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Problems Associated With the Use of the Global Positioning System (GPS) by Young Fishermen in Malaysia

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Abstract: The main attempt of this study is to investigate the problems associated with the use by young fishermen in Malaysia of the Global Positioning System (GPS). This study is quantitative in nature and involved a total of 240 respondents who were young fishermen aged between 15 and 40 years. Individuals financial capacity to buy GPS was the main problem detected while the respondents also raised their concerns about a lack of GPS training programs, courses, seminars and promotional initiatives to further encourage the use of GPS within their fishing operations. The main recommendation made was to provide a technology subsidy to those who show an interest in buying GPS while additional funding should be allocated by the relevant parties to hold any programs, seminars, courses or promotional initiatives that can further encourage young fishermen in Malaysia to use advanced technology in their fishing operations.

Key words: Young fishermen, community development, problem to use GPS, fisheries industry development, technology usage

INTRODUCTION

In studies conducted by Shaffril *et al.* (2013), Omar *et al.* (2012) and Mazuki *et al.* (2013), it can be seen that the majority of fishermen in Malaysia are low-to-moderate income earners. In response to this, a number of efforts have been made to further increase their earnings from their fishing operations, one of them being the introduction of fishery technologies. Although, there are a number of a fishery technologies available, such as sonar, echo sounder, wireless set and remote sensing, the main scope of this study is the GPS of which the main functions are to mark specific locations at sea and to navigate the fishermen exactly to those locations. These two direct benefits have consequently resulted in many indirect benefits for the fishermen, particularly with regard to cost reduction, saving time and safety and security enhancement (Hassan *et al.*, 2011). Although, such benefits seem to attract a huge number of fishermen to use GPS, the current employment of it among fishermen is still at a low level (Omar *et al.*, 2012) which brings about the question what are the main problems that have lead towards such a low usage level? The answer to this will lead the present study to its main objective which is to investigate the problems associated with using GPS particularly among young fishermen the future generation of the fishing industry.

Benefits for fishermen of GPS use: There are a number of technologies fishermen use to assist them in their fishing operations. Hassan *et al.* (2011) have looked into the benefits of GPS, sonar, remote sensing, wireless set, echo sounder, radar, mobile phone and internet within the fishing industry. While all the aforementioned technologies are fit for use in deep-sea fishing only technologies such as GPS, echo sounder, mobile phone, wireless set and internet are appropriate for coastal fishing. In this study, the present study would like to discuss the functions and benefits offered by GPS usage. GPS enables fishermen to mark their fishing locations and to navigate to those locations, day or night. In addition, GPS will indicate the latitude, longitude, altitude, surface speed, sunrise and sunset times, odometer and accuracy warning system. These functions in turn, create a number of benefits.

Reducing the duration of fishing operations: Before the introduction of fishery technologies, fishermen had were reliant upon the stars and the hills to help them navigate to their marked fishing spots. The accuracy and the reliability of such a technique is poor and most of the time the fishermen are relying on luck. However, today advanced fishing technologies are replacing the more traditional ways of catching fish and GPS in particular is helping to reduce operation times by navigating fishermen to exactly the right place (Omar *et al.*, 2012; Mazuki *et al.*, 2013).

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Minimizing costs: As there is a reduction in duration of fishing operations, so too are costs of running the operations minimized. First, less fuel will be consumed when using GPS, as search time is reduced. Second, less money is spent on crew members' salaries, as operation times are reduced. In addition to this, shorter fishing operations also means thatthe fishermen themselves require less energy and consume less food and drink during their fishing operations.

Increasing productivity and income: In terms of benefiting fishermen's economic well being streamlining operations benefits them a great deal, as greater productivity means more money for the fishermen. Use of GPS also positively impacts fishermen's income in that it helps them save on things like fuel.

Enhancing safety and security aspects: GPS can act as a safety tool in a number of ways. First, it can improve safety during bad weather (e.g., extreme wind and waves). Because the current climate is very unpredictable, visibility might suddenly become impaired, however, GPS is able to navigate fishermen exactly to the jetty (Omar *et al*., 2012). Second, GPS enables fishermen to mark any dangerous coralor high tides that can wreck their small vessels. In addition to this, with its ability to measure speed and direction GPS can help fishermen avoid high tides and winds.

Enhancing technology literacy skills and reducing digital gaps: Hassan *et al*. (2011) have looked into the ability of GPSto improve community technology literacy and skills. Fishermen who are consistently exposed to GPS might have the chance to learn and use such technology and such exposure can result in an increase in their understanding of how GPS functions and can benefit their fishing operations. If they are able to master the skills and knowledge required to use the technology, then it will narrow the digital gaps that occur between rural and urban communities.

Problems among fishermen with using technology: Although, GPS offers various benefits to the fishermen, its employment among fishermen in Malaysiais still low. Omar *et al*. (2012) have concluded that only 25.5% of the fishermen in Malaysia use GPS within their fishing operations at a high level while 71.0% of them either use it at a lower level or never used it at all and the remaining 3.5% use it at a moderate level. This low usage level might be caused by several problems encountered by the fishermen in their bid to use technology described below.

Financial factors: Financial limitations can be the main reason as why people are not using technology. As the cost of technologies such GPS can often run into thousands of ringgits (MYR), fishermen of whom the majority are low-to-moderate earners, might face problems when it comes to being able to afford them (Shaffril *et al*., 2013; Omar *et al*., 2012; Bolong *et al*., 2012). The poor are found to be slower adopters of technology which is revealed by the findings of Warren (2007) and Alampay (2006) who explain that such low level of usage among the poor is related to their limited access to technology facilities. Additionally, though affording to purchase the advanced technology was one of the issues raised, the costs associated with maintenance of the technology after purchasing it could be another issue, as sometimes the cost of an overhaul or service of a piece of technology is greater than that of buying a new one. This factor will pose problems for low-to-middle income earners (Du *et al*., 2010).

Lack of technology awareness, skills and knowledge: Some fishermen, particularly those in the remote areas, are less aware of the advantages of technologies like GPS within the fishing industry and this is the group that stands to gain the least from the associated benefits (Donner and Escobari, 2010). On the other hand, a lack of technological skill and knowledge has caused difficulties among fishermen when it comes to developing their compatibility with GPS usage. The map displayed by GPS, for example, aims to inform fishermen of their location, however without adequate technological literacy, such advanced applications are seen as useless and unreliable by these fishermen. A response to this issue is required and training the fishermen is a good start (McKenna *et al*., 2008; Fujita *et al*., 2007). Factors, such as age and education level are commonly associated with such problems where in older and less educated fishermen are expected to master traditional fishing routine while at the same time possessing less advanced fisheries skills.

Lack of support from the authorities: Support from the authorities to further encourage the use of technology among the community is crucial. The role of the authorities, lies particularly in conducting courses and seminars and intensively promoting the use of technology, through which fishermen will be subject to a continuous learning process and exposure to the importance of using fishing technologies within their operations (Omar *et al*., 2012). In addition to this, financial assistance (e.g., a technology subsidy) is crucial if the related parties want to see more fishermen in Malaysia using fishing technologies.

Not related to their fishing routine: Such, problems tend to be related to olderfishermen who possess a large volume of experience and practise traditional fishing techniques. Traditional fishing techniques, such as navigating using the stars and hills can be a substitute for GPS navigation. Though, traditional fishing practices consume more time and energy, older fishermen often prefer to stick with these techniques because they find them more user-friendly.

Poor technology infrastructure: Despite human factors, the technology itself can be the main cause, as to why fishermen refuse to use technology. Poor satellite signal, for example, will affect GPS effectiveness while a lack of workshops or the technology experts required to repair broken GPS might deter fishermen from using. The language used in the technology can also impair usage, as application of a foreign language within it will always result in a lower level of acceptance and usage among the local population.

MATERIALS AND METHODS

This is a quantitative study that relies on a questionnaire that has been developed to collect the required data. Through, a multi-stage simple-random sampling, a total of 240 fishermen were selected as the respondents. There were 4 main locations for the data collection process: Mersing (representing the Southern zone), Langkawi Island (representing the Northern zone), Pangkor Island (representing the central zone) and Kuala Besut (representing the East coast zone). To remain in line with the main focus young fishermen of this study, only fishermen aged between 15 and 40 years old have been chosen. This age range was chosen as it is the recommended definition for what constitues youth, as outlined by the Ministry of youth and sport. The questionnaire was developed mainly from past studies, as well as a review of literature, after which it was pre-tested and validated. For each of the questions (except for the demographic part), the respondents were given a 5 Likert-like scale ranging from 1 (strongly disagree) to 5 (strongly agree). The mean score gained for each part/statement then was categorized into 3 levels, based on the calculation of 5 (number of maximum mean score) divided by 3 (number of levels). The calculation resulted in 3 levels: Low (mean score 1.00-2.33), moderate (mean score 2.34-3.67) and high (mean score 3.68-5.00). All of the analyses performed were using SPSS.

RESULTS

Demographic factors: Table 1 demonstrates the demographic data of the respondents. The average mean score for respondents age was 31.3 years where a majority of them were included in the category of 36-40 years old. A total of 25.8% of the respondents were aged 25 years and below which is good news for the aging fishing communities in Malaysia. The majority of the fishermen were educated to a low level which is proven by the fact that only 4.5% of them possessed tertiary-level education. The mean score for income from fishing activities was RM941.50 which exceeded the poverty level set by the economic planning unit (RM750), nevertheless it should be taken into consideration that 22.9% of them earn RM500 or less. Though the respondents were young fishermen, some of them had been working as fishermen for 16 years or more with some of them having been involved in fishing activities, since the age of 10. The mean score for days spent at sea for their fishing operation in a month was 18.7 days where a total of 35.4% of them spent between 16 and 20 days at sea in a month. Within the scope of this study, the majority of the respondents were small-scale fishermen, as more than two thirds of them were conducting their fishing operations within the zone A catchment area.

Table 1: Demographic data of the respondents

Variables	Frequency	Percentage	Mean
Age (years)			31.3
<25	62	25.8	
26-30	44	18.3	
31-35	42	17.5	
36-40	92	38.4	
Education level			
Never been to school	21	8.8	
Primary school	61	25.4	
PMR/LCE/SRP	64	26.7	
SPM/MCE/SPMV	83	34.6	
Tertiary level	11	4.5	
Income (from fishing activity) (RM)			941.5
<500	55	22.9	
501-750	46	19.2	
751-1000	91	37.9	
>1001	48	20.0	
Experience as a fisherman (years)			12.2
<5	68	28.3	
6-10	48	20.0	
11-15	46	19.2	
>16	78	32.5	
Days spent on fishing operations per month			18.7
<15	75	31.3	
16-20	85	35.4	
21-30	80	33.3	
Catching area			
Zone A	161	67.1	
Zone B	46	19.2	
Zone C0 and C2	33	13.7	

PMR/LCE/SRP refers to Malaysia lower certificate of education; SPM/MCE/SPMV refers to Malaysia certificate of education and Malaysia certificate of vocational education

Problems to use GPS among young fishermen: A total of 6 statements have been prepared for the respondents to measure the problems associated with using GPS related

Table 2: Agencies/organizations

Statements	Mean score
Overall mean score	3.48
Lack of training with regard to GPS usage by the related parties	3.58
Lack of technical support from the related parties	3.61
It is difficult for the fishermen to share or get the related GPS information from related officers	3.23
Less awareness on the importance and benefits of GPS usage	3.11
Lack of staff to educate fishermen on GPS usage	3.53
Lack of financial funds to conduct programs related to GPS usage	3.82

Table 3: Individual

Statements	Mean score
Overall mean score	2.54
Not confident in using GPS	2.38
No motivation to use GPS	2.25
Language problem	2.50
Lack of interest in using GPS	2.12
Have no skills to use GPS	2.54
Limited time to learn how to use GPS	2.25
Lack of financial resources to buy GPS	3.77

to to agencies/organizations (Table 2). About 5 out of the 6 statements recorded a moderate mean score while the statement regarding the lack of financial funds to conduct programs related to GPS usage recorded a high mean score. The lowest mean score was recorded for the statement of less awareness on the importance and benefits of GPS usage.

For measuring the problems associated with using GPS and related to the fishermen themselves, a total of 7 statements were prepared for the respondents. Out of 7 statements, a total of 3 of them recorded a low mean score while a further 3 statements recorded a moderate mean score. About 1 out of the 7 statements, related to a lack of financial resources to buy GPS, recorded a high mean score and was significantly different from the scores associated with the other statements (Table 3).

The technology available is seen as being ready to support GPS usage among the fishermen because out of 5 statements prepared for them, 3 statements recorded a low mean score while the other 2 statements recorded a moderate mean score. The resulting mean score denotes that most of the fishermen seem to acknowledge that GPS is related to their fishing operation and admit that GPS is user-friendly. The strength of satellite signal seems to support GPS usage among fishermen, as most demonstrate their disagreement with the statement related to weakness of satellite signal in their area, resulting in a low mean score for this statement (Table 4).

The overall mean score for problems related to policy in GPS usage was 3.51. The mean score recorded ranged from 2.81-3.57 where the statement related to lack of funds to promote GPS usage to relevant parties recorded the highest mean score while the statement related to the existing government policy around GPS usage among young fishermen not being solid recorded the lowest mean score. All the statements prepared for the respondents, in this study recorded a moderate mean score (Table 5).

Table 4: Technology

Statements	Mean score
Overall mean score	2.52
There are unsystematic technology infrastructure development within the fishing industry	2.84
Less GPS available in this area	2.95
Language that gives the instructions in the system is difficult to understand	2.60
GPS is not related to fishing operations	2.22
GPS technology is not user-friendly	2.24
The satellite signal available at this area is weak	2.26

Table 5: Policy

Statement	Mean score
Overall mean score	3.51
The existing government policy around GPS usage among young fishermen are not solid	2.81
The existing laws and regulations do not support GPS usage among young fishermen	2.75
Lack of fundingfor encouraging young fishermen to use GPS in their fishing operations	3.39
Lack of funding for conducting courses/seminars related to GPS	3.53
Lack of fundingfor promotion of GPS usage by relevant parties	3.57

DISCUSSION

From the results presented, it can be seen that problems related to agency/organization and policy can be given more focus by the relevant parties. The main concern that needs to be addressed by these parties is that there is inadequate funding available to conduct programs, courses/seminars and promotional initiatives to further encourage young fishermen to use GPS within their fishing operations. Programs, courses, seminars and promotion are important things to be considered if related parties want the community to start using technology and persist with it (Shaffril *et al*., 2010; Hassan *et al*., 2011; Omar *et al*., 2012). Hassan *et al*. (2009) have highlighted the importance of offering consistent technology programs and courses in order to form positive attitudes towards technology usage among the community while Omar *et al*. (2012), on the other hand, have pointed out that seminars and courses can continuously educate fishermen on technology use, as well as highlight to them the importance of employing technology in their operations. Furthermore, dedicated funds should be allocated to improve the existing policy, as this can sustain technology use among young fishermen.

The individual young fisherman does not appear to have a big problem with using GPS, as the results showed that they have the interest, motivation, confidence to use it. This scenario is not surprising, as young people tend to be associated with eagerness to use advanced technology in order to demonstrate their status and to

show that they are up to date with current trends (Dittmar, 2005). The analysis conducted demonstrated that problems related to fishermen's personal financial capacities recorded the highest mean score, this should therefore be taken into consideration by the concerned parties if they want to further encourage GPS usage among young fishermen in Malaysia. Financial capacity is always associated with lack of technology usage among fishermen, particularly among the poor (Omar *et al*., 2012). Alampay (2006) has come out with a simple explanation as to how financial capacity influences technology use among the community, as those with a stronger financial capacity tend to use technology more frequently than those with weaker financial capacity, as the former can afford to buy such technology which enhances the probability of them actually using it. To overcome this, it is recommended that young fishermen in Malaysia are to be given subsidies for buying fishery technology. Subsidy allocation has been proven an effective tool in encouraging community technology use with Malamud and Pop-Eleches (2011) study having examined how authorities in countries, such as Brazil, Uruguay, Peru and Columbia have significantly increased technology usage among low-income groups by providing technology subsidies.

Similar to problems related to the individual, problems related to technology seem not to hinder the young fishermen of Malaysia when it comes to using GPS which demonstrates the readiness of existing technologies to support their technology use. Nonetheless, a moderate mean score was recorded for unsystematic technology infrastructure development within the fishing industry with it recommended that in particular, GPS courses and difficulty in understanding the language used in the system itself should be given a special focus. Unsystematic technology infrastructure development can be further strengthened by the employment of a more robust policy on the encouragement of technology use while financial support from the related parties can further increase the number of GPS courses/seminars available in their areas. Should GPS courses and seminars be conducted among young fishermen, dedicated English lessons related directly to the instructions provided in the GPS should be offered.

CONCLUSION

Fishery technology has been recognized, as one of the tools that can help further develop both the fishing industry itself and the socio-economic status of the fishermen working in it. Although, the fishery technology available, particularly GPS, offers a number of benefits to fishermen, there is still a portion of them who are not using it at a high level due to a number of problems. This study has concluded that the main problem faced by them in adopting GPS is associated with their financial capacity. It was also found that there was lack of GPS programs, courses, seminars and promotion which according to the young fishermen, resulted from shortage of funding. Technology subsidies is the main recommendation made as a result of this study while more funding should be allocated to conducting more related programs, seminars, courses and promotion of technology use, as all of these have the potential to construct a positive attitude towards technology among young fishermen in Malaysia.

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