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### Abstract

Information and Communication Technologies (ICTs) have been considered as key driving forces for enabling agricultural development –the sector which provides livelihoods for majority of the population in Bangladesh. The Department of Agricultural Extension (DAE), the largest public sector agricultural extension service provider in Bangladesh, has recently enacted a new organizational policy for its staffs to use ICTs such as social media to provide better services. However, there is little or merely anecdotal evidence about how extension agents of DAE have been accepting and using social media for their professional work. Drawing on the theoretical underpinnings of the Technology Acceptance Model (TAM), this study is a first attempt to investigate social media use and acceptance among extension agents in Bangladesh. Data was collected using semi-structured questionnaires from 140 extension agents of DAE who work in the eastern region of Bangladesh. Both descriptive and inferential statistics were used to analyze the data. The findings indicate that most extension agents (51.4%) used social media for half an hour to one hour every day. Perceived ease of use (PEoU) and Perceived usefulness (PU) are the most influential elements that determine DAE staff acceptance of social media for performing professional functions. Social media was perceived by extension agents as a means for improving professional performance, such as disseminating agricultural information; garnering support for new agricultural policy; networking with clients and colleagues and enabling coordination of services provided by colleagues. Overall, the findings indicate potential uses of social media in an ICT-based agricultural development strategy in Bangladesh.

### Keywords

social media, agricultural extension workers, Department of Agricultural Extension, ICTs, communications

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**Abstract**

*Information and Communication Technologies (ICTs) have been considered as key driving forces for enabling agricultural development – the sector which provides livelihoods for majority of the population in Bangladesh. The Department of Agricultural Extension (DAE), the largest public sector agricultural extension service provider in Bangladesh, has recently enacted a new organizational policy for its staffs to use ICTs such as social media to provide better services. However, there is little or merely anecdotal evidence about how extension agents of DAE have been accepting and using social media for their professional work. Drawing on the theoretical underpinnings of the Technology Acceptance Model (TAM), this study is a first attempt to investigate social media use and acceptance among extension agents in Bangladesh. Data was collected using semi-structured questionnaires from 140 extension agents of DAE who work in the eastern region of Bangladesh. Both descriptive and inferential statistics were used to analyze the data. The findings indicate that most extension agents (51.4%) used social media for half an hour to one hour every day. Perceived ease of use (PEoU) and Perceived usefulness (PU) are the most influential elements that determine DAE staff acceptance of social media for performing professional functions. Social media was perceived by extension agents as a means for improving professional performance, such as disseminating agricultural information; garnering support for new agricultural policy; networking with clients and colleagues and enabling coordination of services provided by colleagues. Overall, the findings indicate potential uses of social media in an ICT-based agricultural development strategy in Bangladesh.*

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### **Introduction**

The revolutionary aspects of social media (SM) are apparent from the recent growth of 2.56 billion mobile social media users worldwide who constitute approximately 68% of global internet users (Kemp, 2017). Social media has become an essential means of communication because of increased use of Smartphones and mobile internet users worldwide (Stanley, 2013). As a parliamentary election manifesto, “Digital Bangladesh” Information and Communication Technology (ICTs) has been considered the essential development tool for up-scaling the economic and social status of the citizens of Bangladesh (Malone, Akbar, Bell, & Bohn, 2013). Emphasis and investment is driven toward infrastructural development of ICTs. There has been an exponential growth pattern (2% annual increase) of new social media users in Bangladesh (Shohrwardhy & Hassan, 2014). There are an estimated more than 21 million current social media users in Bangladesh (Internet World Stats, 2017). Facebook is the highest usage social media tool in Bangladesh accounting 99.3% usage. Besides, Twitter (0.34%), Tumblr (0.11%) and YouTube (0.09%) secured second, third and fourth position (Stats Monkey, 2016). The current potential of social media is further exemplified by the 800 government offices using social media for their departmental purposes (GoV, 2016).

Agriculture plays a key role in Bangladesh’s development, contributing to 20% of the nation’s GDP and accounting for the livelihoods of 80% of the population. However, the agricultural sector continuously faces the challenges of securing food for 160 million people. As the population growth swells the demand for food increases and the agricultural sector faces the burden of producing 0.3 million tons more food to feed approximately two million new faces every year (MoA, 2012).

The agricultural sector is also under the threats of climate change (Stern, 2007). It follows that sustaining agricultural growth is extremely important for sustainable development in Bangladesh. The Department of Agricultural Extension (DAE) is one of the leading agencies that implements agricultural policy in Bangladesh (Uddin, 2008). The mission of DAE is to improve the technological knowledge and skills of farmers at all levels by providing skilled, effective, decentralized, region-dependent/adapted, demand-based and integrated extension services with a focus on ensuring sustainable and profitable increase in crop production (DAEa, 2016).

The Ministry of Agriculture (MoA) formulated the New Agricultural Extension Policy in 1996 and further updated in 2012, renamed as the National Agricultural Extension Policy (NAEP). The NAEP emphasized structural and strategic reforms of DAE and highlighted the deployment of electronic, virtual and online services for agricultural extension services (MoA, 2012). Therefore, interest in the use of virtual knowledge and services is growing. Knowledge mobilization and networking are important elements of agricultural innovation— a process aimed at higher productivity, better adaptability and progressive economic growth in agro-based countries like Bangladesh (Swanson & Rajalahti, 2010). As in other tropical countries, agricultural innovation in Bangladesh requires effective collaboration and coordination among different actors of agricultural development (Tropical Agriculture Platform, 2016). The recent policy i.e., NAEP focuses on collaboration, partnerships among agri-stakeholders for synchronizing extension services, and linking producers, entrepreneurs with probable markets, consumers, and other

actors in the agricultural value chain to support mutual learning (MoA, 2012).

Social media augments quick communication over geographic distances through networking opportunities and collaboration among its users (Stanley, 2013). In recent years, social media is credited with supporting agricultural and rural development innovation processes, herein enabling interaction, knowledge sharing, and supporting agricultural development (EU SCAR, 2013). The important functions of social media for supporting agricultural innovation are, specifically, peer-to-peer communication, farmer-industry networking, and community engagement (Kaushik, Chowdhury, Hambly Odame, & van Paassen, 2017; Saravanan, Suchiradipta, Chowdhury, Hall, & Hambly Odame, 2015). Following the contemporary policy and practices of ICTs and social media, DAE has prescribed its staff to use social media for their professional purposes. Since 2014 extension agents of DAE have been using social media to build and maintain connections with colleagues and clients, share experience and activities in the field, and follow up departmental notices (DAEb, 2016; DAEC, 2016; MoA, 2016).

### **Purpose of the Study**

Social media has been used as a new means of communication among extension agents of DAE in Bangladesh but there has not been any systematic research on how extension agents have accepted and used social media for professional purposes. This raises the question of if and how extension agents have accepted and used social media to support various organizational activities. Therefore, this study aims to analyze acceptance and use of social media by extension agents of DAE.

### **Theoretical Framework**

Information system (IS) researchers used the behavioral intention model taken from social psychology as an essential theoretical groundwork to determine user behavior (Swanson, 1982; Davis, Bagozzi, & Warshaw, 1989). The Theory of Reasoned Action (TRA) proposed by Fishbein and Ajzen (1975) is a well-researched behavioral intention model. According to the model, a person's use of a system is determined by their behavioral intention (BI) towards using the system. BI is informed by the person's attitude (A) and subjective norms (SN) about the behavior. Attitude (A) is conceptualized as a person's positive or negative feelings (evaluative effect) about a specific behavior. Subjective norms (SN) epitomize a person's perception about the peer pressure to follow a certain behavior or not.

Davis (1986) adopted TRA as a theoretical foundation to develop the Technology Acceptance Model (TAM) as shown in Figure 1. TAM is a widely used theoretical model for studying the adoption of ICTs in the agricultural sector, such as the use of ICTs by the Caribbean extension officers (Strong, Ganpat, Harder, Irby, & Linder, 2014) or computer utilization for extension personnel in India (Sivakumar, Parasar, & Anantharaman, 2013). The model was used to study the acceptance of different ICTs tools such as email (Gefen & Straub, 1997), online shopping (Vijayasathy, 2004), e-government services (Carter & Bélanger, 2005), and adoption of mobile services (Wang, Lin, & Luarn, 2006; Meso, Musa, & Mbarika, 2005).

It has been extensively used for studying social media acceptance and use, for instance, on Social Networking Sites (SNS) (Leng, Lada, Muhammad, Ibrahim, & Amboala, 2011; Sago, 2013; Al-Ghaith,

Sanzogni, & Sandhu, 2010; Al Ghaith, 2015; Nah & Saxton, 2012; Rauniar, Rawski, Yang, & Johnson, 2014; Nasri & Charfeddine, 2012).

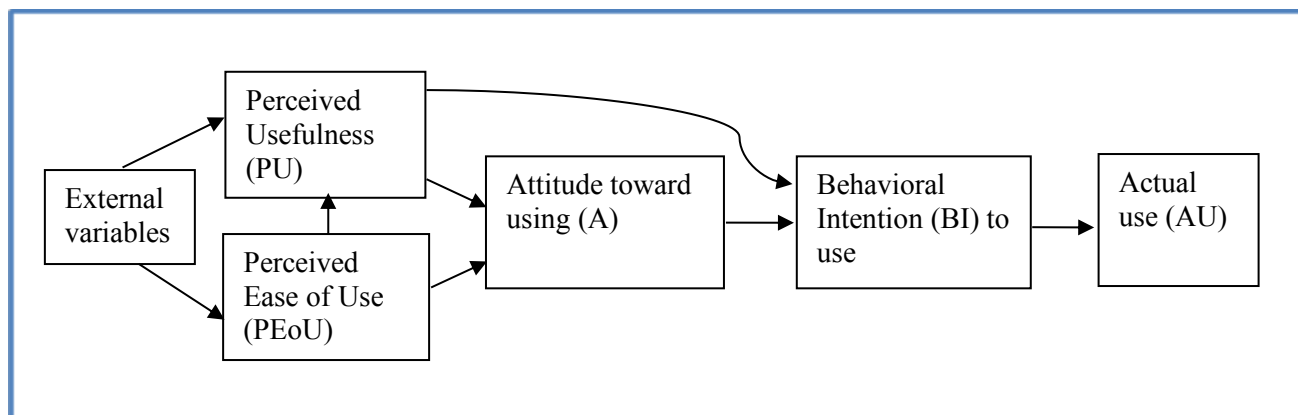


Figure 1. Technology Acceptance Model (TAM), Davis (1989)

According to the model, Perceived Ease of Use (PEoU) and Perceived Usefulness (PU) are considered as fundamental determinants of information technology acceptance and usage (Davis, 1989). PEoU is “the degree to which a person believes that using a particular system would be free of effort.” In the model, ease is conceptualized as “freedom from difficulty or great effort.” PEoU contributes to intention of behavior and usage of a system in two ways: self-efficacy and instrumentality. The easier it is to interact with a system and to follow certain behaviors, the more self-efficacy the system will be perceived as having by the potential users (Bandura, 1982). The relationship between PEoU and attitude captures the intrinsically motivating aspect of PEoU (Davis, 1986). A significant positive relationship between PEoU and A was evident in number of studies, such as mobile banking (Amin, Baba, & Muhammad, 2007), online shopping (Vijayasathy, 2004), software use (Morris & Dillon,

1997), acceptance of internet banking (Ramayah & Suki, 2006), and social media (Facebook) acceptance and use (Nasri & Charfeddine, 2012; Al-Ghaith, 2015).

Instrumentally, PEoU indicates that the less effort and time needed to perform a behavior with a certain tool, the more work the individual can achieve with the same amount of effort and time. As per previous studies, PEoU has a significant and positive effect on PU. The direct relationship between PEoU and PU was reported in several studies, for example, internet acceptance by undergraduate students in the USA (Yi & Hwang, 2003), SNS acceptance (Leng et al., 2011; Nasri & Charfeddine, 2012; Al-Ghaith, 2015), personal digital assistance for adults in Germany (Arning & Ziefle, 2007), acceptance of short message service (Lu, Deng, & Wang, 2010), and use of mobile-based ICTs (Meso et al., 2005). The following hypotheses have been proposed based on the above studies:

Hypothesis-1: *PEoU has significant positive influence on PU of social media.*

Hypothesis-2: *PEoU has significant positive influence on A for social media*

An individual forms positive attitude (A) towards the system if they evaluate the system with a positive output (Davis et al., 1989). According to Davis (1989), PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance.” The term ‘useful’ is conceptualized as a system that can be used advantageously. A study on foreseeing consumers’ intention to practice online shopping found that consumers’ perceived usefulness of the internet medium to get information about products and compare prices is positively associated with their attitudes towards online shopping (Vijayasathy, 2004).

Hypothesis-3: *PU has significant positive influence on A for social media*

In TAM, the direct relationship of PU and behavioral intention (BI) illustrates that when people find the potentiality of increasing their job performance by using a computer system, they form cognitive appraisal. Thus they develop intention to use the desired computer system over and above the feelings they have towards the behavior (Davis et al., 1989). Thus PU has been found to be a potential driver to form BI towards a technology in both online and offline context (Venkatesh & Davis, 2000). Al-Ghaith (2015) executed TAM to conceptualize the usage of SNS and found that users’ perceived usefulness positively influenced their behavioral intention to use SNS. Likewise, a research investigation on the acceptance of Mobile Banking by Malaysian clients elucidated that customers’ perceived usefulness of Mobile Banking had

a significant effect on their behavioral intention to use Mobile Banking (Amin et al., 2007).

Hypothesis-4: *PU has significant positive influence on BI to use social media*

Attitude has been considered as a cause for intention (Lu, Yu, Liu, & Yao, 2003). The attitude (A) and BI relation in TAM depicts that all things being equal, people have the intention to perform a behavior when they hold positive attitudes towards the behavior. Cheng, Lama, and Yeung (2006) adopted TAM to understand customers’ intention of adopting Internet Banking in Hong Kong. They concluded that Attitude is an intervening variable and clients’ attitude positively influenced their intention. Hence, for Tunisian university students in a different study, attitude had the strongest effect on their Facebook use intention (Nasri & Charfeddine, 2012).

Hypothesis-5: *A has significant positive influence on BI to use social media*

According to TAM, computer usage is eventually determined by the BI of the user (Davis, 1989). Previous studies, for instance, Wireless Application Protocol (WAP) adoption for mobile commerce in Taiwan (Hung, Ku, & Chang, 2003), customers’ intentions and usage of Short Message Services (SMS) in Singapore (Lai, 2004), and exploring the regulating effects of gender in the intention of mobile chat service use (Nysveen, Pedersen, & Thorbjornsen, 2005) have concluded that intention has a positive effect on behavior towards a technology. Ajzen (1991) mentioned that intention is considered as the last antecedent of behavior.

Hypothesis-6: *BI to use has significant positive influence on AU of social media.*

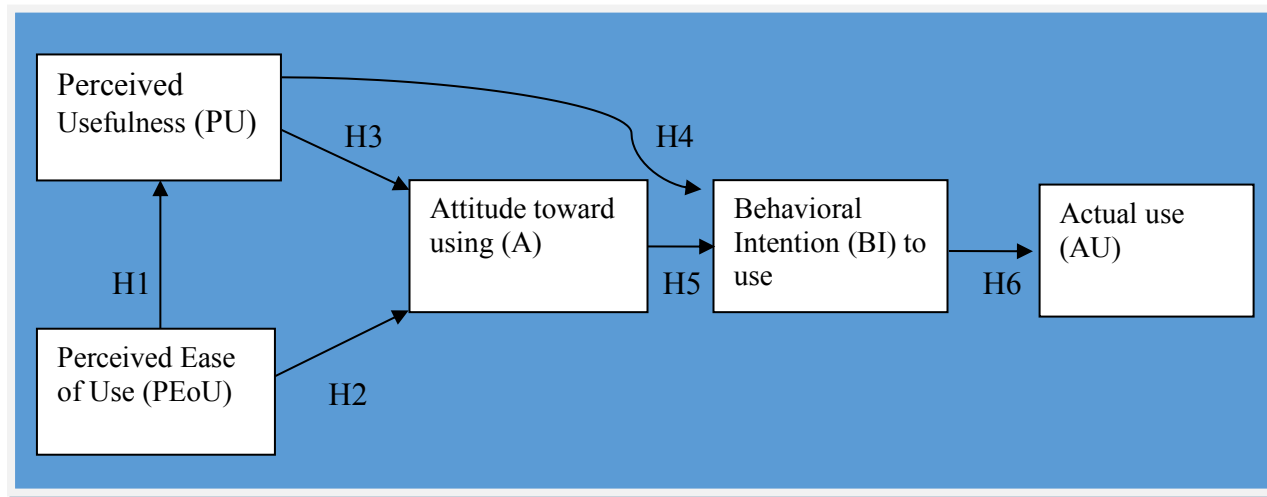


Figure 2. Hypotheses for TAM model

### Methods

The Comilla region was randomly selected out of fourteen agricultural regions in Bangladesh. This region comprises of three districts: Comilla, Chandpur and Brahmanbaria. The sub-districts (called Upazilla) within a district are headed by Upazilla Agriculture Officers (UAO). The sub-district consists of several blocks headed by Sub Assistant Agriculture Officers (SAAO). At first, each of the districts and sub-districts offices was requested to identify staff who use social media. Thus, 523 staffs were identified as social media users. From that list, 25% of social media using staff (total 140) were randomly selected as respondents of the study.

The items for each of the constructs of the TAM model (PEoU, PU, A and BI) were adopted from previous research that established their validity and reliability (Davis et al., 1989; Venkatesh & Davis, 1996). For this research the structure and meaning of those items were modified based on the research context and ultimately four items for each of the constructs were

formulated. In order to measure the constructs, a 5-point Likert scale for the items with response options ranging from strongly agree to strongly disagree was adopted, the same methodology followed by Nasri and Charfeddine (2012) and Leng et al., (2011). Respondents indicated Actual Use (AU) of social media by the number of minute social media used per day. The AU data were then categorized into six groups, such as use of social media up to 30 minutes per day, 31 to 60 minutes per day, 61 to 120 minutes per day, 121 to 180 minutes per day and more than 180 minutes per day. The study followed a mixed method strategy i.e. combination of qualitative and quantitative method. At first, informal and unstructured interviews were conducted to obtain an overview of social media use. Informal discussion and participant observations were conducted during professional events (e.g. weekly meeting of extension agents). Following this phase, a structured questionnaire was prepared which included items for the constructs of TAM. The questionnaire was pre-tested with fifteen (15) respondents. Based on the pre-



test, the chronologies of the questions were adjusted and phrasing of the questions was

modified to ensure understanding and intended meaning of the respondents.



Figure 3. Red dot on a map of Bangladesh indicating the study locale

The research was conducted during the period of August to November 2016. The researchers participated in every weekly Upazilla agricultural meeting at the various Upazillas. After the weekly meeting of a particular Upazilla, the selected respondents were requested to take part in the survey. Data from the district level officers was collected based on individual appointment.

Two focus group discussions (FGD) were conducted, one with administrative staff (from Agricultural Extension Officer, AEO to higher level officers) and the other with frontline staff (SAAOs). The FGD with administrative staff was held at Deputy Director's (DD) office of Brahmanbaria

and the FGD with frontline extension staff (SAAOs) was conducted at Muradnagar Upazilla and. In addition, field notes were collected during informal discussions, surveys and interviews. Thus, to ensure the validity of the data, triangulation of data sources was implemented.

The quantitative survey data was analyzed using software from the Statistical Package for Social Science (SPSS) version IBM SPSS statistics V-23. The responses of the items of TAM constructs (i.e. PEoU, PU, A, BI) were coded as 1 for strongly disagree, 2 for disagree, 3 for neither agree or disagree, 4 for agree and 5 for strongly agree and the scores for each item were entered in

the software. Both descriptive and inferential (regression) statistical analyses were performed for all the constructs. The data from informal discussions and focus group discussion (FGD) were recorded and transcribed. Then the transcriptions were

manually coded according to some themes, such as usefulness, attitude, job performance, resources, internet facility, skill and the codes were used according to their relevance to the findings of the research.



Figure 4. Red dots illustrating the different study locations (three districts of Comilla Region)

According to Wixom and Watson (2001), convergent validity is adequate when the item loading value is greater than 0.50. For the TAM model, two items from PEOU, one item from the PU and A constructs each were dropped due to their failure to load in their respective construct with greater than 0.50 values. Thus two items for PEOU, three items for PU and A construct each and four items for BI

construct were included for analysis. Again, convergent validity is also fulfilled when the constructs have an Average Variance Extracted (AVE) value of at least 0.50 (Wixom & Watson, 2001). Accordingly all the constructs fulfilled the minimum AVE value ranged from 0.586 to 0.717 for the TAM model (Table 1).

Table 1  
*Construct Reliability and Convergent Validity of TAM Constructs*

Constructs	Items	Factor loading	Average variance extracted (AVE)	Chronbach's alpha	Kaiser-Myere-Olkin (KMO)
Perceived Ease of Use (PEoU)	PEoU1	0.862	0.717	0.705	0.50
	PEoU2	0.803			
Perceived Usefulness (PU)	PU1	0.711	0.586	0.739	0.661
	PU2	0.885			
	PU3	0.749			
Attitude towards Using (A)	A1	0.763	0.623	0.803	0.708
	A2	0.809			
	A3	0.806			
Behavioral Intention to use (BI)	IU1	0.880	0.716	0.850	0.780
	IU2	0.825			
	IU3	0.908			
	IU4	0.867			

The Chronbach's alpha of the TAM model constructs satisfy the minimum value (0.70) as suggested by Bagozzi and Yi (1998) and ranged from 0.705 to 0.850 (Table 1). Thus, all constructs demonstrate an acceptable reliability level. To establish the discriminant validity, Hair, Black, Babin, Anderson, and Tatham (2006)

suggested a conservative approach where AVE for each of the constructs is compared with the inter-construct correlation square of the associated constructs. Table 2 shows that all the AVE values were greater than the correspondent squared correlation value of inter-constructs of the TAM model.

Table 2  
*AVE and Squared-correlation (n=140)\**

	PEoU	PU	A	IU
PEoU	0.717			
PU	0.165	0.586		
A	0.154	0.462	0.623	
BI	0.197	0.31	0.403	0.716

Note: \* Diagonal shows the AVE and the values below the diagonal are values of correlation square

### Findings and Discussion

Of the items of Perceived Ease of Use (PEoU) "learning to use social media is easy for me" received the highest score followed by the statement, "it is easy for me

to become skillful at using social media" (Table 3).

Table 3 shows that the item of Perceived Usefulness (PU) that received the highest score was "I get various agricultural information from social media" and the

lowest scored item was “I can follow the activities of my colleagues on social media”.

The statement “social media are effective means of presenting professional achievement” obtained the highest score among other items of Attitude towards Using (A) and “Social media are helpful to get connected to different stakeholders” received the lowest score (Table 3).

The next construct was Behavioral Intention to use (BI) and the items that

received highest score were “I intend to use social media for expressing my professional activities to others” and “I intend to use social media to get updated agricultural information”. The statement that received the lowest score was “I intend to use social media to get connected with people that matter to me” (Table 3).

Table 3

*Descriptive Statistics of Statements Related to TAM Constructs*

<b>Statements</b>	<b>N</b>	<b>M</b>	<b>SD</b>
<i>Perceived ease of use of SM</i>			
Learning to use social media is easy for me	140	4.529	0.704
It is easy for me to become skillful at using social media	140	4.229	0.771
<i>Perceived usefulness of SM</i>			
I get various agricultural information from social media	140	4.407	0.586
Social media provide me opportunities to perform various professional activities	140	4.393	0.571
I can follow the activities of my colleagues on social media	140	4.386	0.489
<i>Attitude toward using SM</i>			
Social media are effective means of presenting professional achievement	140	4.321	0.603
Social media help navigating effective sources of agricultural information	140	4.200	0.590
Social media are helpful to get connected to different stakeholders	140	4.143	0.685
<i>Behavioral intention to use SM</i>			
I intend to use social media to get updated agricultural information	140	4.321	0.626
I intend to use social media for expressing my professional activities to others	140	4.336	0.531
I intend to use social media as a quick communication tool	140	4.286	0.732
I intend to use social media to get connected with people that matter to me	140	4.257	0.723

The last construct of the TAM model is Actual Use (AU). Table 4 depicts that the highest percentage (51.4) of DAE personnel used social media between “31 to 60

minutes per day”. The next highest proportion (25.0%) of the respondents used social media “up to 30 minutes per day”.

Table 4  
Descriptive Statistics for Actual Use of SM

Statements	Frequency	Percentage
Up to 30 minutes per day	35	25.0
31 minutes to 60 minutes per day	72	51.4
61 minutes to 90 minutes per day	15	10.7
91 minutes to 120 minutes per day	10	7.2
More than 120 minutes per day	8	5.7
Total	140	100.0

**The Acceptance of Social Media by Agricultural Extension Workers**

The results of the hypotheses testing are shown in Figure 5. Hypothesis 1 was tested by regressing PEOU on PU. PEOU had a moderate significant ( $p < 0.001$ )

positive influence on PU. PEOU explained 16.5 percent of variance ( $R^2 = 0.165$ ) for PU with co-efficient Beta ( $\beta$ ) 0.406. The findings indicate that the easiness to use social media is an influential factor for the respondents to perceive it useful.

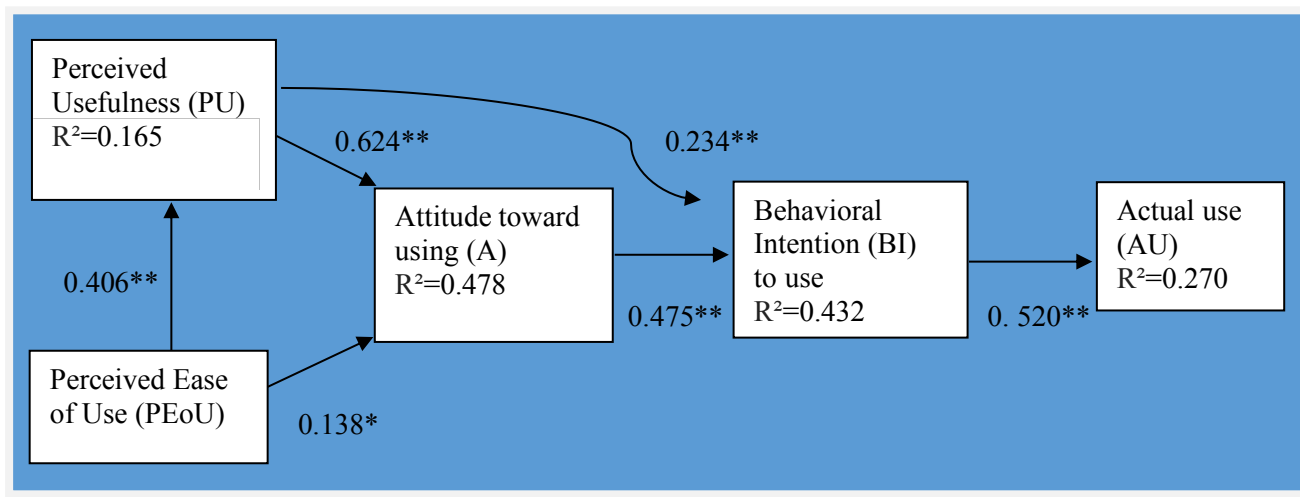


Figure 5. Hypotheses result of TAM model ( $**p < 0.001$  and  $* p < 0.05$  significance level)

In the cases of hypotheses 2 and 3, PEOU had significant ( $p < 0.05$ ) positive influence and PU had weak but significant ( $p < 0.001$ ) positive influence on Attitude (A) towards social media. PEOU and PU together explained almost half (47.8%) of the variance ( $R^2 = 0.478$ ) of Attitude (A) towards using social media. Although both

constructs (PEoU, PU) were significant PU had a strong influence on A than PEOU in forming a favorable attitude of agricultural extension workers of DAE towards using social media.

For hypotheses 4 and 5, both PU and Attitude (A) had a significant ( $p < 0.001$ ) positive influence on BI to use social media.

PU and Attitude (A) together explained 43.2 percent ( $R^2 = 0.432$ ) variance of BI to use social media. In case of hypothesis 6, BI to use social media had a moderate ( $\beta = 0.520$ ) significant ( $p < 0.001$ ) positive influence on AU of social media by extension agents. The findings indicate that 27.0 percent of variance ( $R^2 = 0.270$ ) for AU was explained by BI to use social media.

The findings indicate an acceptance of social media by agricultural extension workers of DAE to accomplish their professional purposes. The hypotheses formulated for the TAM model were supported in this research. The research findings confirm that PEOU instrumentally influenced PU of social media. Agricultural extension workers of DAE considered that use of social media for professional purposes did not require much effort. They found that learning to use social media and to become skillful at using it was easy for them. A recent study in the United States indicates that a significant relationship exist between agricultural communicators' use of Instagram and PEOU (Hawley, Hall, & Chowdhury, 2018). Previous research on the TAM model (Nasri & Charfeddine, 2012; Leng et al., 2011; Rauniar et al., 2014) also concluded that PEOU is an important predictor of PU for social media.

According to Davis (1986), the self-efficacy function of PEOU influences A towards using ICT tools. Literature regarding the research on other ICTs acceptance showed mixed results in this aspect. For instance, the research of Nasri and Charfeddine (2012) for Social media (Facebook) acceptance, Vijayasathy (2004) for online shopping, and Morris and Dillon (1997) for software use reported significant influence of PEOU on A towards use of ICT tools. On the contrary, Leng et al., (2011) reported that PEOU of SNS for university students in Malaysia had no significant influence on A towards use of

SNS. In the last decade Bangladesh witnessed a significant advancement of internet facilities and availability of affordable Android smartphones. Mobile operating companies in Bangladesh are now offering affordable internet packages. Furthermore, there are now several Bengali typing softwares for Android versions available in Google Play. Considering that staffs of DAE have at minimum a Diploma degree, it should be easy for them to operate, command and type on social media given the above technological solutions.

The professional usefulness of social media has formed favorable attitudes among agricultural extension workers of DAE towards use of social media. They have found social media to be a beneficial tool to increase their job performance in line with the task requirements. Senior officers have started using social media to send short official notes and instructions to the frontline extension officers. This medium reduced barriers of communication in terms of physical distance and time. As a result, it enhanced timely execution of instructions. Furthermore, the senior officers of DAE often followed up with junior officers to get updates on their daily activities (e.g. field visits, demonstrations, trainings, meetings, etc.) via social media. Social media therefore served two purposes: for the junior and field officers to articulate and demonstrate their performance and for the senior officers to monitor the job activities and performance of their subordinates. These findings are in line with Treem (2015) who noted that social media provided an account for individuals to assess the work of others in organizations. Other studies on the TAM model (Nasri & Charfeddine, 2012; Vijayasathy, 2004; Morris & Dillon, 1997) also confirmed the result that usefulness is a major determinant in forming attitudes towards using ICT tools.

### **Conclusions, Implications and Recommendations**

The acceptance of social media by agricultural extension workers is a significant step for enhancing the performance of the extension services of DAE. The extension workers' ease of using social media indicates that they require less effort in learning to use social media and to be skillful in using social media for professional purposes. Therefore, they have been using it to reach out to a larger number of clients and to collaborate with their colleagues timely and effectively. Furthermore, social media enabled them to readily share professional accomplishments with their reporting officers and other colleagues. Social media, therefore, offered opportunities for extension agents to build network both within and beyond their organizational circles. Enhancing inter- and intra- organizational networks and sharing of experiences are essential elements for supporting agricultural innovation and development (Tropical Agriculture Platform, 2016).

Overall, the findings indicate potential use of social media in an ICT-based agricultural development strategy in Bangladesh. Concerning the use of ICT-based services for development in Bangladesh, this research provides useful insights into improving the extension service system. Social media has helped extension service providers to perform professional activities better. It has offered a virtual window to share and disseminate agricultural information and learn from the accomplishments of other colleagues. Although the research focused on the current use of social media on intra-organizational activities and interactions (within DAE staff), there are opportunities to support conversations beyond the boundaries of organizational circles and widen the network to reach other agricultural stakeholders.

Strong et al., (2014) found that Caribbean extension workers were more likely to use ICTs to expand their professional knowledge and improve service delivery than customary communication approaches. ICTs played a vital role in satisfying their personal benefits (e.g. personal tasks, knowledge, contact etc.) and increasing their professional performance. Sivakumar et al., (2013) concluded that the TAM model has provided an essential management tool for extension managers in India to identify perceptual complexities among their staff and enable staff to use computer technologies properly.

The professional use and acceptance of social media has to be augmented among the DAE staffs. Initiatives should be taken to encourage social media non-users of DAE staffs to be part of the virtual network of social media users. It is necessary to offer various institutional supports for extension agents, for example, sharing the good practice of social media in agricultural extension, professional appreciation,, training, awareness building and highlighting benefits of social media use in professional practices. This research only used the typical constructs of the TAM model to explore the acceptance and use of social media by the extension agents of DAE. Other authors modified the model and included other variables, such as perceived enjoyment and social influence. Therefore, based on the contexts, other pertinent external variables could be explored and included in the TAM model to achieve a more thorough and accurate explanation of acceptance. Furthermore, the online networks of social media are sources of user generated content, offering beneficial as well as controversial and misleading information. Further study should be conducted to analyze agricultural information and knowledge flows in social media and how to reduce negative

consequences while using the media for strengthening extension services. In addition to these, it would be interesting to investigate why some DAE staffs did not accept social media and what support systems might facilitate their use of social media in professional practices. Social media was used for communication amongst colleagues with little reference about use of the media to improve communication with farmers. Also, it is not evident that social media enabled farmers to express their needs. This issue deserves attention as farmers will likely use social media intensively in future.

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