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Influence of Behavioural Factors on Mobile Phone Usage among Fishermen to Seek Climate Change Related Information

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Abstract

In this millennium era, information can be obtained through mobile phones, one of the tools of Information and Communication Technology (ICT). Mobile phones play an active role in channeling information related to climate change among fishermen. The present study tries to understand how behavioral factors can influence mobile phone usage among fishermen to gain climate change-related information. The study relies on the quantitative questionnaire to collect data from 400 selected respondents via two stages of cluster sampling. The four areas involved were Kuantan (Pahang), Perhentian Island, Kuala Terengganu, and Tumpat (Kelantan). The result shows that the majority of the fishermen are those aged more than 51 years old (40%). The results showed that behavioural intention, performance expectancy, attitude, and social influence have a positive and significant relationship with mobile phone usage.

Keywords: Behavioural Factors, Mobile Phone Usage, Climate Change, Fishermen, Quantitative Method

Introduction

Mobile phones may be a technology that is considered traditional among the general public. Still, this technology is vital for specific communities, such as small-scale fishermen. It is no wonder why the study by Omar et al (2012); Shaffril et al (2021) found that more than 95% of small-scale fishermen carry mobile phones with them every time they go out to sea to catch fish. Mobile phone offers significant functions, and among them is to obtain and disseminate weather information. Climate change in Malaysia is not a new phenomenon. Some signs of climate change such as increasing temperatures How et al (2023), instability of rainfall patterns Wan Azli (2010), rising sea levels Simons et al (2023), the frequency of strong winds

and big waves Razali et al (2010), the instability of the east coast monsoon season Suhaila et al (2010) has already been detected in this region.

These changes have had a direct and indirect impact on the socio-economic routine of fishermen. Among the effects are 1) preventing small-scale fishermen who mostly only steer small vessels and low-powered boat engines from going out to sea to earn a living, 2) damaging the physical infrastructure of fishermen such as houses, fishing jetties, and fishing markets, 3) reduce the quantity and quality of living resources in the sea such as fish, squid, shrimp, and crabs and further affect the income of fishermen. Adapting to these impacts is seen as one of the effective measures to reduce these impacts. Several tools are used to facilitate community adaptation to climate change, including communication technology. Communication technologies such as mobile phones have long been used abroad to increase the strength of a community's adaptation to climate change. Mobile phones have been proven to speed up the information-sharing process and increase public awareness of the dangers of climate change. In Nepal, for example, communities use it as a tool to spread early warning Islam et al (2016), while in Africa, farmers use it to disseminate information about the impact of climate change and how to control it (Yegbemey et al., 2023). It's a different story in Ghana, where rural communities can use it to get information and ask questions about climate change (Dumenu et al., 2016).

Technology use has long attracted researchers' interest, especially about influencing factors, frequently used and combined models and theories such as UTAUT, TAM, DOI, and TRA. The factors included in this model have been tested for their effectiveness on community groups such as professionals, education, and consumerism (Parayil et al., 2023; Haneefa, 2023; Bhati et al., 2023; Wijaya and Weinhandl, 2022). The success of this kind of study has proven that for these groups, there are already strong models of technology use that can be referred to. Despite the flurry of related studies, there are not many models that can be consulted regarding how small-scale fishermen use mobile phones to obtain information on weather changes and subsequently cause a lack of comprehensive understanding of this issue and subsequently cause the policy to be formed to be less in line with interests, wishes, and abilities of the target group. This study is interested in examining the potential of behavioral factors, namely behavioral intention, performance expectancy, effort expectancy, social influence, attitude, and facilitating condition to influence the use of mobile phones to obtain information on climate change among small-scale fishermen in Malaysia.

Literature Review

Compared to deep-sea fishermen, small-scale fishermen, also known as coastal fishermen, make up almost 65% of the registered fishing population in this country (Ramli et al., 2013; Shaffril et al., 2021). These small-scale fishermen have several characteristics, among which they go to sea with small-sized vessels (the majority are 22 feet and below), use low-power boat engines (the majority are 40 horsepower and down), and use traditional fishing tools such as bubu, seines, and drift nets (Abu Samah et al., 2019). Although in terms of the use of fishing technology, small-scale fishermen need to catch up, however, in terms of the use of basic communication technology such as mobile phones, the majority of them are users. Although mobile phones are an outdated technology for the general public compared to smartphones, for small-scale fishing groups, this technology plays a vital role, significantly helping them cope with the impacts of climate change. Several studies have been done to identify the potential of mobile phones in helping to face the effects of climate change.

A quantitative study by Shaffril et al (2017) focused on adaptation to climate change among 400 small-scale fishermen. They found that the fishermen studied had three high levels of adaptation, namely knowledge about the environment, formal and informal networks, and awareness and positive attitudes towards the environment—nevertheless, a total of 13 aspects of adaptation recorded moderate and low levels of strength. Shaffril et al (2017) in his study suggested that mobile phone technology can be used to help fishermen cope with the effects of climate change. This study provides an example of the success of Fisher Friend technology in assisting small-scale fishermen in India, where the weather change information provided can help fishermen plan safe trips and warn other friends of the danger of extreme weather that is about to strike.

Shaffril et al (2014) studied mobile phone use and focused on the pattern of mobile phone use among 250 fishermen. Shaffril et al (2014) have concluded that fishermen consider mobile phones a tool they must bring together to the sea, and among the main factors that fishermen bring with them to the sea are emergency and safety factors. They said the aspects of weather change and the uncertain weather conditions now require them to carry a tool that can help in times of emergency. The analysis of this study also found that fishermen use mobile phones to obtain weather information. Another study conducted by Nikoi et al (2016) evaluated how mobile phones can be used as one of the appropriate tools to help agricultural communities cope with the impact of climate change. This study found that extension officers only gave brief training because mobile phones are a user-friendly and easy-to-use technology. It has also seen how mobile phone technology has successfully spread and accelerated the sharing of information about climate change, allowing agencies and communities to take proactive action. Nikoi et al (2016) concluded that in the context of climate change, mobile technology is a tool that can save property and lives in addition to removing farming communities from the shackles of poverty.

Several behavioral factors are accentuated in specific models that can be used to understand mobile phone use among small-scale fishermen. For example, the Unified Theory of Acceptance and Use of Technology (UTAUT) is a model Venkatesh and his colleagues developed in 2003. This model has four primary constructs, which are 1) perception of usefulness, 2) perception of ease of use, 3) social influence, and 4) ease of facilities. In addition, this model has one mediating factor, behavioral intention, and four moderating factors, which are gender, age, experience, and voluntary use. The Technology Acceptance Model (TAM) is a model that provides an understanding of the acceptance and use of technology. This model summarizes when a community is exposed to new technology, several factors such as perceptions of usefulness, ease of use, behavioral intentions, and attitudes towards use influence the use of technology. The Theory of Reasoned Action (TRA) is another classic theory that can be used to understand the use of technology in the community. This theory was developed by Martin Fishbein and Icek Ajzen in 1967, and initially, it was a theory that focused on attitudes. In the context of technology use, TRA can describe how a person's attitude can influence the use of technology. Behavioral intentions and environmental influences are also factors considered in this theory. The Diffusion of Innovations Theory was developed by Everett Rogers in 1962, and it emphasizes that the diffusion process is a process where one innovation is disseminated to the community in a social system. In addition, Rogers noted four essential elements to spread a new idea, namely 1) Innovation itself, 2) communication channels, 3) time, and 4) social system. This theory has several categories of use, namely early adopters, early majority, late majority, and laggards.

Methodology

This research used a quantitative approach (cross-sectional survey). Data were collected using a questionnaire consisting of three parts. The first part measures the use of mobile phones to obtain information on weather changes, the second part measures behavioral factors, and the third part measures the socio-demographic aspects such as gender, age, education level, household members, household income, and experience as a fisherman. The number of selected samples for this study is 400. The study relies on random cluster sampling whereby, at the first stage, all fisheries districts in Malaysia were listed. Then, four fisheries districts, namely Kuala Terengganu, Kuantan, Tumpat, and Perhentian Island, were randomly selected. For each of the selected districts, 100 small-scale fishermen were chosen as the samples for the study. Before the data collection process, the research team visited potential areas to know their suitability for the study. The researchers built up connections and linkages with local leaders and the community during the visit. The process was mainly conducted at community places of interest, such as public halls, coffee stalls, and their homes. The process was assisted by enumerators who were briefed and trained before the data collection activity. The primary technique used to collect the data was survey. The survey was conducted in the local language, and the respondents were allowed to ask questions if they needed clarification. The study uses inferential statistics such as Pearson product-moment correlation for relationship analysis.

Result and Discussion

Table 1 depicts the socio-demographic data of the respondents studied. Based on the results, most respondents were male (99.5%). Thus, the result agrees that the male group monopolized the fishermen community in Malaysia. Moreover, this result shows that the majority of fishermen are among those aged more than 51 years old (40%). Otherwise, this study observed that the average age among respondents is 45 years old. Most respondents have education level until secondary school (35.7%).Furthermore, the result shows that most respondents have some household members between 4-6 people (49.5%). The average household income is RM2163.40. Also, the majority of respondents have experience as a fisherman for 21 years (Table 1)

On average, small-scale fishermen use mobile phones to seek climate change-related information almost seven times a week. The present study reveals that 54% use six (6) while the remaining fishermen (46.0%) use mobile phones less than five times a week. (Table 2).

Table 1
Socio-demographic data of the respondents

Factors	Frequency	Percentage	Mean
Gender			
Male	398	99.5	
Female	2	0.5	
Age			44.8
30 years old and younger	93	23.3	
31 to 50 years old	147	36.7	
51 years old and older	160	40.0	
Education level			
Never been to school	20	5.0	
Primary school	118	29.5	
Secondary school (lower level)	95	23.8	
Secondary school (upper level)	143	35.7	
Tertiary level	24	6.0	
Number of household members			
3 members or less	74	18.5	
4 to 6 members	198	49.5	
7 members or more	128	32.0	
Household income			2163.4
RM1000 or less	139	34.8	
RM1001-RM2000	136	34.0	
RM2001 or more	125	31.2	
Experience as a fisherman			21.2
5 years or less	74	18.5	
6 to 15 years	117	29.3	
16 to 25 years	64	16.0	
26 years or more	145	36.2	

Table 2
Frequency of using mobile phones to gain climate change-related information

5 times or less in a week	184	46.0	
6 times or more in a week	216	54.0	
Mean score			**6.7**

Relationship between mobile phone usage and selected behavioral factors

Based on the data above, four out of six behavioral factors studied have a significant and positive relationship with mobile phone usage (Table 3). BI (r = .213), PE (r = .203) AT (r = .175), SI (r = .120), and AT (r = .175) have a low and positive relationship with mobile phone usage. PE has been consistently recognized as a significant contributor to community

technology usage (Ali et al., 2022; Shaffril et al., 2021). Shaffril et al (2021) show that communities perceive technology as beneficial to them if it enables them to increase their productivity, gather large amounts of information within a short time, consume minimal cost, and easily connect them to the community; thus, it is not surprising that PE is positively associated with fishermen's mobile phone usage here, as the technology enables them to consume less time, money and energy via information sharing while reducing their vulnerability towards specific threats during their fishing operations. Additionally, EE has a positive and moderate relationship with fishermen's mobile phone usage. The data gained is in tandem with that found by Al-Al-Sabaawi et al (2023), who accentuated that people will start to use technology if it is easy to use and stop using it if it poses difficulties.

Moreover, Ramayah and Ignatius (2005) stressed that enjoyment is a critical aspect, as a lack of enjoyment can impinge on EE towards technology usage. BI was another construct with a positive and low relationship with fishermen's mobile phone usage. BI is hugely affected by attitude. Siyam (2019) provides a simple explanation regarding the role of attitude in technology usage in that those with a positive attitude will use the technology, and those with a negative attitude will hesitate to do so. It is not surprising that SI can inhibit mobile phone usage among fishermen. A study conducted by Mensah et al (2023) confirms that SI is a crucial factor in encouraging people to use technology by accentuating that people who are surrounded by a community that actively uses technology will be influenced to use the same technology. Additionally, Mensah et al (2023) stress that people will adopt certain technologies based on the perception that people close to them have embraced and expect them to use the technology.

Table 3
Relationship between behavioral factors and usage of mobile phones to seek climate-related information among fishermen

Behavioural factors	**r**	**p**
Behavioral Intention (BI)	.213	.0001
Performance Expectancy (PE)	.203	.0001
Effort Expectancy (EE)	.092	.066
Social Influence (SI)	.120	.017
Attitude (AT)	.175	.0001
Facilitating condition (FC)	.053	.295

*BI & PE = Low Correlation; Definite But Small Relationship **~ 0.20- 0.39**
*AT, SI, EE AND FC = Slightly; Almost No Relationship **~ <0.19**

Conclusion

To date, there are not many models that can be consulted regarding how small-scale fishermen use mobile phones to obtain information on climate change impacts, and this result in a lack of comprehensive understanding of this issue and cause the policy to be formed to less in line with interests, wishes, and abilities of the target group. This study is interested in examining the potential of behavioral factors, namely behavioral intention, performance expectancy, effort expectancy, social influence, attitude, and facilitating condition, to influence the use of mobile phones to obtain information on climate change among small-scale fishermen in Malaysia. This study concludes that four behavioral factors, namely behavioral intention, performance expectancy, effort expectancy, and social influence, have a positive and significant relationship with mobile phone usage. Two factors, namely attitude

and facilitating condition, on the other hand, did not have any significant relationship with mobile phone usage. Future studies should explore the possibility of having more behavioral factors in their research, as the current factors show almost no to small relationship. Among possible additional factors are cultural learning, compatibility, and self-esteem. There are several limitations of this study: first, there are no mediating or moderating analyses performed, and second, the study merely focuses on four fishing areas in Peninsular Malaysia.

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