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Determinants of Cellphone Usage among Sea Fisher's During Marine Fishing in Selected Coastal Villages of Bangladesh

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Abstract

The cell phone can provide numerous benefits to sea fishers who risk their lives and resources for making livelihoods. This article is based on the firm assumption that the use of the cell phone during marine fishing can contribute to income, security and risk reduction. This study adds to the empirical evidence of determinants of cell phone use by fishers during marine fishing. For the purpose of reaching objectives, the study has drawn quantitative data generated through structured face-to-face interviews with 200 randomly selected fishers from three selected villages adjacent to the Bay of Bengal in the mid coastal area of Bangladesh during the period January to February 2016. Descriptive statistics, inferential statistics and binary logistic regression model is used to analyze the data. The study concludes that fishers own cell phone (odds ratio[OR]=6.56, 95 per cent confidence interval [CI]: 1.69,25.44), enjoying the availability of cell phone network (OR=166.20, 95 per cent CI:38.35, 720.28), earned low (OR=20.35, 95 per cent CI:4.24, 97.28) to medium income (OR=9.53, 95 per cent CI:0.99, 91.12) form sea fishing have a greater tendency to use cell phones, while fishers had low information need (OR=0.11, 95 per cent CI:0.01, 1.13) represented lower use of cell phone during marine fishing. Thus, it is essential to build cell phone infrastructure bases in the potential fishing zones of Bangladesh and supplying cell phone devices at subsidised cost.

Keywords: *Sea fishers; Cell phone; Use; Determinants; Bangladesh*

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Introduction

The marine fisheries sector is considered as an important sector of the economy of Bangladesh (Hussain and Haque, 2010). The Bay of Bengal is one of the world's 64 Large Marine Ecosystem (LMEs), and eventually the sea water of Bangladesh is endowed with 475 species of fishes, 36 species of shrimps, 5 species of lobsters, more than 15 species of crabs, 5 species of tortoise, and 15 species of coral. In 2014-2015, 16.28% of the total produced fish in the country came from sea fisheries sector (Humayan & Barua, 2016). Not only fish production, this sector also offers livelihood for a significant section of people in the country. For instance, about one million people are securing their earning through marine fishing (Khan, 2010).

Natural hazards and technological failure have turned sea fishing to a risky profession since a long period of time (Smith, 1998). Sea fishers encountered several occupational hazards, such as accidents during hauling in nets (Lincoln, 2002), health risk from diseases (Kissling et al., 2005), substantial variability in catch, which contributed to financial uncertainty in return (Salas et al., 2011). Frequent occurrence of tropical cyclone in Bangladesh is making sea water progressively rougher (Nishikura, 2010). Incidence of frequent pirate attack is a recent addition to the risks of sea fishing, cost sizeable amount of lives and resources (Rider, 2015; Financial Express, 2016; Pandey, 2015).

Information becomes the most crucial commodity during emergencies and disaster incidents (Barrantes et al., 2009; FEMA, 2014). Media and communication can play pivotal role in saving lives of people vulnerable to disaster. It can assist people in changing attitude towards risks and encouraging action towards resilience building. Therefore, most emergency agencies around the globe use social media alongside traditional media (e.g. television, newspaper, community meetings, etc.) to communicate for warning, response, and recovery (Dufty, 2014). Fish friend, a mobile application in India, is offering comprehensive information on ocean condition such as wind speed, wind direction and weave height along with early warning information on disaster like cyclones, high waves, heavy rainfall, etc. This information helps fishermen to decide whether it is safe to go or not to the ocean and which type of fishing gear to take with them (Qualicomm, 2016). A localised mobile based alert service, such as weather forecast, when and where to fish in Lake Victoria played

crucial role to secure lives and preserves livelihood of the fishers in Uganda (Erricson, 2012).

Cell phone due to its potentials in supporting two-way communication and access to rich information sources, such as the internet can be a potential way of offering information to the sea fishers of Bangladesh. Cellphone can make sea fishing enjoyable and easier (Amrita & Karthickumar, 2016). However, adoption of cell phone depends upon numerous factors, such as market, household, and social factors (Obong, Mugonola & Phillips, 2017). In case marine fishing, the factors of cell phone use remain blurred due to the paucity of research. Hence, it is essential to identify the determinants of cell phone use during marine fishing to assist stakeholders' devise effective strategies to address the issues limiting the use of cellphone during marine fishing in Bangladesh.

Objectives of the study

The main objective of this study was to reveal the determinants of sea fisher use of cellphone during marine fishing. However, the specific objectives of the study were as follows:

I. To reveal the present status of the network availability, ownership, and use of cellphone by the sea fishers during marine fishing.
II. To determine the factors affecting the use of cellphone by the sea fishers during marine fishing.

Methodology

Research framework and hypothesis

A Mobile phone can facilitate faster and cheaper two-way communication, which can improve the life of the sea fishermen through better income and reduction of risks. Hence, the usage of mobile application in fisheries sector in developing countries is gaining popularity (Amirta & Karthickumar, 2016). Mobile technology can enhance income and easy access to market. Jensen (2007) in a study in Kerala, India found that due to coverage of cell phone fisherman's travel from their usual markets soar from 0% to 35%. During emergencies, such as engine failure in the deep sea, fishermen can acquire precise information on how to repair engine (Govindaraju & Mabel, 2010) and can keep in touch with family members until return to their residence (Boadi et al., 2007). According to Amirta & Karthickumar (2016) mobile applications serve as various valuable tools, such as solunar, tidal charts, advance weather reporting, radar maps, forecast and incidental reporting, GPS advance tracking, Catch Log Book, sea depth measuring, and tracking of potential fishing zone. However, the decision to use cell phone is likely to depend on a number of factors which can be grossly classified into personal, socioeconomic and situational factors.

Among the personal factors age, education level, etc., can influence cell phone use in communicating agricultural information (Nymba & Mlozi, 2012). Alam et al. (2018) and Obong, Mugonola and Phillips (2017) in their studies in Bangladesh and Uganda identified age and education as a significant determinant of cell phone adoption and use. However, all these studies were in consensus that the use of cellphone decrease with the increase of age. Contradicting this finding Olumide et al. (2010) in Mathuha (2015) found that the age along with education significantly influence an older person's attitude toward perceived usefulness and perceived ease of use of cellphone. Family size can also influence the adoption of technology, as large family has more demand of economic benefit. Moreover, large household need more information exchange, which may influence cellphone use. Thus, Akinola (2017) and Njuguna et al. (2015) in their studies found family size as a significant determinant of cell phone use and adoption. Use of cell phone can also be influenced by marital status. Actually, single and married people have different context, tendencies and information need. In a study in Iraq, Altabatabaie (2018) found that use of cell phone significant vary with marital status and single people showed significantly more use of cell phone compared to married people. Farming experience is another factor can contribute negatively to cell phone use as people having high experience in their job often remain reluctant in using other information sources for better performance. Hence, Asif et al. (2017) in their study found reverse association between farming experience and use of cell phone. Therefore, this research deserved to reveal the impact of personal factors in cell phone use during marine fishing.

H1: Age has an impact on marine fishers' use of cell phone during marine fishing
H2: Education has an impact on marine fishers' use of cell phone during marine fishing
H3: Family size has an impact on marine fishers' use of cell phone during marine fishing
H4: Marital status has an impact on marine fishers' use of cell phone during marine fishing
H5: Fishing experience has an impact on marine fishers' use of cell phone during marine fishing

Among the socio-economic factors income has been identified as a crucial determinant of cell phone use in several numbers of studies (Alam et al., 2018; Obong, Mugonola and Phillips, 2017; Nymba & Mlozi, 2012). Ownership very often ensures instant access to cell phone when accompanied by adequate skill. Thus, Okello et al. (2014) in his study identified mobile phone ownership as a significant determinant of ICT use in Kenya. Nymba & Mlozi (2012) also revealed ownership as an important factor shaping the use of cell phone for agricultural information. Hence, this research also perceives that socioeconomic factors can significantly contribute to use of cellphone during marine fishing.

H6: Income of sea fishers' can significantly influence the use of cell phone during marine fishing
H7: Ownership of cell phone can significantly influence the use of cell phone during marine fishing

Information need and facilities required for operating the technology can play crucial role in shaping the usage of technology. Among the situational factors Nymba & Mlozi (2012) identified agricultural information need as a decisive factor influencing the use of cell phone in acquiring agricultural information. Network availability has been identified as one of the important conditions in cell phone and/or ICT use in several studies conducted in varied geographical locations (Urassa and Mvena, 2016; Tirkaso and Hess, 2015; Mathuha, 2015; Nymba & Mlozi, 2012;). Therefore, this research is profoundly interested in exploring the effect of situational factors in cell phone use during marine fishing and presented the research framework diagrammatically in Figure 1.

H8: Information need can significantly contribute to the use of cell phone during marine fishing
H9: Cell phone network availability can significantly influence the use of cell phone during marine fishing

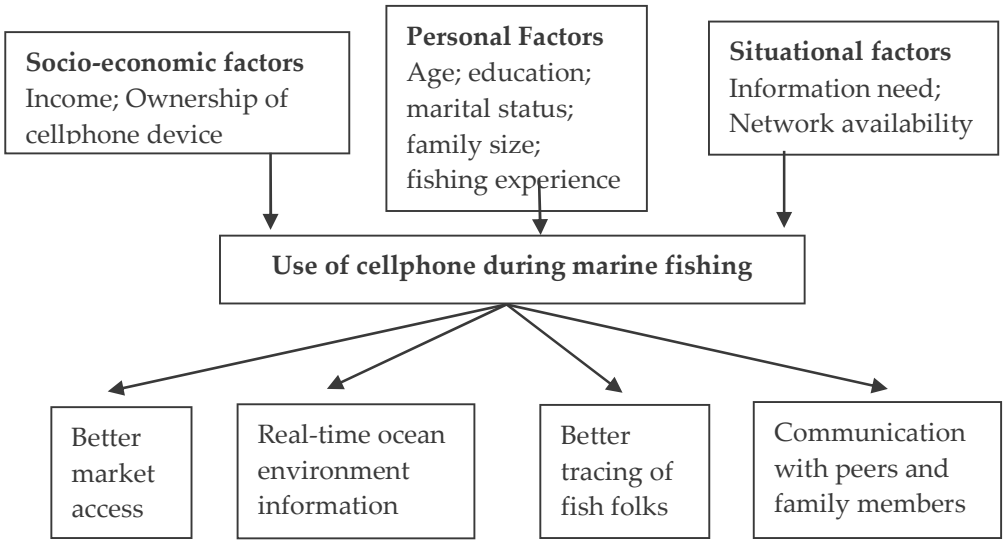
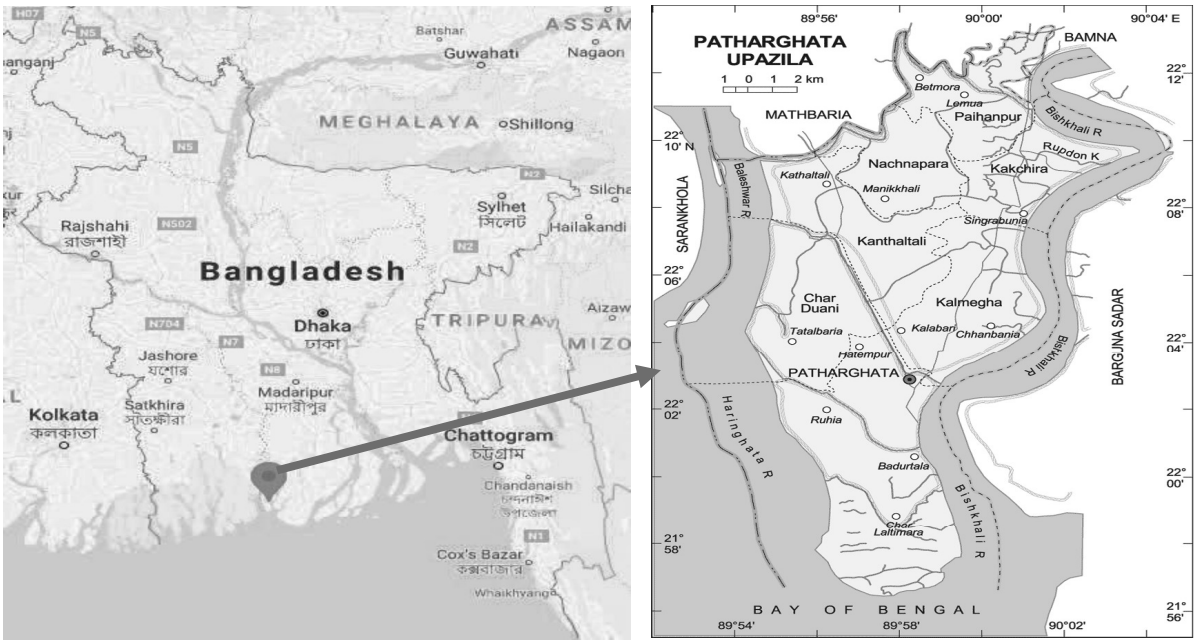


Fig.1 Research framework

Study site

This study was conducted in three selected coastal villages of Patharghata Upazila under Barguna district. The names of the selected villages were Padma, Ruhita, and Badurtala under Patharghata Sadar Union. Patharghata Upazila is mainly bounded by the Bay of Bengal on the southern side, the Biskhali and Baleswar Rivers on the eastern and western sides. The study area is renowned for the presence of a large number of fishermen directly involved in marine fishing. The total area of this upazila is 387.36 Square km and population is about 1, 63,927 (BBS, 2011). This study area has lots of riverine area hence a huge amount of marine fisheries resources is collected every year. However, a map of the study area is displayed in Figure 2.

Figure 2: Map of the study area



Study design

This study adopted structured interview elicited response pertaining to sea fisher's demographic characteristics and use of cellphone during marine fishing as well as their information need, cellphone ownership and network availability.

Population sampling

All the fisheries of three selected villages, fish regularly in the ocean were the population of the study. At first, a list of all the sea fishers were prepared, which included 675 individuals. Consequently, a random sampling method was used to determine the sample size. It is noteworthy to mention that at 90% confidence interval and 5% margin of error the required sample size was 195. Hence, this study selected 202 sea fishers for interview. It is important to note that during final analysis two respondents were dropped due to inconsistency in given information. Therefore, the sample size considered during final analysis was 200.

Measurement of Variables

Use of cellphone during marine fishing was the criterion variable of the study and was measured based on dichotomous response, such as yes and no. The respondents used cellphone 2-3 times in last one month during marine fishing were considered as the user of cellphone, while the participants who did not use cellphone at least 2 times in last one month during marine fishing was identified as non-user of cellphone. However, a detail of the hypothesised variables of this study, their definition and measurement are displayed in Table 1.

Table 1: Hypothesised variables of the study

Variables	Explanation	Type	Measurement	Value
UCELL	Use of cellphone during marine fishing	Dummy	Yes (use cellphone at least 2-3 times/month) No (Don't use cellphone in last one month)	
AGE	Age of the respondents	Continuous	Score 1 for each completed	+/-

EDU	Education of the respondents	Dummy	Can't read and write=0; Can read and write = 1	+
MARST	Marital status of the respondents	Dummy	1= Married; 0= Unmarried	+/-
FAMSZ	Family size of the respondents	Continuous	Number of individuals /family	+/-
EXPFISH	Experience in marine fishing	Continuous	Score 1 for each year of experience	+/-
INCFISH	Income from sea fishing	Continuous	Score 1 for each '000'	+
INFNED	Information need during marine fishing	Continuous	Score (Regularly=4, Frequently=3, Occasionally=2, Rarely=1, No=0) against 7 items	+
AVCENT	Availability of cellphone network during marine fishing	Dummy	Yes=1; No=0	+
OWCELL	Personal ownership of cellphone by the respondent	Dummy	Own=1; Don't own=0	+

Statistical analysis

For describing general characteristics of the respondents this study used descriptive statistics, such as weighted mean, frequency, percentage, etc. The association between predictors and criterion variable was explored deploying chi-square test. Finally, to reveal the determinants of cellphone use during marine fishing, this study adopted logistic regression analysis. In this research, the use of cellphone during marine fishing could take a value of 1 if used and o otherwise. As described by Gugrati, Porter, & Gunasekar (2012), the functional form of logistic model is:

$$P_i = E\left(Y = \frac{f}{x}\right) = 1 \qquad (1)$$

$$P_i = E\left(Y = \frac{1}{x}\right) = \frac{1}{1+e^{-(\beta_0+\beta_1 x_{1\ldots\ldots}\beta_n x_n)}} \qquad (2)$$

For ease of exposition, we can write equation (2) as

$$P_i = \frac{1}{1+e^{Z_i}} \qquad (3)$$

If P_i the probability of using cellphone in equation (3) then ($1-P_i$), the probability of not using cellphone, is

$$1 - P_i = \frac{1}{1+e^{Z_i}} \qquad (4)$$

Therefore, we can write

$$\frac{P_i}{1-P_i} = \frac{1+e^{Z_i}}{1+e^{-Z_i}} \quad (5)$$

Now P_i/ (1-P_i) is simply the odds ratio in favor of using cellphone – the ratio of the probability that a person will use cellphone to the probability that the person will not use cellphone.

Now if we take the natural log of equation (5) we obtain

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_i + \beta_n X_n \quad (6)$$

Z_i = is the function of explanatory variables (x) which is also expressed as:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_i + \beta_n X_n \quad (7)$$

β_0= Incept

β_1, β_2..... β_n are the slopes of equation in the model

X_i = in the vector of relevant determinant

Z_i = is the log of odds ratio

If the stochastic error term u_i is introduced, the logit model stands as:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_i + \beta_n X_n + u_i \quad (8)$$

Before the development of the final model Multicollinearity among the independent variables was assessed and Variance Inflation Factors (VIF) was used to determine the association among independent variables. It is noteworthy to mention that all the analyses were performed using IBM SPSS statistics 23 software.

Results and Discussions

Description and association of sociodemographic characteristics with cell phone use

The majority of the respondents (61.50%) was old young and can read and write (81.50%), and almost all of them (98.50%) were married. Most of the respondents (74.50%) belonged to medium size family and had moderate (70%) fishing experience. More than two third (79.50%) of the respondents had low to moderate income from marine fishing and had medium (69.50%) information need. In case of availability of cell phone network, less than one third respondents (30.50%) explained the cell phone network as available and almost similar percentage (28.50%) of the respondents own cell phone. A detail of all the independent predictors is displayed in Table 2. In addition, Table 2 also presents the relationship between the participant's use of cellphone and the independent predictors based on chi-square test. Characteristics such as education ($p<0.05$), family size ($p<0.000$), income from sea fishing ($p<0.000$), information need ($p<0.01$), availability of cellphone network ($p<0.000$) and ownership of cell phone ($p<0.003$) were significantly associated with the fisher's use of cell phone during marine fishing.

Table 2. Association between sociodemographic variables and the use of cellphone (n=200)

Characteristics	**Use of cellphone**			λ^2
	No, n (%)	**Yes, n (%)**	**Total, n (%)**	
Age				
Young	21 (14.90)	11 (18.60)	32 (16)	
Old young	92 (65.20)	31 (52.50)	123 (61.50)	0.230
Middle aged	28 (19.90)	17 (28.80)	45 (22.50)	
Education				
Can't read or write	32 (22.70)	5 (8.50)	37 (18.50)	0.018
Can read and write	109 (77.30)	54(91.50)	163 (81.50)	
Marital status				
Married	139 (98.60)	58 (98.300	197(98.50)	0.883
Unmarried	2 (1.40)	1 (1.70)	3 (1.50)	
Family size				
Small	99 (6.40)	25 (42.40)	34 (17)	
Medium	116 (82.30)	33(55.90)	149 (74.50)	0.000
Large	16 (11.30)	1 (1.70)	17 (8.50)	
Fishing Experience				
Low	8 (5.70)	5 (8.50)	13 (6.50)	
Moderate	101 (71.60)	39 (66.10)	140 (70)	0.665
High	32 (22.60)	15 (25.40)	47 (23.50)	
Income from fishing				
Low	50 (35.50)	52 (88.10)	102 (51)	
Medium	51 (36.20)	6 (10.20)	57 (28.50)	0.000
High	40 (28.40)	1(1.70)	41(20.50)	
Information need				
Low	22 (15.60)	20 (33.90)	42 (21)	
Medium	103 (73)	36 (61)	139 (69.50)	0.010
High	16 ((11.30)	3 (5.10)	19 (9.50)	
Availability to cellphone Network				
No	132 (93.60)	7 (11.90)	139 (69.50)	0.000
Yes	9 (6.40)	52(88.10)	61 (30.50)	
Ownership of cellphone				
No	110 (78)	33 (55.90)	143 (71.50)	0.003
Yes	31(22)	26 (44.10)	57 (28.50)	

Information need

As indicated in Figure 2 fishers need different types of information of which need of weather information was on the top (WM=3.65). Other major aspects of information need encompass family member's information (WM=2.54), fish marketing related information (WM= 2.02), information on places of fish availability (WM=1.55), etc. A detail of information need of sea fishers during marine fishing is presented in Figure 2. Supporting our findings, a study focused on mobile phone use in Ugandan aquaculture found that farmers used cellphone for contracting family members, input suppliers and market information (Matuha, 2015).

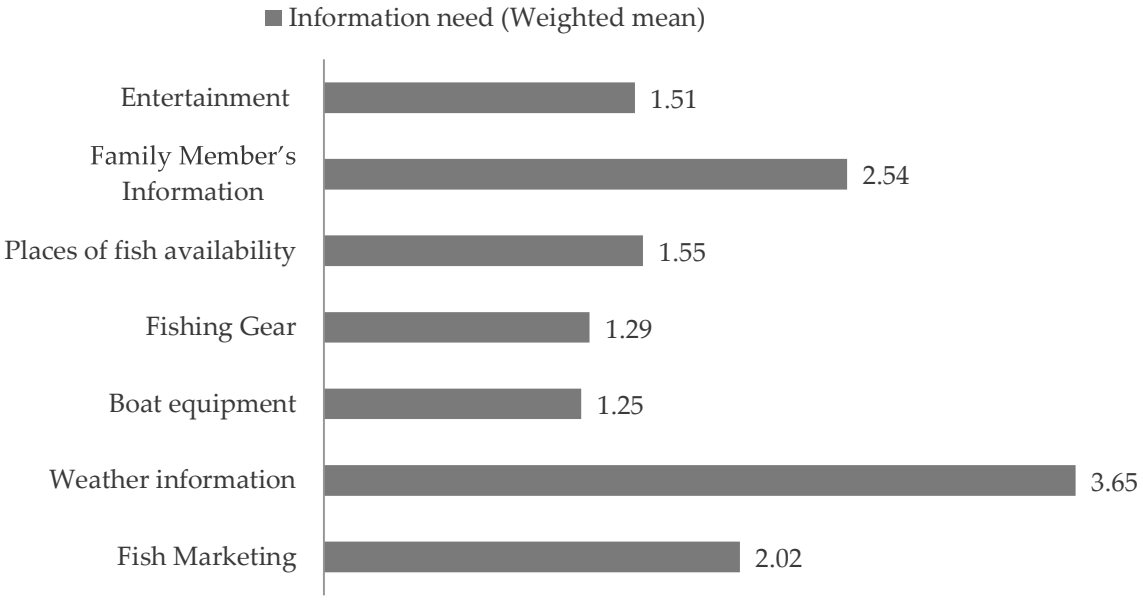


Fig.2 Information need of fishers during marine fishing

Determinants of marine fisher's use of cellphone

Table 3 presets the results of unadjusted and adjusted OR in using cell phone during marine fishing at 95% CI. Factors statistically significant in the unadjusted model were entered into the adjusted model. The findings say that among the independent predictors, income from fishing, information need, availability of cell phone network and ownership of a cell phone is significantly influencing the cell phone use. Fishers having low and medium income from sea fishing had 20.35 times (OR=20.35, 95% CI: 4.24, 97.48; $p<0.000$) and 9.53 times (OR=9.53, 95% CI: 0.99, 91.12; $p<0.05$ more chances to use cellphone compared to fishers having a high income. Participants having low information need are 9.09 times (Reverse OR= 9.09, 95% CI: 0.01, 1.37; $p<0.10$) less likely to use cellphone during marine fishing than the fishers having high information need. Fishers enjoy availability of cellphone network were 166.20 times (OR=166.20, 95% CI: 38.35, 720.28; $p<0.000$) more inclined to use cellphone than those who didn't

find mobile network available. Similarly, the participants own cell phones were 6.56 times (OR= 6.56, 95% CI: 1.69, 25.44; p<0.01) more prone to use cellphone than the fishers didn't possess a cell phone.

Table 4. Determinants of the use of cell phone by sea fishers during marine fishing

Variable	**Unadjusted model**				**Selection for adjusted model**	**Adjusted model**			
	SE[1]	**OR[2]**	**95^ CI[3]**			**SE[1]**	**OR[2]**	**95^ CI[3]**	
Constant	4.65	0.03				1.10	0.013***		
Age					No				
Young	1.72	0.13	0.01	3.63					
Old young	1.27	0.33	0.03	3.92					
Middle aged (Ref.)		1.0							
Education	1.14	1.57	0.17	14.59	No				
Marital Status	4.37	0.59	0.00	3101.2	No				
Family size					No				
Small	1.57	2.05	0.09	44.17					
Medium	1.52	0.43	0.02	8.46					
Large (Ref.)		1.0							
Fishing Experience									
Low	2.38	3.47	0.03	370.03	No				
Medium	1.18	2.39	0.24	24.03					
High (Ref.)		1.0							
Income from fishing					Yes				

Low	0.89	21.21***	3.71	121.25		0.79	20.35***	4.24	97.48
Medium	1.24	10.37*	0.92	117.10		1.15	9.53**	0.99	91.12
High (Ref.)		1.0					1.0		
Information need					Yes				
Low	1.39	0.14*	0.01	2.13		1.20	0.11*	0.01	1.13
Medium	1.23	0.37	0.03	4.14		1.08	0.27	0.03	2.26
High (Ref.)		1.0							
AVCENT	0.79	142.92***	30.42	671.48	Yes	0.74	166.20***	38.35	720.28
OWCELL	0.73	4.93**	1.17	20.70	Yes	0.69	6.56**	1.69	25.44
Observations (N)						200			
Cox & Snell R Square (%)						56.1%			
-2Log likelihood						78.15			
LR λ2 (4)						164.46***			
Hosmer and Lemeshow (p-value)						7.38 (0.390)			
Range of VIF (Min.-Max.)						1.02-1.329			

Note: *p<0.10, **p<0.05, and ***p<0.01, [1]Standard Error, [2]Odds ratio, [3]Confidence interval, VIF = Variance Inflation Factor

A number of regression diagnostic tests were also performed to ensure the precise estimation (Table 4). The VIF value with a range of 1.02-1.33 indicated the absence of multicollinearity problem in the model (Daoud, 2017). The value of Hosmer-Lemeshow statistics showed insignificant difference exists between the observed data and the full model (p = 0.390), indicating a good fit between the two (Hosmer & Lemeshow, 2000). With an area of 0.969, ROC curve confirmed the sufficient predictive power of the fitted model (Seshan, Gönen & Beeg, 2013).

Discussion

This study aimed to examine the predictors of the use of cellphone during marine fishing in some selected villages in adjacent areas of the Bay of Bengal. The determinants that significantly increased the use of cellphone include low income from sea fishing, information need, availability of cellphone network, ownership of

cellphone. Low income participants were most likely to use cellphone compared to high income fishers. Sikundla, Mushunje & Akinyemi (2018) in their research focusing socioeconomic drivers of mobile phone adoption for marketing among smallholder irrigation farmers in South Africa also identified monthly income as a significant driver of mobile phone adoption. In the coastal area of Bangladesh, mobile phone network is available in the nearby areas of the shore, where the depth of the sea water is shallow and eventually has low availability of fish and other resources. On the contrary, cellphone network is not available in the deep sea, which is more resourceful compared to shallow areas. Hence, the fishers have more income from the sea fishing showed less use cell phone.

Information need during fishing has emerged as a significant determinant of cellphone use during marine fishing. Actually, marine fishers are highly vulnerable to the wilder nature of the ocean due to dynamic sea current, wind speed, direction, wave heights, etc. (Singh, Kimbhune and Singh, 2017). As a result, the fishers and their family members always remain anxious of unwanted situations. Hence, to reduce anxiety and moving to safety at the right time, real time weather information and communication with family members on shore is vital. On the other hand, getting proper price of the catch is crucial to ensure satisfactory income. Perhaps due to these facts, the major sector of information need for the fishers is weather information, family member information and fish marketing related information.

Participants enjoying availability of cellphone network were significantly highly inclined to the use of cellphone during marine fishing. Supporting our findings, Urassa & Mvena (2016) claimed that level of cellphone network coverage had significant association with access to beef cattle market information via cellphone. Similarly, Matuha (2015) also identified cellphone network as an important factor alter the use cellphone in Ugandan aquaculture. A mobile phone is commonly described as physical device that can be carried to anywhere. It is composed of a battery to provide power and must have some type of mobile network connectivity in order for the device to operate and to send and receive data (Mobile Networking: Definition, Components & Comparison, 2018). Therefore, the network infrastructure (e.g. available base stations) is a crucial issue to consider as it is directly linked to 'network effect' (Islam & Grönlund, 2011).

This research identified cellphone ownership as a major determinant of cellphone use during marine fishing which is supported in several studies. For instance, Freeman & Mubichi (2017), Okello et al. (2014) has submitted device ownership as an important factor in the use of ICT for agriculture and market information. Another study in Hungary Mezei, Benyi, and Muller (2007) also explored association in mobile ownership and regular use among school children. In fact, ownership of device can guarantee instant access to services if the user has skill in using device and other facilities, such as balance, power supply, etc.

Practical implications

Warm tropical climate accompanied by high rainfall and flow of abundant nutrients from the land has created the coastal and marine environment of Bangladesh as world's richest ecosystems with high productivity (Hossain, 2001; Islam, 2003 in Shamsuzzaman et al., 2017). Despite the presence of huge marine resources, marine fishing in Bangladesh is predominantly performed through non-mechanised boats. According to DoF (2016), marine fish stock in the country is captured and harvested through a limited number of commercial trawlers (247 trawlers), 32,859 motor driven boats and 34,810 non-motor driven artisanal boats. This low mechanisation posed several challenges, such as lower amount marine catch, over exploitation of shallow marine area, inability to usurp the potential of the commercial fishing zone, and loss of life and resources in the sea. Efficiency of marine fishing and loss of lives and resources can be minimised by applying cell phone. The mobile phone could help fishermen with safety information and effective fishing through providing real-time information on potential fishing zones (Amrita & Karthickumar, 2016). However, use of cell phone for marine fishing depends upon both modifiable and non-modifiable factors. Two major modifiable factors identified in this research are availability of cell phone network and ownership of cellphone device. Hence, Policymakers should take immediate initiatives to develop the mobile phone network infrastructure to amplify the mobile phone network coverage in the potential marine fishing zones of the country. Policies also need to identify pathways to increase cellphone ownership among the fishers as cellphone ownership is a key driver of cellphone use during marine fishing.

Future studies should evaluate the ways of innovate application of cell phone for better fishing and providing real-time information on the dynamic ocean environment in a cost-effective way. Spatial research is also necessary to explore other socioeconomic and demographic factors influence the use of cell phone during marine fishing.

Limitations of the study

This study embraces several limitations, such as fisherman's use of cellphone may vary significantly based on geographical location and socioeconomic status of the fishermen. The geographical coverage of this study is very limited, which may fail to capture the real situation due to failure of considering spatial variability. Socioeconomic factors supposed to influence the fishermen's use of cellphone are not limited as this study perceived. So, consideration of more factors could portray a more vivid picture. Last but not least, this study measured fisher's situation and their use of cell phone based on respondent's opinion. However, direct observation of the real situation during marine fishing may provide a more precise scenario.

Conclusions

The application of cell phone in the marine fishing sector can cater numerous benefits related to income, safety, and security. This study attempts to explain the factors that influence the use of cell phone during marine fishing by the sea fishers and found income from sea fishing, information need, network availability, and ownership of cell phone as significantly influential factors. Thus, for the additional use cell phone during marine fishing, the concerned authorities intend to enhance income, security and risk reduction in sea fishers using cell phone-based services, should shed light on the development of cell phone network in potential fishing zones of Bangladesh. Moreover, they also need to consider the supply of cell phones in affordable price.

The findings of this study provide an applied guideline for the increased use of cell phone during marine fishing in developing countries. In addition, this study also creates an opportunity for cell phone-based fishing technology developers and information service providers to gain a better understanding of the end users, which in turn will develop their capacity to face the challenges in designing and implementing successful cell phone-based services.

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