

Fishermen and ICT: Towards Creating Knowledgeable Fishermen in Malaysia

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Abstract: The significant relationship between ICT and community development in Malaysia cannot be denied. Groups such as farmers, students, teachers, rural administrators and entrepreneurs have benefited a lot from the advantages that ICT offers. Besides this fact, do the fishermen as one of the major groups in Malaysia have benefited from ICT? This is a qualitative study and which used the data gained through literature and document analyses. Based on the analysis it was found that ICT development in Malaysia is well managed and planned. This can be seen through the establishment of several initiatives such as Rural Internet Center, Rural Info Center, National Information Technology Agenda and National Broadband Initiatives. Further analysis has discovered that there are a lot of benefits that fishermen could obtained through ICT. However, to ensure the fishermen will gain the benefits of ICT, a number of problems and obstacles related to ICT usage must be overcome.

Keywords: Information and Communication Technology, Fishermen and Fisheries Sector Development

INTRODUCTION

Information and Communication Technology or ICT is not a new phenomenon in Malaysia. ICT first landed in Malaysia in 1874 when telephone was first used. In 1987, a new era of ICT began in Malaysia when internet was first introduced. Since then Malaysia never looked back to further develop ICT applications and services in this country (Musa, 2010). Accordingly, Musa (2010) has stated that ICT was derived from two concepts namely technology and communication. Technology is a tool or software used to do or construct something. It will ease people who use it, save time and cost, efficient and secured. Whereas information technology refers to method, tools and software involve in the process of developing, gathering, processing, administering, disseminating and recording unlimited information. Computer is frequently related to ICT due to its ability in running all of the tasks mentioned above. However, other ICT tools such as television, radio and newspaper also have the same capabilities. Since communication media, communication technology and information technology in many issues are referred to the same thing, thus the concept of Information and Communication Technology has been accepted and used. ICT covers tools, software, content applications and products that have and bring together with it the message, information and knowledge that can be accessed and utilized. A large majority of Malaysian nowadays possess and use ICT. According to Murphy (2008), Malaysians spend one hour 25 minutes a day reading print media such as newspaper and magazine, spend one hour 33 minutes a day listening to radio, spend one hour 50 minutes a day watching television, VCD, DVD and other video sources. Murphy (2008) has emphasized that the usage of internet among Malaysians is at a good level where on average Malaysians allocate two hours and 47 minutes on internet usage a day.

ICT Development in Malaysia:

ICT development has been one of main focuses of the Malaysian government. In the 6th Malaysia Plan (6MP), ICT has been identified to be the platform for development that has the synergy to modify Malaysia from a P-based economy to a K-based economy. In the 6MP, ICT was emphasized in the manufacturing sector. Also, in this period the National Information Technology Council (NITC) was established and the main function of this council is to cultivate ICT culture within the socio-economic activities of the Malaysian community.

ICT development in Malaysia was then further strengthened in the 7th Malaysia Plan (7MP). In this period, the National Information Technology Agenda (NITA) was introduced. NITA by that time was the mechanism utilized by the government to transform Malaysia into a value-based economy through the development of talent, infrastructure and applications. Within this period, the Multimedia Super Corridor (MSC) was established for the purpose of establishing a world class ICT environment that would attract the best multimedia enterprise to use this region as the test bed for cutting edge applications. Within this period e-initiatives were emphasized where services such as e-economy, e-public services, e-community, e-learning and e-sovereignty were introduced. On top of this, the Multimedia University was established for the purpose of fulfilling the demand for ICT expertise and enhancing the ICT based research capabilities

In the Eight Malaysian Plan (8MP), the roles of ICT for developing the country have been widened. ICT services were broadened to the general public and rural areas in order to enhance the ICT usage among the community especially those who stay in the rural areas. The National Broadband Plan was established so that the broadband access across the country can be operated. Under the 8MP, the Malaysian Information and Communication Services (MyICMS) 886 blueprint was established and the main purpose of this establishment is to integrate the development of cellular telephony, internet and broadcasting. In the 8MP, the MSC was further boosted with the introduction of services such as electronic government, National Multi Purpose Card, Smart School, Telehealth, e-business, R&D cluster and Technopreneur Development.

Besides focusing on the manufacturing and community development through ICT in the 6MP, 7MP and 8MP, The Ninth Malaysia Plan (9MP) has placed ICT as an impetus for creating Malaysia as a competitive knowledge based economy and global ICT and multimedia hub, thus in the 9MP the focus is to widen the Malaysia communication networks through the phased implementation of the MyICMS 886, trim down the digital divide problems, develop the existing cyber cities and expanding the new ones (MSC Phase II) and fostering new growth such as bioinformatics. Within this period, the development of ICT talent and information security have been emphasized.

In the recent 10th Malaysia Plan, it is clearly seen that ICT will continue to play its significant roles in the development of this country. In this period, ICT was selected as one of the National Key Economic Areas (NKEA) (one of the 12 identified NKEA designed to build the foundation of 10MP). On top of it, recently Malaysia has introduced its new broadband services known as YES.

Rural Internet Center, Rural Info Center and National Broadband Initiative:

Rural Internet Center or locally called PID and Rural Info Center or locally called as MID are the two famous ICT projects that are able to be sustained. PID was introduced in 2000 by the Ministry of Energy, Water, and Communication (MEWC), currently known as Ministry of Information Communication and Culture (MICC). In the early stage of PID establishment, there were only 14 PID centers nationwide. Now, all the states in Malaysia have their own PID with Selangor and Johor securing the highest number of PID. Until 2010, there are 42 PID nationwide. Uniquely, all the PIDs are placed at the post office based on the reason that the post office is one of the attraction places of the community and it provides a lot of facilities to the publics. The main purpose of the PID establishment is to reduce the digital divide that exists between the rural and urban communities. On top of it, PID provides continuous training and encourages local content development and this is needed to ensure that the rural community possess a high level of ICT skills. Among the trainings included are computer applications, e-mail usage and website surfing.

The Rural Info Center or MID was established in 2001 by the Ministry of Rural and Regional Development (MRRD) through their Infodesa Program. The main objective of this program is to offer the rural community the ICT facilities and basic ICT trainings. It is hoped that the community will gain benefit from the computer and internet utilization in their daily activities. Indirectly, the establishment of MID can raise the socio-economic standard of the rural population. All of the states in Malaysia has their own MID with Johor come out with the highest number. Among the services offered in MID are training on basic and advance computer skills, computer and internet services, Infodesa portal, computer printing, website services, computer repair and information on villages nationwide.

The recent ICT initiative created by the government is the National Broadband Initiative (NBI). It was established in order to bring broadband to the whole nation. In 2007, the Malaysian government has set its target for broadband whereby the country is to achieve 50% household broadband penetration by the year 2010.

Besides these great ICT developments and initiatives brought by the government, all the communities must ensure that the benefits of these programs are exposed to them and this includes the fishermen. Fishermen as an important group in this country must equip themselves with all ICT skills and knowledge if they want to be competitive and do not want to be left behind.

Malaysian Possession and Usage of ICT:

In order to answer the main objective, it is good to get general data of ICT possession and usage among Malaysians. As presented Table 1, it can be concluded that television is the most possessed ICT tool among the Malaysians where 95.2% of Malaysians were found to possess television at their home. However, computer possession among the Malaysians needs to be encouraged as the percentage of computer possession among them recorded is only 28.2%.

Internet is an important tool nowadays. A research specifically done on internet usage among the agriculture community by Md. Salleh *et al.* (2009) had revealed that e-mail was the most used internet application among the agriculture community in Malaysia. Furthermore, it was found that e-mail can be used as a main tool in disseminating the agriculture information to the agriculture community. In addition, Salleh *et al.* (2009) also found that website surfing is one of the popular internet applications used by the agriculture community. However a study done by Hayrol *et al.* (2009) had revealed that agriculture website is not the main interest of the agriculture community when they are surfing the websites. According to Hayrol *et al.* (2009) six internet applications such as blog, bulletin board, yahoo messenger, chat, mailing list and agriculture forum online offer a huge potential that are ready to be discovered as fishermen in Malaysia. Accordingly, they should be exposed to these applications and be taught on how to use these applications wisely (Table 2).

Table 3 shows the internet usage among Malaysians based on the socio demographic factors. Strategies must be planned to encourage those who live in rural areas, female and in the age group of 45-49 years old as these groups recorded the lowest percentage of the internet usage within their respective group. Meanwhile, there is a probability that the internet benefits have been received by those who live in urban areas, male and those in the age group of 15-19 year based on the highest percentage of usage within their respective groups.

Background of Fisheries Industries in Malaysia:

Without doubt fishermen is an important group in Malaysia. Their roles in ensuring food security in Malaysia is important. Even though being a fisherman is still seen as a second class job, it promises a huge income for those who are interested. There are 42 fisheries districts in Peninsular Malaysia (Figure 1) where 22 of the districts are located at the west coast of Peninsular Malaysia while the remaining 19 districts are located in the east coast of Malaysia. Also, there are 32 fisheries districts in Sabah/Sarawak zone (Figure 2) whereby 15 fisheries districts can be found in Sarawak, 16 fisheries districts can be found in Sabah and one fisheries district can be found in Federal Territory of Labuan. The overall total of the fisheries districts in Malaysia is 74.

Data in Table 4 below shows that Malaysia has a huge number of registered fishermen. As stated, the number of registered fishermen in 2005 was 90,702, in 2006 it increased to 97,947, in 2007 it increased to 99,617, in 2008 it increased to 109,771 and in 2009 it kept increasing to 125,632. In the recent data provided by the Department of Fisheries, Sabah and Sarawak zone recorded 41,759 registered fishermen which was the highest compared to other four zones while southern zone recorded the lowest number of registered fishermen. As the number of fishermen kept on increasing, it is a wise step for the related agencies to cultivate the ICT usage among the fishermen as ICT offers a huge and numerous benefits for those who use it. This issue will be discussed in the later part of this paper.

As the number of registered fishermen kept on increasing in the last five years, the same trend also was recorded for the number of registered vessels in Malaysia. The number of registered vessels recorded in 2005 was 36,016 and in 2009 the total was 48,745, almost 25% increase. The latest statistic provided indicates that the zone of Sabah and Sarawak recorded the highest number of registered vessels (18,247) while the zone of East Coast recorded the lowest number of registered vessels (6,819). The number of registered vessels is showing an increasing trend and it also provides a probability that the fishermen productivity can be doubled (Table 5).

As mentioned earlier, the fisheries sector offers a huge income for those who are interested and this can be seen based on the data presented in Table 6. The data provide a positive indicator when the fisheries productivity recorded an increasing trend of marine fish landing, even though there was a slight productivity decreased in 2009. There is strong probability that the productivity of the fishermen can be easily be increased if the fisheries sector in Malaysia is using ICT and the fishermen are well trained and utilize ICT accordingly.

ICT and Fishermen in Malaysia:

ICT tools such as GPS, Sonar system, wireless set, fisheries remote sensing, computer, internet and mobile phone have indeed offered huge benefits for the fishermen. Table 7 indicates the functions as well as benefits of the ICT tools that can be obtained by the fishermen.

It should be noted that fishermen in Malaysia have been encouraged to use the online services provided by DOF and LKIM. DOF has introduced SIRIP or Networking System of Fisheries Information. Under SIRIP, among the online programs introduced are:

E-training:

<http://eservices.dof.gov.my/ePerkhidmatan/index.php?mod=authentication&opt=login&spage=1>

List the Management and administration of courses and trainings conducted by the Department. This service is also offered to Malaysians, foreign citizens who are the members of Malaysian Technical Cooperation Program and students of higher learning institutions. All of them are invited to become members of this portal and can request to attend the trainings and courses offered online.

E-extension:

<https://eservices.dof.gov.my/ePerkhidmatan/index.php?mod=authentication&opt=login&spage=2>

An online system that is initiated to manage and administer related assistance offered by DOF in their effort to create new entrepreneurs in the fisheries sector. Within this e-extension service, those who are interested need to register and within this system they can apply the programs offered online. Among the programs offered are: Fisheries Resources Management Community (KPSP)

Demonstration and Trial (P&D)

Agro Based Industry Entrepreneurs (UIAT)

E-aquaculture:

<https://eservices.dof.gov.my/ePerkhidmatan/index.php?mod=authentication&opt=login&spage=3>.

e-Aquaculture is an online service aimed to provide support to the small scale aqua-culturist, private investors, entrepreneurs and those who are involved in aquaculture activities. The supports provided are in the form of:

Development of Zone Industry Aquaculture (ZIA) and High Impact Projects (HIP)

Restructuring and Development of Aquaculture Communities

Demonstration

Incubators

Special Projects

Disaster Relief

Development of Graduate Entrepreneurs

VMS Web:

Vessel Tracking and Monitoring Systems (VMS) is a computerized system introduced by DOF to track fishing vessels. At the current time all of the C2 boat (deep sea boat) in Malaysia are equipped with this system. This system utilizes information technology and communication satellite. A detector known as the Vessel Tracking Unit (VTU) is installed on fishing vessels to track the position of the vessel on the Global Positioning System (GPS). Within this system, the longitude and latitude, track and speed of the vessel travelling through satellite system Immarsat sent to the VMS system of Department of Fisheries Computer System. Among the benefits offered by this system are to assist the management of vessels company (fleet management), to be used as the communication tools and to help in protecting the fisheries resources undertaken by the DOF. Malaysian Fisheries Development Authority or LKIM is an agency that is established for the purpose of improving the socio-economic status of fishermen. The focus of this agency is on increasing revenues, expanding and developing the country's fishing industries. As the fishermen development agencies, LKIM also has introduced online services in assisting the fishermen and their officers. Among the online services provided are:

E-license:

<http://elesen.lkim.gov.my/SPB/SPBOnline/Menu/index.aspx>

This is an online system developed by LKIM for those who wish to apply for trading, import and export license. Also, within this system, information such as on the method to apply the license, conditions required to get the license, types of licenses and fees, mode of payment, importers/exporters directories and list of nearest LKIM offices are provided.

E-fund:

<http://dananelayan.lkim.gov.my>

A system designed for online fund loan application. The main objective of this system is to facilitate loan applications, loan monitoring and reporting on the performance of Area Fishermen Associations who are given the LKIM fishermen loan.

E-fishermen:

<http://ediesel.lkim.com.my/Login.aspx?ReturnUrl=/Default.aspx>

A system provided by LKIM to their officers in order to assist them in administering the diesel subsidy scheme to the fishermen. E-fishermen is a system that allows the responsible officers to track how much the diesel/petrol have been used by the registered fishermen, where they bought the subsidized diesel/petrol and when they bought the subsidized diesel/petrol. This system also is able to provide LKIM officers information on list of new applications (on smart card), list of applications that have been send, information on approved or rejected applications and management of "smart card".

Fish Online:

<http://risikan.lkim.gov.my>

A system that is initiated to provide all the related information to the fishermen. Information that are provided within this systems are the related fisheries websites, fishermen products, the landed fish prices, statistics, directory of the related agencies and associations, laws and regulations, species of the fish and species of mollusk.

E-declaration:

<http://epengisytiharan.lkim.com.my>

This is a system that requires the registered fishermen to declare their landing productivities. To declare their productivities is important as it will allow the registered fishermen to gain all the benefits offered by the government through the productivity incentives, COLA allowance and diesel subsidy.

ICT Benefits for Fishermen:

Increased Knowledge:

Information is a powerful tool nowadays. ICT's ability to response to the informational needs of the community cannot be denied (Kari, 2007). This indeed will enhance their knowledge regarding everything. ICT can be the key to disseminate the right information to the right people in the right form. Grimes (2000) emphasized that ICT has the ability to provide opportunity to the community including the fishermen to learn new things and this will produce knowledgeable fishermen (k-fishermen). ICT is able to provide information such as imminent disaster, weather, wave height, wind speed, potential fishing areas and daily market prices. In Ghana for example, fishermen use ICT to check from their agents and customer form various parts of the country where the price is better (Abissath, 2005). It should be noted that technologies vary in their capabilities and their costs, and ICT is among the cheaper choices that fishermen have. ICT can serve as an information and communication center for the fishermen by collecting, organizing, storing, retrieving, and disseminating needed information. It has huge ability in translating the information needed into the local language and converting it into a more useable form (Kozma, 2006).

Enhance Rural Community Literacy Level:

ICT ease to use process will reduce illiteracy problem among the fishermen (Patterson *et al.*, 2008). Use of computers for example in literacy education can enhance the uptake of literacy skills for a number of reasons (Rossiter and Bagdon, 1999). For example, since ICT is able to provide fishermen with immediate feedback, learners of literacy can proceed more quickly and effectively than otherwise.

Using ICT programs, the fishermen needs and interests can be met since the fishermen can work independently, flexibly, and at their own pace, developing both oral and writing skills and at the same time as learning to read. In addition, ICT can be fun to use, especially for fishermen who have never used them before, so it can encourage fishermen to participate in literacy education and can motivate them to continue to learn thereby increasing the rates of retention of literacy (Ellie, 2006)

Make Communication Process Easier:

ICT produce easier, faster and cheaper communication. The Internet for example, manifests itself in various, often powerful, ways. Nowadays it is possible for a housewife with no higher education to set up an online shopping to market her home-based tailoring business and it is also possible for a university student studying in the city to interact with her family in the village via e-mail and skype (Rahayat, 2000), and without doubt fishermen also can have access to all of these services. The demands for home PCs in the community have increased. New advances in telecommunications, notably wireless connections through satellite and terrestrial technology, are expected to progressively help to overcome the problem of affordable access to

telecommunications in rural areas in developing countries, and doubtlessly will profit the community in the rural setting including the fishermen (Akinsola *et al.*, 2005). On top of it, ICTs can help to overcome or reduce barriers in communication associated with distance and isolation (Rose, 1999). ICT can bring learning resources and information to the fishermen instead of making the community travel to the places of learning. This allows fishermen to learn in their own workplace and in their own time. ICTs can also provide opportunities for interactive communication and networking. They also offer opportunities for information from around the world to be generated locally to suit local situations, thus enhancing its relevance (Ballantyne, 2007).

Reducing the Digital Divide:

The digital divide is the gap between those with regular; effective accesses to digital technologies and those without. The global digital divide is a term often used to describe the gap between more and less economically developed nations, while at the national level, there is often an urban-rural divide. ICT usage indeed has an influence on those who use it and those who do not use it. Studies done by Cooper (2006); Furuholt and Kristiansen (2007) and Owo (2010), revealed that ICT users are more likely to be well-off and better educated than non-users and, that men are more likely than women both to access and to use the Internet regularly. In both developed and developing countries, the Internet penetration rate among younger people is substantially higher than that among older people (Loges and Jung, 2001 and Md. Salleh *et al.*, 2009). Fishermen with a bigger access to the ICT are expected to have a bigger share of Internet usage in developing countries. Furthermore geographic location also affects access to and use of the Internet, with more affluent regions having higher Internet penetration rates than poorer ones (Gilligan, 2006).

Moreover, the intersection of socio-economic status, gender, age, language and geographic location tend to increase the digital divide within and between countries. The largest gap is between better-educated, affluent, younger, English speaking men in developed cities and less-educated, poor, older, non-English speaking women in underdeveloped rural areas (Furuholt and Kristiansen, 2007). With the huge allocation on ICT development from the government in RMK-9, a lot of telecenters were established. This indeed will open a bigger opportunity for the fishermen to use ICT and reduce the digital divide. In Malaysia for example, The Rural Internet Desa in Marang Terengganu is one of the ICT centers located near to the fishermen village. Musa *et al.* (2008), have noted that the rural community will become skilled if they are exposed to ICT training and usage and this will narrow the digital divide between rural and urban community and the same case also can be applied to the fishermen where they must be frequently exposed to ICT trainings and seminars if they are requested to be ICT skilled. Furthermore, to have frequent ICT training skills is important to reduce the digital divide as it has been emphasized by Carey *et al.* (2002), where they revealed that the number of ICT training skills attended have a significant effect on the ICT usage.

Enhancing Community Socio Economy:

ICTs have also been acknowledged as critical catalysts, tools and enablers especially for socio- economic growth (Lal, 1999 and Barba-Sanchez *et al.*, 2007). According to Lyazi (2009), ICT impact has been massive and offer access to digital technologies. Its' social and economic impact goes beyond connectivity since it has empower grassroots with all kinds of information meant to bring about economic and social growth. ICT have also played a big role in promoting gender equality through sensitization programs, have equipped people with skills based on the knowledge they disseminate and also provide employment to qualified community members; this is good impact. Subsequently, ICT can aid fishermen in enhancing their productivity.

Referring to Cecchini and Raina (2002), through ICT, for example, agriculture community are able to find out immediately how much they earned during a harvest, and computerization has resulted in improved management and cost savings in fertilizer stocks. ICT has the potential for many applications in the rural areas, including allowing fishermen access to information that could improve their livelihood, and access to government services via the internet. Rao (2004) and Abdul Razaq *et al.* (2009), in their study noted that ICT offers remarkable opportunities for the alleviation of poverty and employment generation as well as producing higher achievement among those who master it.

Fishermen could greatly increase productivity with access to information on improving fisheries inputs, weather, markets, new production techniques, and farming technologies. ICT tools such as sonar, GPS and Fisheries remote sensing for example will tell exactly information such as location, quantity and species of the tracked fish and this for sure will save cost, time and energy of the fishermen.

According to Norizan (2009), ICT will enable e-entrepreneurship where e- transactions and e-skills to enhance the socio economic status of the communities via the development of websites, e-payment gateways and also e-marketers.

Other Benefits:

Lowrey (2004) in his writing has informed us on how the fishermen in Guinea have admitted that ICT is now considered as more powerful weapon in fighting foreign poaching trawlers in their fishing areas compared to their machinegun.

Previously they are helpless when there are foreign poaching trawlers in their areas and sometimes they are firing their machinegun as an expression of frustration. But now with the assist of Global Positioning System (GPS), the fishermen are able to provide the coastguard station the exact location of the foreign poaching trawlers and with the information the coastguard officers are able to intercept the intruders.

Expected Problems to Be Faced by Malaysian Fishermen in Using ICT :

There are a number of expected challenges to be faced by the fishermen in terms of usage of ICT. According to Hosseini *et al.* (2009) these challenges could be classified into six categories and they are as follows: organizational, technical, financial, social, regulatory and human. For the organizational factor, the identified variables were lack of interest by high level managers and extension experts to use ICT, concerns about the risk of using ICT, low quality of service provided by the service centers, lack of interest by private sector to participate in developing ICT for rural areas, and low number of service centers in rural areas.

Meanwhile, the variables that are based on the technical factor that have an impact on the challenges of using ICT are low bandwidth, lack of hardware, lack of appropriate infrastructure, lack of software, low number of web sites, weak telecommunication systems, old telephone lines, and lack of expertise.

Table 1: Possession of selected ICTs among Malaysian

ICT	2000 (%)	2002 (%)	2004 (%)
Computer	13.5	24.1	28.2
Television	84.3	93.8	95.2
Radio	78.8	87.5	84.5
Video/ VCD/DVD	53.5	71.0	77.4

Source: Malaysian Communication and Multimedia Commission 2008

Table 2: Internet applications used by the Malaysian (n=164)

Variables	Frequency	Percentage	Mean
E-mail			1.14
None	30	18.3	
Seldom	81	49.4	
Always	53	32.3	
Website surfing			1.12
None	43	26.2	
Seldom	58	35.4	
Always	63	38.4	
Blog			.57
None	95	57.9	
Seldom	45	27.4	
Always	24	14.7	
Bulletin board			.51
None	100	61.0	
Seldom	45	27.4	
Always	19	11.6	
Yahoo Messenger			.48
None	104	63.4	
Seldom	42	25.6	
Always	18	11.0	
Chat			.43
None	105	64.0	
Seldom	48	29.3	
Always	11	6.7	
Mailing list			.37
None	112	68.3	
Seldom	44	26.8	
Always	8	4.9	
Agriculture forum			.35
Online			
None	117	71.3	
Seldom	36	22.0	
Always	11	6.7	

Sources: Md. Salleh *et al.* (2009)

DAERAH-DAERAH PERIKANAN, MALAYSIA
FISHERIES DISTRICTS, MALAYSIA

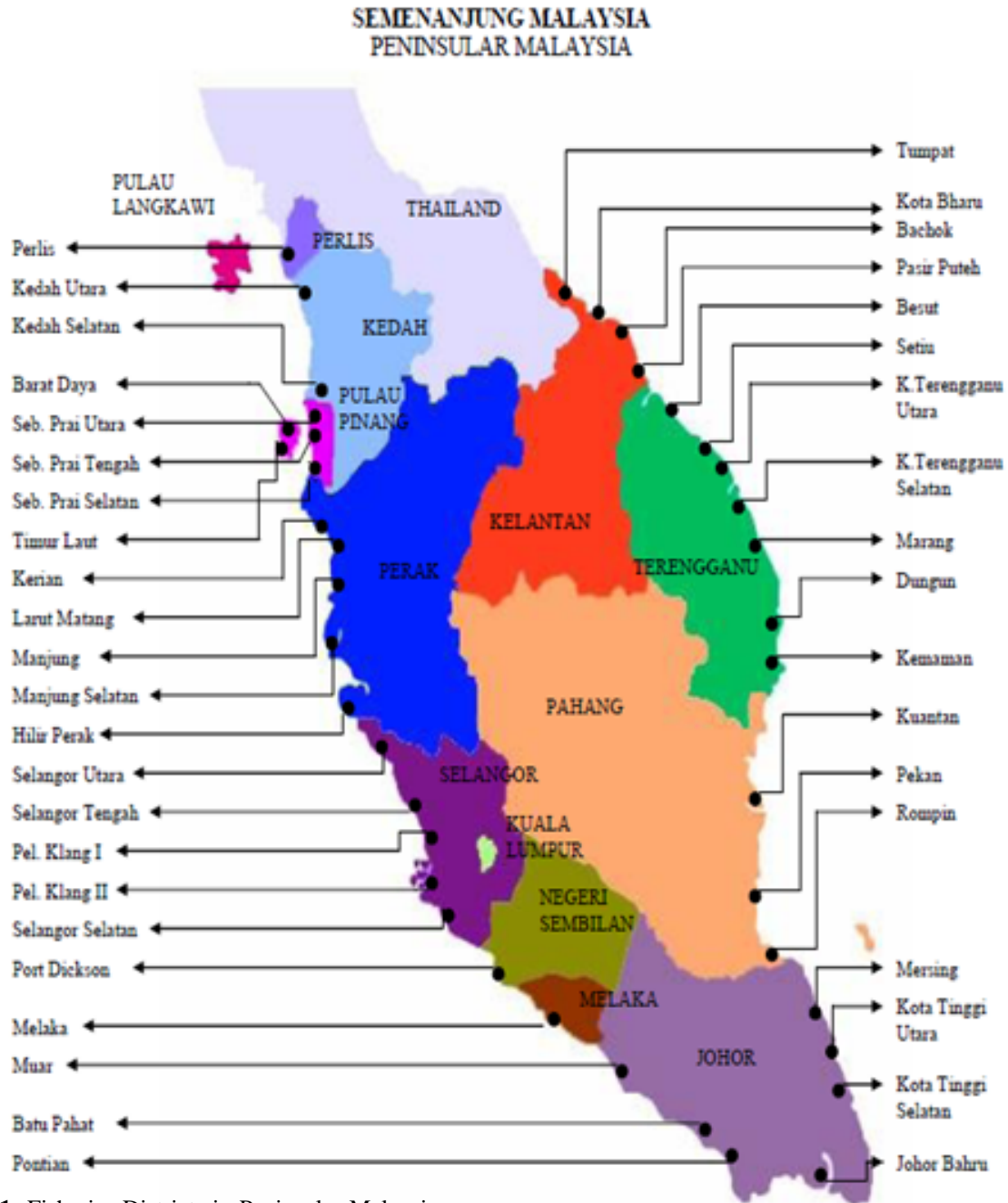


Fig. 1: Fisheries Districts in Peninsular Malaysia.

On the other hand, in terms of financial challenges, among them are high cost of buying hardware and software, high cost of access to internet, cost of maintaining the system, expense of upgrading the system, and lack of investment by private and public sectors.

Besides, the social challenges in using ICT are technophobia, negative attitude about modern technology, not understanding about advantages and disadvantages of ICT, lack of social interaction, and prejudiced beliefs about advantage of ICT (Hosseini *et al.*, 2009).

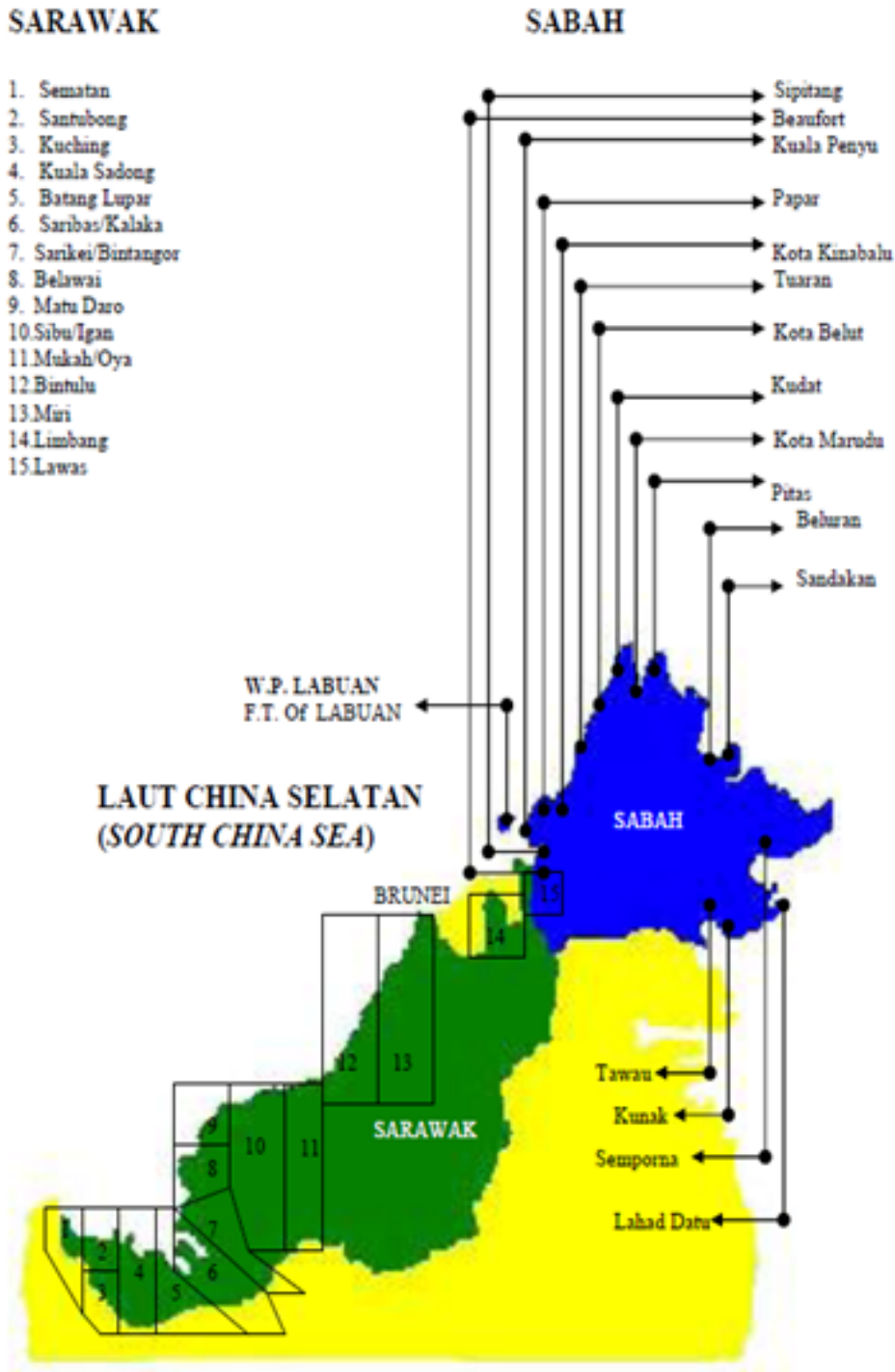


Fig. 2: Fisheries Districts in Malaysia (Sabah and Sarawak Zone).

Moreover, there are also challenges brought about by the factor of regulatory and these made the lack of intellectual property right, centralized extension planning, lack of policy support, lack of adequate regulatory environment, rigid and outdated regulations, lack of strategic vision in developing ICT for rural areas, and current regulatory structures and existing national legislation unable to deal with the speed of changes in technology related changes.

Another study done by Musa *et al.* (2009) have identified five main problems that obstruct people from using ICT which were do not know the benefits of ICT, do not have ICT skills or expertise, time constraint, difficulties in using ICT and have no knowledge in using ICT.

Table 3: Internet usage by Malaysian based on socio-demographic factors

Factors	Percentage of Usage (2006)	Percentage of Usage (2008)
Locality		
Urban	82.0	85.0
Rural	18.0	14.0
Gender		
Male	53.3	51.9
Female	46.7	48.1
Age category		
< 15	7.3	6.8
15-19	18.7	17.9
20-24	16.3	15.7
25-29	11.3	11.9
30-34	12.3	11.7
35-39	10.4	11.2
40-44	10.6	9.3
45-49	6.1	6.1
>50	7.1	9.4
Internet usage per week		
<4 hours	25.7	28.0
4 but less than 8 hours	22.3	23.2
8 but less than 15 hours	20.3	19.3
15 but less than 22 hours	10.3	8.4
22 but less than 28 hours	5.8	5.2
More than 28 hours	15.7	16.0
Purposes of internet usage		
Getting information	84.5	94.4
Communication	80.7	84.7
Education	52.6	64.5
Fulfilling leisure time	45.9	63.5
Financial purpose	23.6	31.8
Public services	12.0	29.2
e-government transaction	-	19.8
Online stock exchange	-	5.9
Others	0.2	0.7

Table 4: Number of registered fishermen in Malaysia 2005-2009.

Zone	State/Year	Number of Registered Fishermen in Malaysia 2005-2009				
		2005	2006	2007	2008	2009
Northern	Perlis	4,960	5,156	5,766	5,825	6,905
	Kedah	7,215	7,936	8,531	9,429	11,184
	P. Pinang	3,089	3,066	3,193	4,040	5,540
Total		15,264	16,158	17,490	19,294	23,629
East Coast	Kelantan	5,695	6,007	6,714	8,478	9,624
	Terengganu	8,706	8,670	8,651	9,007	10,421
	Pahang	4,539	5,497	5,559	6,654	7,024
Total		18,940	20,174	20,924	24,139	27,069
Central	Perak	8,234	9,143	10,580	10,516	12,156
	Selangor	5,799	6,241	7,078	7,199	7,074
Total		14,033	15,384	17,658	17,715	19,230
Southern	Malacca	1,330	1,112	1,273	1,281	1,844
	Negeri Sembilan	295	300	353	361	460
	Johor	9,310	9,620	9,034	9,706	11,641
Total		10,935	11,032	10,660	11,348	13,945
Sabah and Sarawak	Sarawak	10,344	13,913	11,440	12,694	16,278
	Sabah	20,845	20,845	20,845	23,673	24,691
	Federal Territory of Labuan	341	441	600	818	790
Total		31,530	35,199	32,885	37,185	41,759
Overall total		90,702	97,947	99,617	109,771	125,632

Sources: Department of Fisheries Malaysia 2005-2009.

Table 5: Number of registered vessels in Malaysia 2005-2009.

Zone	State/Year	Number of Registered Vessels in Malaysia 2005-2009 (All types of inboard owered)				
		2005	2006	2007	2008	2009
Northern	Perlis	713	687	713	875	1,150
	Kedah	1,744	2,242	2,414	2,506	3,358
	P. Pinang	1,783	2,066	2,141	2,175	2,961
Total		4,240	4,995	5,268	5,556	7,469
East Coast	Kelantan	989	1,268	1,276	1,432	1,290
	Terengganu	2,422	2,409	2,422	2,439	2,906
	Pahang	1,303	1,379	1,441	1,876	1,993
Total		4,623	5,056	5,139	5,747	6,819
Central	Perak	4,606	4,779	4,890	4,899	5,413
	Selangor	2,855	3,032	3,491	3,617	3,943
Total		7,461	7,811	8,381	8,516	9,356
Southern	Malacca	256	981	1,000	1,007	1,157
	Negeri Sembilan	1,202	280	289	303	433
	Johor	4,148	4,360	4,084	4,347	5,264
Total		5,606	5,621	5,373	5,657	6,854
Sabah and Sarawak	Sarawak	3,402	4,214	4,458	4,199	6,054
	Sabah	10,456	10,456	10,456	10,978	11,906
	Federal Territory of Labuan	117	123	146	306	287
Total		13,975	14,793	15,060	15,483	18,247
Overall total		36,016	38,276	39,221	40,959	48,745

Sources: Department of Fisheries Malaysia 2005-2009

Table 6: Total of landing of marine fish 2006-2009 .

Zone	State/Year	Total of landing of marine fish 2006-2009			
		2006	2007	2008	2009
Northern	Perlis	163,038	193,800	189,358	178,247
	Kedah	67,122	83,922	95,940	106,486
	P. Pinang	33,122	37,774	43,627	42,790
Total		263,282	315,496	328,925	327,523
East Coast	Kelantan	71,714	74,840	68,039	58,891
	Terengganu	111,394	81,007	104,699	84,319
	Pahang	113,063	105,446	119,249	114,338
Total		296,171	336,099	291,987	257,548
Central	Perak	209,153	239,653	219,066	258,086
	Selangor	146,388	116,138	124,224	131,350
Total		355,491	355,791	343,290	389,436
Southern	Malacca	1,829	1,801	1,790	1,691
	Negeri Sembilan	374	426	376	610
	Johor	109,118	94,278	88,923	87,614
Total		111,321	96,505	91,089	89,915
Sabah and Sarawak	Sarawak	148,665	140,223	136,324	125,136
	Sabah	176,314	184,162	174,010	172,584
	Federal Territory of Labuan	28,486	27,945	28,909	29,437
Total		353,465	352,330	339,243	327,157
Overall total		1,379,770	1,381,424	1,394,531	1,391,579

Sources: Department of Fisheries Malaysia 2006-2009.

Conclusion:

Based on the analyses done, it can be concluded that ICT development in Malaysia is well planned. People in both areas, rural and urban have benefited equally from the ICT programs and initiatives planned for them. Of course, one of the main beneficiaries of these programs and initiatives are the fishermen. The number of registered fishermen in Malaysia keeps on increasing year by year and it is a positive indicator that the number of their productivity is also increasing. To further increase their productivity, ICTs can be used.

ICTs such as GPS, sonar, wireless sets, fisheries remotes sensing, computers, internet and mobile phones can be a great help to the fishermen in conducting their enterprises. Based on the analysis done, there are a lot benefits ICT can offer to the fishermen and one of it is to increase their productivity. Above all, ICT also is able to increase fishermen's knowledge, increase their literacy level, reduce digital divide problem, ease communication process and enhance their security aspects. To further encourage fishermen to use ICT, problems that obstruct them from using ICT regularly must be instantly detected. Among the potential problems are they do not know the benefits of ICT, do not have ICT skills or expertise, time constraint, difficulties in using ICT and have no knowledge in using ICT.

When the obstacles of using ICT can be overcome, the desire to develop knowledgeable fishermen could be achieved, God willing.

Table 7: ICT tools functions and benefits for fishermen.

ICT Tools	Functions/benefits
GPS	Marking the spots where a lot of fish can be caught, fishermen can return exactly to the right place whether its daylight or dark. GPS unit will indicate the latitude, longitude, altitude, surface speed, sunrise and sunset times, odometer and accuracy warning system.
Sonar	Through sonar, fishermen can get a complete, immediately up to date, available map of the whole fishing area showing the exact location, extend, density, depth, movement, species and size of all fish shoals. In addition, information regarding sea bottom such as depth, contours, slopes and stones can easily be gained.
Fish remote sensing	Providing data on marine environment including mapping areas of ecological importance, fish stock assessment, fish migration and fishing operation. It is also useful for observation of water temperature and primary productivity in water. It also can play a significant function in the identification of thermal front where cold and warm water meet which are favorite areas for certain fish.
Wireless set and the Computer	It is useful for safety purposes. If anything happens to them at the sea they can communicate with other vessels and responsible agencies. On top of it, they can immediately share information regarding the fishing spots with the others. For record purposes (ex: profit and loss, species caught, weather condition, markets, etc)
Internet loan	To gain and share fisheries data such as market price, online applications, weather conditions, professional advices, services, business opportunity, etc among/between colleague and related agencies
Mobile phone loan	To gain and share fisheries data such as market price, online applications, weather conditions, professional advices, services, business opportunity, etc among/between colleague and related agencies.

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