-156.
- Arokoyo, T., Chikwendu, D., & Ogunbameru, K. (2002). *A study of the access of Rural Women to Public and Private Extension Service in Nigeria*. Report of a study commissioned and funded by CTA.
- Arvanitis, S., & Loukis, E. (2009). Information and communication technologies, human capital, workplace organization and labor productivity: A comparative study based on firm-level data for Greece and Switzerland. *Information Economics and Policy*, 21, 43-61. 10.1016/j.infoecopol.2008.09.002.
- Ashkenazy, Y., Hausdorff, J., Ivanov, P., & Stanley, H. (2001). A Stochastic Model of Human Gait Dynamics. *Physica A: Statistical Mechanics and its Applications*, 316, 662-670. 10.1016/S0378-4371(02)01453-X.
- Atzori, L., Iera, A., & Morabito, G. (2014), From "smart objects" to "social objects": The next evolutionary step of the internet of things. *Communications Magazine, IEEE*, 52(1), 97- 105.
- Backer, T. E., & Rogers, E. M. (1993). *Organizational aspects of health campaigns: What works?* Thousand Oaks, CA: Sage.
- Bai, Y., Yao, Z., & Dou, Y. F. (2015). Effect of social commerce factors on user purchase behavior: an empirical investigation from renren.com. *Int. J. Inform. Manage.*, 35, 538-550.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215. <https://doi.org/10.1037/0033-295x.84.2.191>

- Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology*, 25(5), 729–735. <https://doi.org/10.1037/0012-1649.25.5.729>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bargh, J., & McKenna, K. (2004). The Internet and Social Life. *Annual review of psychology*, 55, 573-900. 10.1146/annurev.psych.55.090902.141922.
- BASIS, (n. d.). About Bangladesh ICT Sector. Retrieved from <https://basis.org.bd/content/about-bangladesh-ict-sector-1>
- Baum, J. A. C., & Ingram, P. (1998). Survival-enhancing learning in the Manhattan hotel industry, 1898-1980. *Management Science*, 44 (7), 996-1016.
- BBS. (2019). 'Statistical Yearbook of Bangladesh. Bangladesh Bureau of Statistics', Statistics Division. Ministry of Planning, Government of the People's Republic Bangladesh.
- Beheshti, H. M. (2004). The impact of IT on SMEs in the United States. *Information Management & Computer Security*, 12(4), 318.
- Benor, D., Harrigon, J. Q., & Baxter, M., (1984). Agricultural extension: the training and visit system. Washington D.C. The World Bank.
- Bertschek, I., & Kaiser, U. (2001). Productivity effects of organizational change: microeconomic evidence, No 01-32, ZEW Discussion Papers. ZEW-Leibniz Centre for European Economic Research.
- Bloom, N., & Reenen, J. V. (2007). Measuring and explaining management practices across firms and countries. *The Quarterly Journal of Economics*, 122(4), 1351–1408.
- Boczkowski, P. J., & Orlikowski, W. J. (2004). Organizational discourse and new media: A practice perspective. In Grant, D., Hardy, C., Osrick, C., Phillips, N., & Putnam, L., (Eds.), *Handbook of organizational discourse* (pp. 359–377). London: Sage.
- Bolt, M.A., Killough, L.N. & Koh, H.C. (2001). Testing the interaction effects of task complexity in computer training using the social cognitive model. *Decision Science*, 32(1), 1-20.

- Bouchlaghem, D., & Shelbourn, M. (2012). Introduction. In D. Bouchlaghem (Ed.), *Collaborative working in construction* (pp. 1–5). Third Avenue, New York: Spon Press.
- Boynton, A. D., Zmud, R. W., & Jacobs, G. C. (1994). The influence of IT management practice on IT use in large organizations. *MIS Quarterly*, 18(3), 299-318.
- Bradlow, E. T., & Gavan, J. F. (2001). Subscale distance and item clustering effects in self-administered surveys: a new metric. *Journal of Marketing Research*, 38, 254-261.
- Bronner, F. & de Hoog, R. (2010). Consumer-generated versus marketer-generated websites in consumer decision making. *International Journal of Market Research*, 52(2), 231.
- Brown, J.S., & Duguid, P. (1998). Organizing knowledge. *California Management Review*, 40(3), 90–111.
- BTRC, (2020). Internet Subscribers in Bangladesh February 2020. Retrieved from <http://www.btrc.gov.bd/content/internet-subscribers-bangladesh-february-2020>
- Cameron, E. & Green, M. (2015). *Making sense of change management: A complete guide to the models, tools and techniques of organizational change*. Kogan Page Publishers.
- Campbell, J. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In M. Dunnette & L. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp. 686–707). Palo Alto, CA: Consulting Psychologists Press.
- Cao, X., Guo, X., Vogel, D. & Zhang, X. (2016). Exploring the influence of social media on employee work performance. *Internet Research*, 26(2), 529-545.
- Carle, A. C., Jaffee, D., & Miller, D. (2009). Engaging college science students and changing academic achievement with technology: A quasi-experimental preliminary investigation. *Computers and Education*, 52(2), 376–380
- Caroli, E. and Reenen, J. V. (2001). Skill-biased organizational change? Evidence from a panel of British and French establishments. *The Quarterly Journal of Economics*, 116(4), 1449-1492.

- Cassidy, S., & Eachus, P. (2002). *The development of the general academic self-efficacy (GASE) scale*. Paper presented at the British Psychological Society Annual Conference, Blackpool, UK.
- Cerpa, N., and Verner, J. N. (1998). Case study: the effect of is maturity on information systems a strategic planning. *Information & Management*, *34*(4), 199-208.
- Chai, Z., Fan, X., & Due, J. (2017). Gender and attitudes toward technology use: A meta-analysis. *Computers & Education*, *105*, 1-13. doi:10.1016/j.compedu.2016.11.00
- Chen, J., Xu, H., & Whinston, A.B. (2011a). Moderated online communities and quality of user-generated content. *Journal of Management Information Systems*, *28*(2), 237-268.
- Chen, Y., Fay, S., & Wang, Q. (2011b). The role of marketing in social media: how online consumer reviews evolve. *Journal of Interactive Marketing*, *25*(2), 85-94.
- Cheung, R., & Vogel, D. (2013). Predicting user acceptance of collaborative technologies: An extension of the technology acceptance model for e-learning. *Computers & Education*, *63*, 160-175. doi:10.1016/j.compedu.2012.12.003
- Chiu, C. M., Hsu, M. H., & Wang, E. T. G. (2006). Understanding knowledge sharing in virtual communities: an integration of social capital and social cognitive theories. *Decision Support Systems*, *42*(3), 1872-1888.
- Cho, V., Cheng, T. C. E., & Lai, W. M. J. (2009). The role of perceived user-interface design in continued usage intention of self-paced e-learning tools. *Computers & Education*, *53*(2), 216–227.
- Chow, W. S., & Chan, L. S. (2008). Social network, social trust and shared goals in organizational knowledge sharing. *Information & Management*, *45*(7), 458-465.
- Chris, F., Anindya, G., & Batía, W. (2008). Examining the relationship between reviews and sales: the role of reviewer identity disclosure in electronic markets. *Information Systems Research*, *19*(3), 291-313, 393-395.



- Chudoba, K. M., Wynn, E., Lu, M., & Watson-Manheim, M. B. (2005). How virtual are we? measuring virtuality and understanding its impact in a global organization. *Information systems journal*, 15(4), 279–306.
- Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 127–149). Washington, DC: APA.
- Coenen, M. and Kok, R. A. (2014). Workplace flexibility and new product development performance: The role of telework and flexible work schedules. *European management journal*, 32(4), 564–576.
- Cohen, S. (2004). Social relationships and health. *Am. Psychol.*, 59, 676-684.
- Cohen, S. and T. A. Wills. (1985). Stress, social support, and the buffering hypothesis. *Psychol. Bull.*, 98, 310-357.
- Compeau, D., Higgins, C. A., & Huff, S. (1999). Social cognitive theory and individual reaction to computing technology: a longitudinal study. *MIS Quarterly*, 23(2), 145-158.
- Compeau, D. R., & Christopher A. H. (1995). Computer self-efficacy: development of a measure and initial test. *MIS Quarterly*, 19, 189-211.
- Coulson, N. S. (2004). Receiving social support online: an analysis of a computer-mediated support group for individuals living with irritable bowel syndrome. *Cyber Psychol. Behav.*, 8, 580-584.
- Coyle, D. M. (2009). *Computers are your future*. 10th ed. Pearson; Upper Saddle River.
- Criscuolo, C., & Garicano, L. (2010). Offshoring and wage inequality: using occupational licensing as a shifter of offshoring costs. *American Economic Review*, 100, 439-43. 10.1257/aer.100.2.439.
- Crocker, J., & Canevello, A. (2008). Creating and undermining social support in communal relationships: the role of compassionate and self-image goals. *J. Pers. Soc. Psychol.*, 95, 555–575.
- Daft, R. L., & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organization design. In B. M., Straw & L. L.,

- Cummings (Eds.), *Research in organizational behavior* (pp. 191–223). Greenwich, CT: JAI Press.
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness, and structural design. *Management Science*, *32*, 554–571.
- Davis, F.D. (1989). Perceived usefulness, perceive ease of use and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319-340.
- Delone, W. H. (1988). Determinants of success for computer usage in small business. *MIS Quarterly*, *12*(1), 51-61.
- Demirci, A. E., & Ersoy, N. F. (2007). Technology readiness for innovative high-tech products: how consumers perceive and adopt new technologies. Retrieved on November 30th, 2014 from [http://isletme.anadolu.edu.tr/media/articles/demirci\\_ersoy01.pdf](http://isletme.anadolu.edu.tr/media/articles/demirci_ersoy01.pdf)
- Dennis, A. R., & Valacich, J. S. (1999). *Rethinking media richness: Toward a theory of media synchronicity*. Proceedings of the 32nd Hawaii International Conference on System Sciences, 1–10.
- Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, tasks, and communication processes: A theory of media synchronicity. *MIS Quarterly*, *32*(3), 575-600.
- DiMicco, J., Millen, D. R., Geyer, W., Dugan, C., Brownholtz, B., & Muller, M. (2008). Motivations for social networking at work. *Proceedings of the 2008 ACM conference on Computer supported cooperative work (CSCW 08)* (pp. 711-720), ACM, New York, USA.
- Do-Hyung, E, Jumin, L. & Ingoo, H. (2007). The effect of online consumer reviews on consumer purchasing intention: the moderating role of involvement. *International Journal of Electronic Commerce*, *11*(4), 125-148.
- Dorasamy, M., Raman, M., Muthaiyah, S., & Kaliannan, M. (2011). *Investigating perceived ICT usefulness for disaster readiness: A preliminary analysis*. 2011 7th International Conference on Information Technology in Asia. doi:10.1109/cita.2011.5999518
- Dutta, S., & Coury, M, E. (2003). *ICT Challenges for the Arab World*, Chapter 8.

- Earl, M. J. (1993). Experiences in strategic information systems planning. *MIS Quarterly*, 17, 1-24. doi:<https://doi.org/10.2307/249507>
- Elsbach, K. D. & Bechky, B. A. (2007). It's More than a Desk: working smarter through leveraged office design. *California management review*, 49(2), 80-101.
- Emami, A., Molaei, M., & Khajeheian, D. (2018). Does employee innovation mediate the relationship between employee performance and relationship marketing? An ICT-based case. *World Review of Entrepreneurship, Management and Sustainable Development*.
- Embassy of Bangladesh Washington D. C. (2012). Vibrant Bangladesh. *Monthly Web Journal*, 5(12), 1-15.
- Enriquez, G. A. (2010). Enhancing student performance using tablet computers. *College Teaching*, 58, 77-84.
- Epple, D., Argot, L., & Murphy, K. (1996). An empirical investigation of the microstructure of knowledge acquisition and transfer through learning by doing. *Operations Research*, 44(1), 77-86.
- Flanagin, A. J., & Metzger, M. J. (2001). Internet use in the contemporary media environment. *Human Communication Research*, 27, 153-181.
- Flora, J. A., Saphir, M. N., Schooler, C., & Rimal, R. (1997). Toward a framework for intervention channels: Reach, involvement, and impact. *Annals of Epidemiology*, 7, 104-112.
- Fornell, C., & Larcker, D.F (1981) .Evaluating Structural Equations with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, 18, 39-50.
- Franco, M., & Garcia, M. (2017). Drivers of ICT acceptance and implementation in micro-firms in the estate agent sector: influence on organizational performance. *Information Technology For Development*, 24(4), 658-680. <https://doi.org/10.1080/02681102.2017.1379378>
- Fuerst, W., & Cheney, P. (1982). Factors affecting the perceived utilization of computer-based decision support systems in the oil industry. *Dec. Sci.*, 13, 554-569.

- Fulk, J. (1993). Social construction of communication technology. *Academy of Management Journal*, 36(5), 921-950.
- Galbraith, J. R. (2002). *Designing organizations: an executive guide to strategy, structure, and process*. San Francisco: Jossey-Bass.
- Gallivan, M.J., Spitler V.K., & Koufaris, M. (2005). Does information technology training really matter? A social information processing analysis of coworkers' influence on IT usage in the work place. *Management Information Systems*, 22(1), 153-192.
- Ganley, D., & Lampe, C. (2009). The ties that bind: Social network principles in online communities. *Decision Support Systems*, 47(3), 266-274.
- Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of E-mail: an extension to the technology acceptance model. *MIS Quarterly*, 21(4), 389-400.
- George, J.F., Iacono, S., & Kling, R. (1995). Learning in context: Extensively computerized work groups as communities of practice. *Accounting, Management and IT*, 5(4), 185-202.
- Gibson, C. B., & Birkinshaw, J. (2004). The antecedents, consequences, and mediating role of organizational ambidexterity. *Academy of Management Journal*, 47, 209-226.
- Greenan, N. & Mairesse, J. (1996). *Computers and productivity in france: some evidence, no 5836, nber working papers*. National Bureau of Economic Research, Inc, <https://EconPapers.repec.org/RePEc:nbr:nberwo:5836>.
- Greenwood, R., & Suddaby., R. (2006). Institutional entrepreneurship in mature fields: the big five accounting firms. *Academy of Management Journal*, 49(1), 27-48.
- Grover, V., Cheon, M. J., & James, T.C. (1996). The effect of service quality and partnership on the outsourcing of information systems functions. *Journal of management Information Systems*, 12, 89-116.
- Gupta, B., Dasgupta, S., Gupta, A. (2008). Adoption of ICT in a government organization in a developing country: An empirical study, *The Journal of Strategic Information Systems*, 17(2), 140-154.

- Gupta, B., Iyer, L., & Weisskirch, R. (2010). Journal of electronic commerce research. *Journal of Electronic Commerce Research, 11*, 41-52.
- Hair, J. F., Hult, G. M., Ringle, C. M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. California: Sage Publications, Inc.
- Hajli, N. (2014). A study of the impact of social media on consumers. *International Journal of Market Research, 56*. 10.2501/IJMR-2014-025.
- Harrison, A. W., & Rainer, R. K. (1992). The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems, 9*(1), 93-111.
- Hatlevik, O. E., & Christophersen, K. A. (2013). Digital competence at the beginning of upper secondary school: Identifying factors explaining digital inclusion. *Computers & Education, 63*, 240-247. doi:10.1016/j.compedu.2012.11.015.
- Hesse, B. W., Werner, C. M., & Altman, I. (1988). Temporal aspects of computer-mediated communication. *Computers in Human Behavior, 4*, 147-165.
- Hornik, R. C. (2002). Public health communication: Making sense of contradictory evidence. In R. C., Hornik (Ed.), *Public health communication: Evidence for behavior change* (pp. 1–19). Mahwah, NJ: Lawrence Erlbaum.
- Hovland, C. I., & Janis, I. L. (1959). *Personality and persuasibility*. New Haven, CT: Yale University.
- Hu, P. J., Clark, T. H. K., & Ma, W. W. (2003). Examining technology acceptance by school teachers: a longitudinal study. *Information and Management, 41*(2), 227-241.
- Igbaria, M., (1993). User acceptance of microcomputer technology: an empirical test. *Omega, 21*, 73-90.
- Igbaria, M. & Iivari, J. (1995). The effects of self-efficacy on computer usage. *Omega, 23*(6), 587-605.
- Igbaria, M., Guimaraes, T., & Davis, G. B. (1995). Testing the determinants of microcomputer usage via a structural equation model. *Journal of Management Information Systems, 11*(4), 87-114.

- Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. (1997). Personal computing acceptance factors in small firms: a structural equation model. *MIS Quarterly*, 21(3), 279-305.
- Jackson, A., Yates, J. A., & Orlikowski, W. (2007). *Corporate Blogging: Building community through persistent digital talk*. Proceedings of the 40th Hawaii International Conference on System Sciences. Big Island, Hawaii.
- Jeon, B. N., Han, K. S., & Lee, K. S. (2006). Determining the factors for the adoption of e-business: a case study of SMEs in Korea. *Applied Economics*, 38, 1905-1915.
- Johnson, R. D., & Marakas, G. M. (2000). Research report: the role of behavioral modeling in computer skills acquisition: towards refinement of the model. *Information System Research*, 11(4), 402-417.
- Jones, G. E. (1997). The history, development and the future of agricultural extension in B.E. Swanson. In R.P., Bentz and A.J., Sofranko (1997), *Improving agricultural extension – a reference manual*. Rome: FAO
- Joo, Y. U., Bong, M., & Choi, H. J. (2000). Self-efficacy for self-regulated learning, academic self-efficacy, and internet self-efficacy in web-based instruction. *Educational Technology Research and Development*, 48(2), 5-17.
- Kang, K., Pang, Z., Da Xu, L., Ma, L., & Wang, C. (2014). An interactive trust model for application market of the internet of things. *IEEE Transactions on Industrial Informatics*, 10(2), 1516-1526.
- Kapurubandara, M., & Lawson, R. (2006, December 9). Barriers Adopting ICT and E-commerce with SMEs in Developing Countries: An Exploratory Study in Sri Lanka. *Collector*.
- Katz, E., & Lazarsfeld, P. F. (1955). *Personal influence: The part played by people in the flow of mass communication*. Glencoe, IL: Free Press.
- Kelman, H.C. (1958). Compliance, identification, and internalization three processes of attitude change. *Journal of Conflict Resolution*, 2, 51-60.
- Kempila, S., & Lonqvist, A. (2003). Subjective productivity measurement. *Journal of The American Academy of Business*, 2(2), 531–37.

- Kennedy, C.M. (2004). A typology of knowledge for district nursing assessment practice. *Journal of Advanced Nursing*, 45, 401-409. doi:10.1046/j.1365-2648.2003.02923.x
- Khan, M. S., Rahman, M., & Uddin, M. (2017). Effectiveness of agricultural information and communication center in technology transfer to the farmers in Bangladesh. *Asian Journal of Agricultural Extension, Economics & Sociology*, 18, 1-11. 10.9734/AJAEES/2017/34998.
- Kim, H. S., Sherman, D. K., & Taylor, S. E. (2008). Culture and social support. *Am. Psychol.*, 63, 518-526.
- Kim, Y. Y. & Oh, S. (2015). What makes smart work successful? Overcoming the constraints of time geography. In *System Sciences (HICSS), 2015 48th Hawaii International Conference*. IEEE, 1038–1047.
- Kiplangat, J., & Ocholla, D. N. (2005). Diffusion of information and communication technologies in communication of agricultural information among agricultural researchers and extension workers in kenya. *SAJnl Libs & Info Sci.*, 71.
- Lal, K. (2007). Globalization and adoption of ICTs in Nigerian SMEs. *Science, Technology Society*, 12(2), 217-244.
- Landers, R., & Goldberg, A. (2014). Online social media in the workplace: A conversation with employees.
- Larson, A. (1992). Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. *Administrative Science Quarterly*, 37(1), 76-104.
- Laudon, K.C., & Laudon, J.P. (2000). *Management information systems: organization and technology in the networked enterprise*, 6th ed. Prentice-Hall, Englewood Cliffs, NJ.
- Leagans, J.P. (1961). Characteristics of teaching and learning in extension education. In M.G. kamath (Ed.), *Extension Education in Community Development*. New Delhi: Directorate of Extension, Ministry of Food and Agriculture, Government of India.

- Lee, Y., & O'Connor, G. C. (2003). The impact of communication strategy on launching new products: The moderating role of product innovativeness. *Journal of Product Innovation Management*, 20, 4-21.
- Leonard-Barton, D. & Kraus, W. A. (1985). Implementing new technology. *Harvard Bus. Rev.*, 63, 102-110.
- Leonard-Barton, D., & Deschamps, I. (1988). Managerial influence in the implementation of new technology. *Management Science*, 34(10), 1252-1265.
- LePore, S. J., Kling, R., Iacono, S., & George, J. F. (1989). Desktop computerization and quality of work life: The role of implementation process and infrastructure. In J. I. DeGross, J. C. Henderson, and B. R. Konsynski (Eds.), *Proceedings of the Tenth International Conference on Information Systems*. Atlanta: Association for Information Systems, 223–235.
- Lewis, W., Argawal, R., & Sambamurthy, V. (2003). Sources of influence on belief about information technology use: an empirical study of knowledge workers. *MIS Quarterly*, 27(4), 657-678.
- Liang, T. P., Ho, Y. T., Li, Y. W. & Turban, E. (2011). What drives social commerce: the role of social support and relationship quality. *International Journal of Electronic Commerce*, 16(2), 69-90.
- Liaw, S. S. (2002). Understanding user perceptions of world-wide web environments. *Journal of Computer Assisted learning*, 18(2), 139–150.
- Liaw, S. S., & Huang, H. M. (2003). An investigation of user attitudes toward search engines as an information retrieval tool. *Computers in Human Behavior*, 19(6), 751–765.
- Lin, J. C., & Hsieh, P. (2007). The influence of technology readiness on satisfaction and behavioral intentions toward self-service technologies. *Computers in Human Behavior*, 23(3), 1597-1615
- Love, E. D., Irani, Z., & Edwards, D. J. (2004). Industry centric Benchmarking of Information Technology Benefits, Costs and Risks for Small-to-Medium Sized Enterprises in Construction. *Automation in Construction*, 13(4), 507-524.
- Lowe, B. & Alpert, F. (2015). Forecasting consumer perception of innovativeness. *Technovation*, 45.



- Lucchetti, R. & Sterlacchini, A. (2004). The Adoption of ICT among SMEs: Evidence from an Italian Survey. *Small Business Economics*, 23(2), 151-168.
- Luo, Y. (1997). Guanxi: principles, philosophies, and implications. *Human Systems Management*, 16, 43-52.
- Lynch, L. & Black, S. (2002). How to compete: the impact of workplace practices and information technology on productivity. *Review of Economics and Statistics*, 83. 10.1162/00346530152480081.
- Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2006). Model based interpretation of survey data: A case study of enterprise resource planning implementations. *Mathematical and Computer Modeling*, 44, 16-29.
- Mann, J. (2012). Transform the workplace with focus on bricks, behaviors and bits. *Gartner report*, G0021229.
- Markus, M. L. (1994). Electronic mail as the medium of managerial choice. *Organization Science*, 5, 502–527.
- Massey, A. P., Montoya-Weiss, M. M., & Brown, S. A. (2001). Reaping the benefits of innovative IT: the long and winding road. *IEEE Transactions on Engineering Management*, 48(3), 348-357.
- Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Inform. Syst. Res.*, 2, 173-191.
- McFadyen, M. A. & Cannella, A. A. (2004). Social capital and knowledge creation: diminishing returns of the number and strength of exchange. *The Academy of Management Journal*, 47(5), 735-746.
- McKnight, D., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for e-commerce: an integrative typology. *Information Systems Research*, 13, 334-359.
- Meelissen, M. R. M., & Drent, M. (2008). Gender differences in computer attitudes: Does the school matter? *Computers in Human Behavior*, 23(4), 1762–1776.
- Meso, P., Musa, P., & Mbarika, V. (2005). Towards a model of consumer use of mobile information and communication technology in LDCS: the case of sub-saharan African. *Information Systems*.

- Meyer, J. W., & Rowan, B. (1991). Institutionalized organizations: Formal structure as myth and ceremony. In W. W. Powell and P. J. DiMaggio (Eds.). *The New Institutionalism in Organizational Analysis* (41-62). Chicago: University of Chicago Press.
- Miller, N. G., Erickson, A., & Yust, B. L. (2001). Sense of place in the workplace: The relationship between personal objects and job satisfaction and motivation. *Journal of Interior Design*, 27(1), 35-44.
- Moore G. C. & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting information technology innovation. *Inform. Syst. Res.*, 2, 192-222.
- Moore, T. T., & Chang, J. C. J. (2009). Self-efficacy, overconfidence, and the negative effect on subsequent performance: A field study. *Information & Management*, 46(2), 69-76. doi:10.1016/j.im.2008.11.006
- Moreau, P., Lehmann, D., & Markman, A. (2001). Entrenched knowledge structures and consumer response to new products. *Journal of Marketing Research*, 38, 14-29.
- Morikawa, M. (2004). Information Technology and the performance of Japanese SMEs. *Small Business Economics*, 23(3), 171-177.
- Morris, E., Joiner, R. & Scanlon, E. (2002). The contribution of computer-based activities to understanding statistics. *Journal of Computer Assisted Learning*, 18, 116-126. doi:10.1046/j.0266-4909.2002.00219.x
- Mueller, J., Hutter, K., Fueller, J. & Matzler, K. (2011). Virtual worlds as knowledge management platform- a practice-perspective. *Information Systems Journal*, 21(6), 479-501.
- Nahapiet, J. & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review*, 23(2), 242-266.
- Nambisan, S. (2002). Designing virtual customer environments for new product development: toward a theory. *Academy of Management Review*, 27(3), 392-413.

- Nath, V. (2001). Empowerment and governance through information and communication technologies: Women's perspective. *International Information and Library Review Journal*, 33(4), 317-339.
- Nelson, R. R., & Cheney, P.H. (1987). Training end users: An exploratory study. *MIS Quarterly*, 11(4), 547–559.
- Neumark, D., & Cappelli, P. (1999). Do "high performance" work practices improve establishment-level outcomes? *National Bureau of Economic Research, Inc, NBER Working Papers*, 54.
- North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- O' Farrell, C. (2003, September 8-12). *Global Trends and Major Issues of ICT Application in Agriculture*. Paper presented at APO seminar on Information and Communication Technology (ICT) for Improved Agricultural Productivity and competitiveness, held in Yogyakarta, Indonesia.
- O'Keefe, D. J. (1990). *Persuasion: Theory and research*. Newbury Park, CA: Sage.
- Oettl, C. A., Beck, K., Raufer, F. M. *et al.* (2018). Zero Email initiative: a critical review of Change Management during the introduction of Enterprise Social Networks. *J. Info. Technol. Teach. Cases*, 8, 172-183.
- Olfman, L. & Mandviwalla, M. (1994). Conceptual versus procedural software training for graphical user interfaces: a longitudinal field experiment. *MIS Quarterly*, 18(4), 405-426.
- Olshavsky, R. W., & Spreng, R. A. (1996). An exploratory study of the innovation evaluation process. *Journal or Product Innovation Management*, 13, 512-529.
- Olson, G. M., & Olson, J. S. (2000). Distance matters. *Human Computer Interaction*, 15, 139–178.
- Ongori, H. (2009). Roles of information and communication technologies option in SMES: Evidence from Botswana. *Research Information Technology*, 1(2), 79-85.
- Orlikowski, W. J. (2000). Using technology and constituting structures: a practice lens for studying technology in organizations. *Organization Science*, 11(4), 404-428.

- Orlikowski, W. J. (1992). The duality of technology: rethinking the concept of technology in organizations. *Organization Science*, 3(3), 398-427.
- Orlikowski, W.J., and Robey, D. (1991). Information technology and the structuring of organizations. *Information Systems Research*, 2(2), 143-169.
- Osterman, K. (2000). Students' Need for Belonging in the School Community. *Review of Educational Research – REV. EDUC. RES.*, 70, 323-367. 10.3102/00346543070003323.
- Palmer, K., Cicarelli, M., Falmer, T., & Parsons, R. (2014). Associations between exposure to Information and Communication Technology (ICT) and reported discomfort among adolescents. *Work*, 48, 165-173. doi:10.3233/WOR-131609
- Pan, L. Y., & Chiou, J. S. (2011). How much can you trust online information? cues for perceived trustworthiness of consumer-generated online information. *Journal of Interactive Marketing*, 25(2), 67-74.
- Parasuraman, A. (2000). Technology-Readiness Index (TRI): a multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research*, 2(4), 307-320
- Parvin, M., & Kabir, N. (2011). Factors affecting employee job satisfaction of pharmaceutical sector. *Australian Journal of Business and Management Research*. 1, 113-123.
- Pennings, J. M., & Harianto, F. (1992). The diffusion of technological innovation in the commercial banking industry. *Strategic Management Journal*, 13(1), 29-46.
- Plantronics (2014). Smarter working: welcome to the next age of work. Retrieved from <http://www.plantronics.com/us/solutions/smarter-working>.
- Rao, N. H. (2007). A framework for implementing information and communication technologies in agricultural development in India. *Technological Forecasting and Social Change*, 74, 491-518.
- Raymond, L. (1988). The impact of computer training on the attitudes and usage behavior of small business managers. *Journal of Small Business Management*, 26(3), 8-13.

- Reenen, J. V. (2011). Wage inequality, technology and trade: 21st century evidence. *Labour Economics*, 18(6), 730-741. doi:10.1016/j.labeco.2011.05.006
- Ridings, C.M., & Gefen, D. (2004). Virtual community attraction: why people hang out online. *Journal of Computer-Mediated Communication*, 10(1), 1-10.
- Rimal, R. N., Flora, J. A., & Schooler, C. (1999). Achieving improvements in overall health orientation: Effects of campaign exposure, information seeking, and health media use. *Communication Research*, 26, 322–348.
- Ritchie, B. & Brindley, C. (2000). Disintermediation, disintegration and risk in the SME global supply chain. *Management Decision*, 38(8), 575-583.
- Robbins, S. P. (2001). *Organizational behavior*. Upper Saddle River, N.J: Prentice Hall.
- Rogers, E. M., & Storey, J. D. (1987). Communication campaigns. In C. R. Berger & S. H. Chaffee (Eds.), *Handbook of communication science* (pp. 817–846). Newbury Park, CA:Sage.
- Rogers, E.M. (1995). *Diffusion of Innovations*. 4th Edition, the Free Press, New York.
- Rogers, E.M. (2003). *Diffusion of Innovations*, 5th ed. The Free Press, New York, NY.
- Rohatgi, A., Scherer, R., & Hatlevik, O. E. (2016). The role of ict self-efficacy as a mediator between students' ict use and their achievement in a computer and information literacy test. *Computers & Education*, 102, 103-116. doi:10.1016/j.compedu.2016.08.001
- Sanders, G.L., & Courtney, J.F. (1985). A field study of organizational factors influencing dss success. *MIS Quarterly*, 9(1), 77-91.
- Sari, A. (2014). Influence of ICT applications on learning process in higher education. *Procedia - Social and Behavioral Sciences*, 116, 4939–4945
- Saunders, C., & Jones, J. W. (1990). Temporal sequences in information acquisition for decision making: A focus on source and medium. *Academy of Management Review*, 15, 29–46.
- Schaefer, C., Coyne, J. C., & Lazarus, R. S. (1981). The health-related functions of social support. *J. Behav. Med.*, 4, 381-406.

- Schmitz, J., & Fulk, J. (1991). Organizational colleagues, media richness, and electronic mail: a test of the social influence model of technology use. *Communication Research*, 18(4), 487-523.
- Schonfield E. (2008). Facebook blows past MySpace in global visitors for May, 2008. Retrieved online August 25, 2009 from: <http://www.techcrunch.com/2008/06/20/facebook-blows-past-myspace-in-globalvisitors-formay>
- Schunk, D. H., Meece, J. L., & Pintrich, P. R. (2014). *Motivation in education: theory, research, and applications* (4th ed.). Harlow: Pearson.
- Scott, W. R. (1995). *Institutions and Organizations*. Thousand Oaks, CA, Sage.
- Scott, W. R. (2004). *Institutions and Organizations*. Thousand Oaks, CA, Sage.
- SELN (2006). Enabling change in rural and regional Australia: the role of extension in achieving sustainable and productive futures- A discussion document produced by the State Extension Leaders Network of Australia. *State Extension Leaders Network*. Retrieved on 26/4/09 from <http://www.seln.org.au>
- Sendag, S., & Odabas, H. F. (2009). Effects of an online problem based learning course on content knowledge acquisition and critical thinking skills. *Computers & Education*, 53(1), 132–141.
- Serradell-Lopez, E., & Castillo-Merino, D. (2014). An analysis of the determinants of student's performance in e-learning. *Computer and Human Behaviour*, 30, 476–484.
- Sethi, R., Smith, D. C., & Park, C. W. (2001). Cross functional product development teams, creativity, and the innovativeness of new consumer products. *Journal of Marketing Research*, 38, 73-85.
- Sewell, G. & Taskin, L. (2015) 'Out of sight, out of mind in a new world of work? autonomy, control and spatiotemporal scaling in telework.' *Organization studies*, 36(11), 1507–1529.
- Shaw, K., Ichniowski, C., & Prensushi, G. (1997). The effects of human resource management practices on productivity: a study of steel finishing lines. *American Economic Review*, 87, 291-313.

- Shiels, H., McIvor, R., & O'Reilly, D. (2003). Understanding the implications of ICT adoption: Insights from SMEs. *Logistics Information Management*, 16(5), 312-326.
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: Wiley.
- Skeels, M. M., & Grudin, J. (2009). When social networks cross boundaries: a case study of workplace use of facebook and linkedin. *Proceedings of the ACM 2009 international conference on Supporting group work(GROUP 09)*(pp. 95-104), ACM, 2009, New York, USA.
- Smith, R. (2013). The end of competitive advantage: how to keep your strategy moving as fast as your business. *Research-technology management*, 56(5) p. 64.
- Sproull, L., & Kiesler, S. (1991). *Connections: New ways of working in the networked organization*. Cambridge, MA: MIT Press.
- Subramanian, G.H. (1994). A replication of perceived usefulness and perceived ease of use measurement. *Decision Sciences*, 25(6), 863-74.
- Suchman, M. C. (1995). Localism and Globalism in Institutional Analysis: The Emergence of Contractual Norms in Venture Finance. In *the Institutional Construction of Organizations: International and Longitudinal Studies*, 39-63, W., Richard Scott, & S., Christensen, (Ed.) Thousand Oaks, CA: Sage.
- Šumak, B., Heričko, M., & Pušnik, M. (2011). A meta-analysis of e-learning technology acceptance: The role of user types and e-learning technology types. *Computers in Human Behavior*, 27(6), 2067-2077.
- Szabo, L., Romanová, A., Bolek, V., & Zelina, M. (2017). Intensity of ICT use by managers of agricultural enterprises. *Agricultural Economics (Zemědělská ekonomika)*, 63, 485-492. 10.17221/132/2016-AGRICECON.
- Szajna, B. (1994). Software evaluation and choice: perceived validation of the technology acceptance instrument. *MIS Quarterly*, 18(3), 319–324.
- Taylor, S., & Todd, P. (1995). Assessing IT Usage: The Role of Prior Experience. *MIS Quarterly*, 19(4), 561.

- Templeton, G. F., Bruce R. L., & Charles A. S. (2002). Development of a measure for the organizational learning construct. *Journal of management Information Systems, 19*, 175-218.
- Thompson, R. L., Higgins, C. A., & Howell, J. M. (1991). Personal computing: toward a conceptual model of utilization. *MIS Quarterly, 15*, 125-143.
- Thong, J. Y. L., Yap, C. S., & Raman, K.S. (1994). Engagement of external expertise in information systems implementation. *Journal of Management Information Systems, 11*(2), 209–231.
- Tømte, C., & Hatlevik, O.E. (2011). Gender-differences in self-efficacy ict related to various ICT user profiles in Finland and Norway. How do self-efficacy, gender and ICT user profiles relate to findings from Pisa 2006. *Computers & Education, 21*, 393–402.
- Tondeur, J., Sinnae, I., & Houtte, V. M. (2011). ICT as cultural capital: the relationship between socioeconomic status and the computer use profile of young people. *New Media & Society, 13*, 1–18.
- Turner, M., Kitchenham, B., Brereton, P., Charters, S., & Budgen, D. (2010). Does the technology acceptance model predict actual use? A systematic literature review. *Information and Software Technology, 52*, 463-479.
- Uguru, F. N. (2001). Information technology access, capabilities and use among administrators of agro-technology transfer programmes in South Eastern Nigeria. Nsukka, Nigeria: Doctoral Thesis, Department of Agricultural Extension, University of Nigeria.
- Usher, E. L., & Pajares, F. (2008). Sources of self-efficacy in school: critical review of the literature and future directions. *Review of Educational Research, 78*(4), 751-796. doi:10.3102/0034654308321456
- Venkatesh, V., & Morris, M. G. (2000). Why not men ever stop to ask for directions? Gender, social influence and their role in technology acceptance and usage behavior. *MIS Quarterly, 24*(1), 115-139.
- Venkatesh, V., & Davis, F. (1996). A model of the antecedents of perceived ease of use: development and test, *Decision Sciences, 27*, 451-482.



- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Wagner, J. A. (1995). Studies of individualism-collectivism: Effects on cooperation in groups. *Academy of Management Journal*, 38(1), 152-172.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, 19, 52–90.
- Walther, J. B., & Parks, M. R. (2002). Cues filtered out, cues filtered in: Computer-mediated communication and relationships. In M. L. Knapp & J. A. Daly (Eds.), *Handbook of interpersonal communication* (pp. 529-563). Thousand Oaks, CA: Sage.
- Wang, C. L. (2007). Guanxi vs. relationship marketing: Exploring underlying differences. *Industrial Marketing Management*, 36(1), 81-86.
- Wong, E., Ormiston, M., & Tetlock, P. (2011). The effects of top management team integrative complexity and decentralized decision making on corporate social performance. *The Academy of Management Journal*, 54, 1207-1228. 10.5485/amj.2008.0762.
- Xu, L., He, W., & Li, S. (2014). Internet of things in industries: A survey. *IEEE Transactions on Industrial Informatics*, 10(4), 2233-2243.
- Yang, H. L., & Cheng, H. H. (2009). Creative self-efficacy and its factors: An empirical study of information system analysts and programmers. *Computers in Human Behavior*, 25(2), 429-438. doi:10.1016/j.chb.2008.10.005

**APPENDIX- A**

**Interview Schedule**

Department of Agricultural Extension & Information System  
Sher-e-Bangla Agricultural University, Dhaka-1207

Interview Schedule for data collection for the Research on  
**Assessment of Sub-Assistant Agriculture Officers' Level of  
ICT Use in Relation to Their Performance in Agricultural Extension Service**

(This interview schedule is entitled for a research study. Collected data  
will only be used for research purpose and will be published aggregately)

**Serial No:** .....

**Name of the respondent:** .....

**Designation:** .....

**Upazila:** .....

**District:**

1. **Age:** ..... years.
2. **Gender:** (please put  $\surd$  mark)      **Male** ( )      **Female** ( )
3. **Education:** Please mention your educational status below.

Sl. No.	Name of the examinations	Division/Grade
1.	SSC/equivalent	
2.	HSC/equivalent	
3.	Two years training from ATI	
4.	Three years training from ATI	
5.	Four years training from ATI	
6.	B.Ag.Ed	
7.	Others (Please specify)	

4. **Job experience:** How long have you been working in DAE? ..... (years).
5. **Job facilities** (Bradlow *et al.*,2001; Grover *et al.*, 1996): Please mention your degree of agreement or disagreement with a tick mark ( $\surd$ ) on the following items.

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
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1.	My office is up-to-date with modern communication technologies (e.g. Mobile, telephone, fax, internet, etc.)*					
2.	My office provide allowance for mobile, internet, etc.					
3.	My office has convenient operating hours for all of its workers*					
4.	My department monitor each employees' activities					
5.	My office provides timely training*					

\*Items dropped due to lower loading.

6. **ICT self-efficacy** (Compeau and Higgins, 1995): Please mention your degree oagreement or disagreement with a tick mark (√) on the following items.

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	I can complete any task using ICTs (e.g. Mobile, Internet, Apps, etc.) even I have only the manuals for reference*					
2.	I can complete the task using ICTs (e.g. Mobile, Internet, Apps, etc.) even I see someone else using it before trying it myself*					
3.	I can complete the task using ICTs (e.g. Mobile, Internet, Apps, etc.) without the help of others					
4.	I can complete the task using ICTs (e.g. Mobile, Internet, Apps, etc.) with the help of built in help facilities					
5.	I can complete the task using ICTs (e.g. Mobile, Internet, Apps, etc.) if someone show me how to do it first*					
6.	I can complete the task by calling someone for help if I get stuck*					

\*Items dropped due to lower loading.

**7. Perceived usefulness** (Davis, 1989): Please mention your degree of agreement or disagreement with a tick mark (√) on the following items.

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	Using ICTs help me to be updated *					
2.	Using ICTs help me to communicate with my supervisor (e.g. AEO, UAO)*					
3.	Using ICTs help me to communicate with input dealers					
4.	Using ICTs help me to save time to obtain my work-related information					
5.	Using ICTs help me to enhance my effectiveness on the job*					
6.	Overall, using ICTs is helpful for my work*					

\*Items dropped due to lower loading.

**8. Perceived innovativeness** (McKnight *et al.*, 2002): Please mention your degree of agreement or disagreement with a tick mark (√) on the following items.

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	I like to explore new ICT resources (website, apps etc.) *					
2.	When I hear about a new ICT resources (website, apps etc.), I often find an excuse to try it					
3.	Among my peers, I am usually the first to try out new ICT resources					
4.	When I get some free time, I often explore new ICT resources (website, apps etc.)					
5.	In general, I am very interested in trying out new ICT resources (website, apps etc.)*					

\*Items dropped due to lower loading.

**9. Inter-personal communication** (Adopted from Templeton *et al.*,2002; Lester *et al.*, 2002; Roberts *et al.*, 2004; Lowry *et al.*, 2009): Please mention your degree of agreement or disagreement with a tick mark (√) on the following items.

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	ICTs (e.g., Mobile, Internet, Apps, etc.) facilitate to share information with my colleagues/coworkers *					
2.	I am comfortable talking to my colleagues about what needs to be done using ICTs (e.g., Mobile, Internet, Apps, etc.) *					
3.	My colleagues enjoy talking to each other using ICTs (e.g., Mobile, Internet, Apps, etc.)					
4.	ICTs (e.g., Mobile, Internet, Apps, etc.) facilitate us to cooperate our activities with our coworkers					
5.	I find it easy to seek for advice from any of my supervisor officer using ICTs (e.g., Mobile, Internet, Apps, etc.) *					

\*Items dropped due to lower loading.

**10. Social support** (Adopted from Sherbourne and Stewart, 1991): Please mention your degree of agreement or disagreement with a tick mark (√) on the following items.

Sl. No.	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	I maintain close social relationship with my coworkers using ICTs (e.g. Mobile, Internet, Apps, etc.)*					
2.	I spend a lot of time interacting with coworkers using social media (e.g. facebook, messenger, whatsapp, etc)					
3.	I am about to develop relationship with coworkers/ colleagues working different areas using ICTs (e.g.					

	Mobile, Internet, Apps, etc.)*					
4.	I can extend my professional network using ICTs (e.g. Mobile, Internet, Apps, etc.)					
5.	I have positive social interaction with surrounding people through social media (e.g. facebook, messenger, whatsapp, etc.)					

\*Items dropped due to lower loading.

**11. Extent of ICT use:** Please mention your extent of ICT use with a tick mark (✓) on the following items.

Sl. No.	Items	Not at all	Rarely	Occasional ly	Often	Frequent ly
1.	Mobile phone (voice call, SMS, MMS, video)	No use	1-3 times/ week	5-6 times/ week	1-3 times/ day	4-6 times/ day
2.	Internet	No use	1-3 times/ week	5-6 times/ week	1-3 times/ day	4-6 times/ day
3.	Computer/Laptop/ Tab/ Other communication device	No use	1-3 times/ week	5-6 times/ week	1-3 times/ week	4-6 times/ day
4.	Union information service center	No use	1-3 times/ months	5-6 times/ month	1-3 times/ week	1-2 times/ day
5.	Agricultural informational service (AIS) mobile app, Krishikotha Mobile App etc.	No use	1-3 times/ months	5-6 times/ month	1-3 times/ week	1-2 times/ day
6.	Krishi Call Center 16123, Agriculture Information and Communication Center (AICC), Online reporting system etc.	No use	1-3 times/ months	5-6 times/ month	1-3 times/ week	1-2 times/ day

Thanks for your kind cooperation.

.....  
Signature of the Interviewer

**APPENDIX - B**

**Job performance evaluation form of the SAAO by  
Upazila Agriculture Officer (UAO) / Agriculture Extension Officer (AEO)**

**Name of the UAO/AEO:.....**

**Name of SAAO.....**

**Date.....**

**Block.....**

**Upazila.....**

Plases indicate the extent of your views about **Job performance** of SAAO by putting tick (√) under the following statements. This view will be used only for research work.

Sl. No	Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	The employee takes his work seriously					
2.	The employee gets the work done in a reasonable amount of time					
3.	The employee arrives on time at his work					
4.	The employee takes initiative at work					
5.	The employee has a good work ethics					
6.	The employee willingly accepts new assignment					
7.	The employee welcome suggestions/new ideas					
8.	The employee effectively adjusts his work to account for changing circumstances					

Comparing him with other officers of the same grade, give your general assessment of the officer by initialing the appropriate column below:

Very Good	Good	Average	Below Average	Poor	Remarks

Thanks for your kind cooperation.

.....  
Signature of the Interviewer

## APPENDIX C

### Cross Loading

	IPC	INN	JobF	PoU	SE	SocialS
SE3	0.163	0.536	0.160	0.302	0.917	0.530
SE4	0.236	0.413	0.240	0.209	0.900	0.476
IPC3	0.692	0.012	0.233	0.018	0.175	0.168
IPC4	0.806	0.183	0.244	0.180	0.156	0.201
JobF2	0.210	0.165	0.847	0.169	0.121	0.237
Job4	0.297	0.182	0.683	0.123	0.238	0.293
INN2	0.073	0.767	0.144	0.272	0.392	0.330
INN3	0.073	0.833	0.206	0.376	0.460	0.414
INN4	0.196	0.738	0.164	0.249	0.370	0.364
PoU3	0.098	0.339	0.127	0.828	0.277	0.382
PoU4	0.130	0.273	0.183	0.753	0.164	0.262
SocialS2	0.134	0.489	0.200	0.348	0.523	0.759
SocialS4	0.103	0.328	0.170	0.215	0.412	0.727
SocialS5	0.288	0.212	0.351	0.315	0.280	0.719

*Note: Item loadings less than 0.69 were dropped from the analysis*