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Acceptance of Technology among Malaysian Fishermen

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Abstract

This paper delves into research on acceptance of state-of-the-art in technology at the individual level among fishermen in Malaysia. This study is quantitative, and surveys a total of 200 registered fishermen from Johor, Malacca and Selangor. The analyses performed have confirmed that the main points that gear fishermen toward accepting fishery technology are related to the issues of safety, technological skill and knowledge, time saving, and minimization of interference by the middleman. A number of discussions and recommendations have been placed and can be expected to assist the relevant parties concerned with constructing strategies to further encourage the use of fishery technologies among fishermen in Malaysia.

Keywords: fishery technology, acceptance, fishermen, fisheries development

1. Introduction

Evolution of technology has changed the way the fishermen conduct their fishing routine. Fishery technologies is proven to increase productivity and income, lessen the associated risks, enhance communication quality, and save time and such benefits are expected to positively benefit a total of 134,110 registered fishermen in Malaysia. The main objective of this paper has much to do with fisheries technologies and Malaysian fishermen whereby it intends to determine the acceptance of fishery technology among Malaysian fishermen. Acceptance can be defined as the variations that can be seen among members of any group with reference to particular characteristics, such as temperament, energy level, friendship patterns and parent-child attachment (Borich & Tombari, 1997). Having the fisheries technology it without having the supports from the target groups-the fishermen, is seen as useless efforts. Research with regard to fisheries technology has been conducted by scholars across the globe, with a focus having been placed specifically on the fishermen's attitude, social environment, socio-economic benefits, and perceived ease of use of technology (Venkatesh & Morris, 2000; Shih, 2004; Luarn & Lin, 2004; Shiro, 2008). However, studies with reference to acceptance of the use of fishery technology are scarce, which thus gives rise to the need for such a study to be conducted.

1.1 The Fisheries Industry in Malaysia

In the year 2011, the fisheries sector contributed 1.1 per cent to Malaysia's gross domestic product (DOF, 2011). Generally, the fisheries industry consists of two major components, namely marine-capture fisheries and aquaculture. Marine-capture fishing was categorized into two main types, namely coastal or inshore fishing, and deep-sea fishing. The Malaysian fishing industry-in particular deep-sea fishing and aquaculture-is required to grow further into a large-scale commercial industry, in order to support Malaysia's aim to reach a high income level by 2020.

The Third National Agricultural Policy, or DPN3 (1998-2010), focused on the need to improve local food output and food resources strategically, in order to ensure sufficient supplies and amenities, and safe, nutritious, high-quality food at an affordable price. With the economic downturn, the food sub-sector was identified as the area that could not only help revitalize the economy and improve the balance of trade, but also strengthen food security. The government has identified four major commodities that are considered pivotal to food security: rice, fish, livestock and vegetables. A number of strategies have been identified to raise the production of these commodities, and as a result, the self-sufficiency level of several food commodities has improved. The self-sufficiency level (SSL) for fisheries increased from 91 per cent in 2005 to 104 per cent in year 2010, as shown in Table 1.

Table 1. Percentage of self-sufficiency level (SSL) in food commodities, 2000-2010

Commodities	2000 (%)	2005 (%)	2010 (%)
Rice	70	72	90
Fruit	94	117	138
Vegetables	95	74	108
Fish	86	91	104
Beef	15	23	28
Mutton	6	8	10
Poultry	113	121	122
Eggs	116	113	115
Pork	100	107	132
Milk	3	5	5

Source: Economic Planning Unit (2006)

Generally, Malaysia's marine areas are divided into four sub-areas: the west and east coasts of Peninsular Malaysia, and the coasts of Sarawak and Sabah. Based on the Fisheries Comprehensive Licensing Policy (FCLP) Malaysia's fishing waters are divided into four zones (Raidah et al., 2012):

1) Zone A: 0-5 miles from shore, this area was reserved for traditional fisheries;

2) Zone B: 5-12 miles from shore, this area was reserved for commercial fisheries that use vessels with capacities below 40 Gross Registered Tonnage (GRT);

3) Zone C: 12-30 miles from shore, this area was reserved for commercial fisheries that use vessels with capacities above 40 GRT;

4) Zone C2: 30 miles from the shore and beyond, this area was reserved for commercial fisheries that use vessels with capacities of 70 GRT and above.

1.2 Fishery Technology and the Fishermen

Coastal fishermen-known also as Zone A fisherman-typically use traditional tools relative to their lower catch volume. Meanwhile, deep-sea fishermen-or Zone B and Zone C fishermen-use advanced-technology, and also has the highest level of market access.

Basically, the fishermen require two types of technology: capture technology and information and communication technology (ICT). Fishery capture technology refers to the type of nets used, the engine capacity and refrigerated sea water (RSW). After that, examples of ICT include mobile phones, global positioning systems (GPS) and echo sounders, and sometimes computer and wireless sets.

Zone A fishermen's level of dependency on technology is still low. Their catchment areas are also very limited, and the potential for access to deep-sea fishing being low while they remain using traditional fishing equipment. Other limiting factors for Zone A fishermen include the annual monsoon season, which limits income, as well as the perishability of fish, making it difficult for them to market their catches extensively. On the other hand, access to a wider market is an important aspect of large-scale or commercial fisheries. The existence of RSW technology on each vessel allows them to keep their catch longer than traditional fishing without RSW would. This helps them market their catch in and outside the country. The use of computers and broadband also helps them market their catches. In addition to this, the use of GPS, sonar and radar can also help Zone B and C fishermen expand their catchment area.

1.3 Benefits of Technology for the Fisheries Industry

According to the Food and Agriculture Organization of the United Nations (FAO) (2013), the opportunities for innovation have been especially good in recent decades, with advances in areas such as fiber technology, mechanization of gear handling, improved performances of vessels and motorization, computer processing for gear design, navigation aids, and fish detection, to name but a few. New-technology adoption can be viewed as one of a range of competitive strategies available to commercial fishing firms.

It clearly makes a difference to the outcome as to whether the innovation is a radical new method or merely a small improvement in technique, whether the potential consumer is a large multi-vessel organization or a single boat handler, whether the fishing community is generally progressive or conservative, and whether the strain to

enhance efficiency is intense or otherwise.

Especially true in the case of fishermen working on large vessels that operate in Zones B, C0 and C2, the duration of their fishing routines has decreased along with their increased use of technology, meaning that they have more time to spend with their families and attend social functions. For Zone A, they can go back and forth on the same day without having to spend the night in the middle of the ocean.

Other than that, the safety aspects of the fishermen can be strengthened. This is due to the use of mobile phones, and stronger phone signals than in the past. Fishermen can receive weather updates or fishing locations from other fishermen out at sea, and can trust that first-hand information to be reliable and accurate. In addition to this, the market price can be updated, while the fishermen are working. For example, in Kuala Muda, Kedah, there is a market called "Pasar Bisik". Fishmongers will offer the fishermen their best price, until they can strike a deal with the fishermen-this bartering is fast-moving and requires timely communication. Those fishermen who come back earlier will get the highest price. Thus, using technology may also help reduce the utilization of manpower and save time.

2. Methodology

A questionnaire was used to conduct this study. Through a multi-stage random sampling, a total of four fishing districts in Peninsular Malaysia were selected: Rengit (Johor), Pasir Panjang (Johor), Kuala Sungai Baru (Malacca) and Kuala Selangor (Selangor). Each area was represented by 50 respondents, giving a total of 200 respondents. The time taken to carry out this study was about 15-20 minutes for each respondent. The chosen 200 respondents consisted of the members of the fishermen's association. For each of the questions asked of them, they were given a five-Likert scale option, whereby one represents strongly disagree, two represents disagree, three represents moderately agree, four represents agree and five represent strongly agree. To achieve the objectives of the study, descriptive statistics, such as frequency, percentage and mean, were employed in order to describe the general data of the study.

3. Results and Findings

3.1 Respondents' Demographic Data

The results showed that most of the fishermen are Malays (93.2 per cent), and that prevalence of men in the fishing industry was still high at 97.1 per cent, indicating that the fishing industry still suffers low recognition among women. The majority of these communities were educated to a low level, with 60.8 per cent of them having completed their education only up to primary level. In addition to this, the mean score recorded for experience-35.0 years-showed that the majority of the respondents interviewed can be considered to be experienced fishermen. Regarding the fishermen category, there were low percentages of skipper in this study, at just 26.8 per cent. In addition, a total of 80.9 per cent of them were Zone A fishermen, who are considered to be accomplished coastal fisherman.

3.2 Acceptance towards Fishing Technologies

Table 2 shows the results regarding the statements that measure the acceptance of fishing technology among fishermen. Based on the analyses performed, it can be seen that the statement "My crew and I feel safer using new fishery technology" recorded the highest mean score (M=4.53). The second highest mean score was recorded in the statement "I am very skilled at using the technology on my vessel" (M=4. 27). The lowest mean score was recorded for the statement "Use of technology makes the catch process much harder" (M=1.24).

Table 2. The acceptance of fishing technology usage

Statement	Strongly Disagree (%)	Disagree (%)	Moderately Disagree (%)	Agree (%)	Strongly Agree (%)	Mean
I am very skilled at using the technology on my vessel	3.8	4.3	11.3	22.1	58.5	4.27
I am not using technology, such as GPS or Sonar, for searching the positions of other vessels.	62.3	18.7	8.6	3.7	6.7	1.74
I can have my own technology without any help from any party	72.3	12.0	8.1	5.3	1.3	1.48
Use of technology has decreased my income and my total catch	64.3	18.7	6.6	3.7	6.7	1.42

Statement	Strongly Disagree (%)	Disagree (%)	Moderately Disagree (%)	Agree (%)	Strongly Agree (%)	Mean
Use of the technology makes the catch process much harder	69.9	13..4	10.5	1.9	4.3	1.24
My crew and I feel safer using new fishery technology	3.7	1.8	5.8	11.7	77.0	4.53
'I am saving my time by using new tools and fishing technology'	23.5	19.5	24.0	21.8	11.2	4.26
I have entered another fishing zone	37.3	27.5	11.7	19.8	3.7	1.55
I know how to use the technology on my vessel	4.8	2.9	7.4	42.2	42.7	4.14
By using the technology allows me to sell my own catch without interference from the middlemen	2.4	11.0	4.3	37.8	44.5	4.13

4. Discussion

Within the scope of this study, it has been found that there are a number of points that incline fishermen toward accepting fishery technology. First, they accept the technology as they possess knowledge about it. The results shown above demonstrate that the majority of the respondents know how to use the technology on their vessels. Fishing technology was invented a few decades ago to make fishing easier, and as these technologies have evolved, they have been developed to become increasingly user-friendly. Such user-friendliness has provided more and more fishermen with the opportunity to learn how to use the new technologies available, regardless of their age or education level. In the current setting, by using ICT like mobile phones, fishermen can be more independent. They can market their own yield without interference from the middlemen, which then results in a higher income. Mobile phone use helps them keep abreast of current market price, catchment areas and weather forecasts.

Safety is one of the things that spurred the fishermen in our study to start using technology. Results gained have demonstrated that a total of 77 per cent of respondents strongly agreed with the statement, "My crew and I feel safer using new fishery technology". Fishermen are vulnerable towards a number of threats while operating at sea. For example, visibility is limited during the night and in bad weather conditions, and there is therefore the risk that their vessel may strike coral reef. Fishing technologies like GPS, however, can warn fishermen of potential threats and navigate them safely to shore. Within the scope of fishing community studies, this study has demonstrated findings that are in tandem with findings of previous studies (Murray & Dolomount, 1994; Pollnac & Poggie, 1989; Torner & Nordling, 2000). In these studies, it has been claimed that technologies have significantly reduced fatality and risk associated with fishing operation (Murray & Dolomount, 1994; Pollnac & Poggie, 1989; Torner & Nordling, 2000).

One more thing worth highlighting here is that while fishery technologies certainly can be accepted by anyone, regardless their age or level of education, the current price of the technologies, particularly GPS, is a hindrance to uptake, as many fishermen simply cannot afford to invest in them. Currently, the minimum price of a GPS system in the local market is RM500 (roughly equivalent to USD166), and with the average monthly income of fishermen being between RM500 and RM1000 (roughly equivalent to USD333), it would be difficult for them to purchase one. Several skippers were good enough to lend their money to buy or to borrow this technology to their crew members who intend to buy their own fisheries technologies. Even worse, some of the fishermen did not know what is fisherman technology, including GPS as a basic tool.

Saving time is an additional benefit brought about by the acceptance of technology. In the days before the introduction of advanced fishery technologies, fishermen could spend about one or two months out at sea-this was especially true of Zone B, C0 and C2 fishermen. Back then, fishermen were guided only by the stars, the hills, the sun and their own experience, when it came to searching for a fishing spot or returning home. In addition to this, they were also at the mercy of the weather, and could find themselves stranded for long periods of time if they got caught out in bad weather conditions. Nowadays, GPS technology in particular helps to reduce the duration of days that fishermen need to spend at the sea for their fishing operation. Furthermore, GPS helps fisherman navigate directly to the fishing spots that they would otherwise get informed of by fishermen in other vessels, cutting the time for searching and enabling them to return home the same day with their catches. In addition, GPS also allows them to record their coordinates so that they can return in the future and inform others

about the locations they've found bountiful.

5. Recommendations

There are several potential recommendations from the results of this paper. First, courses and seminars can be held regularly in order to improve the knowledge of how to use the new technologies. The principal target group is young fishermen, simply because the local fishing industries are dominated by the 'veteran' fishermen (Shaffril et al., 2013; Omar et al., 2012). Secondly, with the robust plans of the federal government, state and local authorities to implement a high level of acceptance of fishery technologies among fishermen in Malaysia, it is recommended that a special body is set up to plan, supervise, evaluate and disseminate ideas. Last but not least, management, entrepreneurial and technical-specific training programs and Fishermen Transformation Program (FTP)-a program which the main objective is to transform small scale fishermen and government dependent fishermen to big scale and less dependent fishermen-should be implemented to ensure effective FTP. Efforts will also be made to encourage coastal fishermen to venture into deep-sea fishing activities by providing loans to help them purchase vessels and other fishery technologies.

References

Department of Fisheries Malaysia. (2011). *Number of fishermen working on licensed fishing vessels*. Retrieved September 13, 2013, from http://www.dof.gov.my/en/senarai-perangkaan-perikanan-2011

Economic Planning Unit, Prime Minister Department Malaysia. (n. d.). *The Ninth Malaysian Plan*. Retrieved September 13, 2013, from http://www.epu.gov.my/en/ninth-malaysia-plan-2006-2010

Food and Agriculture Organization of the United Nations (FAO). (2013). Retrieved September 13, 2013, from http://www.fao.org/statistics/en/

Luarn, P., & Lin, H. (2004). Towards an understanding of the behavioral intention to use mobile banking. *Computers in Human Behavior, 30*, 1-9.

Murray, M., & Dolomount, M. (1994). A constant danger-Safety attitudes and practices among Newfoundland inshore fishermen and related personnel, Stage 1: *The interview study*. A report submitted to the Occupational Health and Safety Division, Department of Employment and Labour Relations, Government of Newfoundland and Labrador: Canada.

Pollnac, R. B., & Poggie, J. J. (1989). *Social and cultural factors influencing fishermen's awareness of safety problems.* Proceedings of the International Symposium on Safety and Working Conditions on Board Fishing Vessels, October 2000.

Raidah, M., Norsida, M., Siti Zobidah, O., Jusang, B., D'Silva, J. L., & Hayrol Azril, M. S. (2012). Technology adoption among fishermen in Malaysia. *Journal of American Science, 8*(12), 1-4.

Shih, H. P. (2004). Extended technology acceptance model of Internet utilization behavior. *Information and Management, 41*, 719-729. http://dx.doi.org/10.1016/j.im.2003.08.009

Shiro, U. (2008). A case study of DIY ICT. *Information, 10*(4), 46-60.

Torner, M., & Nordling, P. O. (2000). Occupational injury in Swedish fishery: 1. Analysis of injury statistics. *Occupational Ergonomics, 2*(2), 81-89.

Venkatesh, V., & Morris, M. G. (2000). Why don't 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. http://dx.doi.org/10.2307/3250981

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