ICT Readiness and Information Security Policies in OIC Countries

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***Abstract*—** Information security is a priority for organization, businesses and even for the government. ICT readiness in all countries especially OIC countries are gradually increased and keep improving their technologies in fulfilling citizen needs. However, the level of ICT security and policies might be differ from each countries especially Muslim developed countries. Therefore, in this paper we are examine ICT development after 15 years, difference review on ICT development from Social Economic Research and Training Centre for Islamic Countries (SESRIC) and ICT Development Index (IDI) analysis from International Telecommunication Union (ITU) as well as the list of Information Security policies or laws that available in Bahrain, United Arab Emirates (UAE) and Saudi Arabia. And then we will explore a possible solution to deal with the associated ICT readiness and policies.

***Index Terms*—** ICT readiness, information security law, Muslim countries

I. Introduction

Information security refers to the processes and methodologies which are designed and implemented to protect print, electronic, or any other form of confidential, private and sensitive information or data from unauthorized access, use, misuse, disclosure, destruction, modification, or disruption. The term of information security itself can be vary. For example, the NIST Computer Security Handbook states the term Computer Security as the protection of an organization's valuable resources, such as information, telecommunication, hardware, and software and afforded to an automated information system in order to attain the applicable objectives of preserving the integrity, availability and confidentiality of information system resources [1].

Meanwhile, the viewpoint from FFIEC IT Examination Handbook Base define information security as the security of the industry's systems and information is essential to its safety and reliability and to the privacy of customer financial information. These security programs must have strong. For the meantime, board and senior management level support with integration of security activities and controls throughout the organization's business processes, and clear accountability must carrying out security responsibilities [2]. Also, ISO 27001 2005 outline information security as about protecting and preserving the secrecy, truthfulness, validity, accessibility, and dependability of information [3]. In short, information security or InfoSec is the set of business processes that protects information assets regardless of how the information is formatted or whether it is being processed, is in transit or is being stored.

To date, the growing number of ICT infrastructure and users as well as the penetration of new technology from the residents required the high level of information security provided by the government. For instance a case as cited by Saeed, Hani and Jamaludin, that occurred in the year 2009 when a computer worm, Stuxnet assaults on the Iranian nuclear facilities. The aim is to assaulting Irian facilities is to harm Iran's enrichment program of Uranium. However, the intention failed damaging as had been expected. Another similar case happen to Saudi Arabia government where its government websites were crashed because of the enormous requests of services received from an unidentified location [4]. As soon as the number of cyber-attack keep upturn to spasm government's confidentiality information, the government has identified information security as a key priority to enforce more on information security policies.

Most of Muslim countries have implemented cyber security law but the level readiness of policies might be differ. Here, I investigate the information security policies in the context of ICT development in Muslim countries from 2000 until 2015. Then, I do some review on reports in 2012 and 2013 of the ICT development in Bahrain, Saudi Arabia and United Arab Emirates. Next, I identify list of information security policies that have been established or in establishing for those countries. Afterward, I applied my insights based on ICT development reports and information security policies for each countries.

II. ICT DEVELOPMENT AFTER 15 YEARS

From the past 15 years, the number of Internet users are progressively especially Internet users from developing countries. By the end of 2015, 2 billion of people from developing countries are spending the Internet. The number of Internet users are increase due to an advanced technology such as mobile broadband subscriptions, individual using an Internet, fixed-broadband subscription and household Internet subscription.

However, there are about 4 billion of people from developing countries that remain offline from accessing the Internet. Surprisingly, people who are from least developing countries (LDC) started to use the Internet in

the 2015 compared during 2000, none of them have accessing the Internet. Recently, number of mobile users are increase. Thus, it is not surprise to realize from Figure 2 that mobile-broadband penetration increased 12 times since 2007. Besides, people are aware of the need to own fixed-broadband subscription but the penetration is slower than mobile-broadband subscription. Figure 1 and Figure 2 shows the changing of internet users throughout the world including OIC countries.

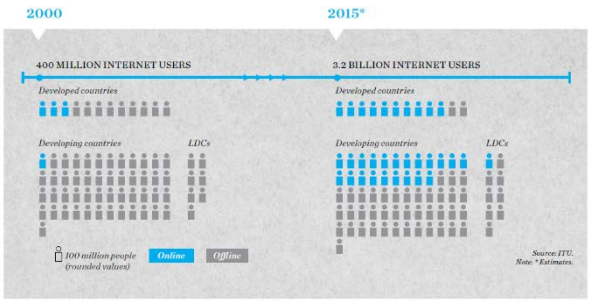

Figure 1: ICT Development after 15 years [5]

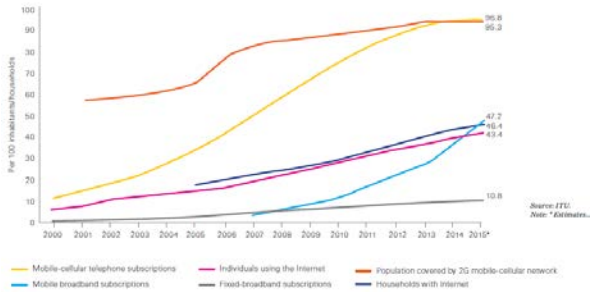

Figure 2: Internet User throughout the World [5]

III. DISCUSSION

Technological development is a considerable driving force behind economic growth, citizen engagement and job creation. Information and communication technologies (ICTs), in particular, are remodeling many aspects of the world's economies, governments, and societies. For example in Muslim countries, public officials, businesses, and citizens are working together to harness the transformative power of ICTs to make services more efficient, increase economic development and strengthen social networks. To discover ICT development in Muslim countries, an analysis from three sources has been reviewed in this paper which are ICT Index from Organization of Islamic Cooperation Statistical, Social Economic Research and Training Centre for Islamic Countries (SESRIC) and ICT Development Index (IDI) analysis from International Telecommunication Union (ITU).

i. A REVIEW ON ICT DEVELOPMENT IN MUSLIM COUNTRIES IN 2012 BASED ON SESRIC.

ICT Index is the study the average of the standardized scores on three key variables: Telephone, Computer, and Internet Penetrations per 1,000 people, by the year 2012. The analysis is comparing the OIC member countries with the rest of the world with respect to the usage of the telephone, computer, and the internet. As seen in Figure 1, ICT Index value is above the world average which is 4.16. Among 41 OIC countries, the index of 16 OIC members was calculated. With the ICTI score 9.54, Bahrain holds the topmost position among 146 countries. United Arab Emirates (13th) and Saudi Arabia (21st) are also the other two OIC member countries where ICTI value exceeds the EU average [6]. In brief, regions in the Middle East are among developed Muslim countries that have been listed in world rank in the year 2012. The ICT Index is shown in Figure 3.

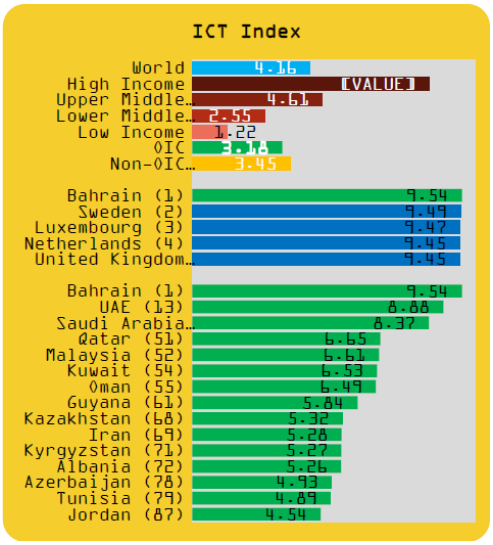

Figure 3: ICT Index from SESRIC staff calculation [6]

ii. A REVIEW ON ICT DEVELOPMENT IN MUSLIM COUNTRIES BASED ON ITU

To see the difference rank in ICT development in the year 2013 in Bahrain, United Arab Emirates and Saudi Arabia, ITU has prepared an analysis of all countries in the world. Table 1 presented the changes position of ranking in the year 2012 and 2013 among Bahrain, United Arab Emirates (UAE), and Saudi Arabia.

The performance of Gulf Cooperation Council (GCC) countries has highlighted the relationship between ICT Development Index (IDI) and Gross National Income (GNI) per capita by high-income countries that reach greater IDI values. From Table 1, these three countries rise extensively in IDI ranking from 2012 to 2013: Bahrain (from no. 28 to 27); United Arab Emirates (from no. 46 to 32); Saudi Arabia (from no. 50 to 47). In 2013, The Arab States with a higher rank probably will sustain with ICT advances.

Economy	Regional rank 2013	Global rank 2013	IDI 2013	Global rank 2012	IDI 2012	Global rank change 2012-2013
Bahrain	1	27	7.40	28	7.22	1
United Arab Emirates	2	32	7.03	46	6.27	14
Qatar	3	34	7.01	42	6.46	8
Saudi Arabia	4	47	6.36	50	6.01	3
Oman	5	52	6.10	61	5.43	9
Lebanon	6	62	5.71	64	5.32	2
Jordan	7	87	4.62	84	4.48	-3
Egypt	8	89	4.45	87	4.28	-2
Morocco	9	96	4.27	92	4.09	-4
Tunisia	10	99	4.23	96	4.07	-3
Palestine	11	100	4.16	95	4.07	-5
Syria	12	112	3.46	112	3.39	0
Algeria	13	114	3.42	114	3.30	0
Sudan	14	122	2.88	121	2.69	-1
Yemen	15	138	2.18	138	2.07	0
Djibouti	16	141	2.08	140	2.01	-1
Mauritania	17	147	1.91	145	1.90	-2
Average*			4.55		4.30	

Note: *Simple averages.
Source: ITU.

Table 1: Comparison of ICT development in the Arab States [7]

iii. ICT SERVICES IN SAUDI ARABIA, UNITED ARAB EMIRATES AND BAHRAIN

Among of these three Muslim countries, United Arab Emirates (UAE) have the highest amount international internet bandwidth per internet user. Besides, United Arab Emirates (UAE) almost doubled up its Internet bandwidth between 2012 and 2013. Yet, the other Arab States regions has connected to submarine Internet cables which the Gulf Bridge International (GBI) system completed its "North Route" terrestrial link in 2013. The connection itself is used to connect the Gulf region with Europe countries [7] [8]. Bahrain, United Arab Emirates (UAE) and Saudi Arabia have the number of subscriptions that go beyond the population in of each country.

Fixed broadband penetration is quite low in these three countries is because people now are more into broadband subscription and mobile subscription. Almost 137 million of people in the Arab States were using mobile online services by end 2013. Bahrain has the biggest proportions of the population continue with United Arab Emirates (UAE). Figure 4 showed ICT development and usage of these three countries and compare with the global, regional and developing/ developed-country averages [7].

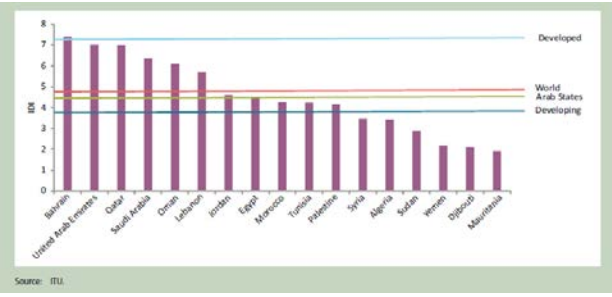

Figure 4: Comparison of ICT development and usage with the global, regional and developing/developed country averages, Arab States [7]

Based on report from SESRIC and ITU, it has given an illustration on ICT development and usage in Bahrain, United Arab Emirates, and Saudi Arabia. Bahrain was topped in the year 2013 index with a score of 7.40 in compared with the year 2012 index with a score 7.22. Bahrain was among the top five in all of the ICT Sectors among the Arab States. Besides, Bahrain's position was mostly driven by the number of internet subscriptions users has exceeded the population in Bahrain. For the United Arab Emirates, the index is 7.03 higher in the year 2013 in compared with the year 2012 the index score 6.27. For United Arab Emirates (UAE), it was among top five in all of the ICT Sectors among the Arab States. United Arab Emirates (UAE) assertions the highest amount of international Internet bandwidth per Internet user and almost doubled its internet bandwidth between 2012 and 2013. Mobile services in term of voice and broadband are much more popular in Bahrain and United Arab Emirates. Meanwhile, Saudi Arabia was two steps behind Bahrain and United Arab Emirates. But ICT development and usage among users in Arab Saudi are increasing year by year. In short, around 137 million people in the Arab States were used ICT by end 2013. The countries where the biggest proportions of the population are online are Bahrain and United Arab Emirates followed by Saudi Arabia.

IV. LIST OF AVAILABLE LAW ON INFORMATION SECURITY POLICIES

The higher rank in ICT development and usage of the country in the world, the further advance information security policies. It is a must for those developed countries to implant protective policies because there are a lot of intruders or snoopers that are demanding personal data and confidential document or information of the country. Table 2 summarize the legal and technical measures of information security policies in Bahrain, United Arab Emirates, and Saudi Arabia. It is based on ITU report on April 2015 in title Global Cybersecurity Index and Cyber-wellness Profiles [9]:

Country	Legal Measures	Technical Measures
Bahrain	• Information Technology Crimes • Protection of State • Information and Documents Lawful Access	• Has an officially recognized national CERT (CERT.bh) • No official recognition from national and sector-specific cybersecurity framework in: ✓Applying internationally recognized cybersecurity standards. ✓Certification and accreditation of national agencies and public sector professionals.
United Arab Emirates	• Cyber Crimes • Electronic Commerce and Transactions	• Has officially recognized national CIRT as aeCERT. • No official approval from national and sector-specific cybersecurity framework in implementing internationally recognized cybersecurity standards. • Do not have cybersecurity framework for accreditation and certification of national agencies and public sector professionals in the UAE.
Saudi Arabia	• Anti-Cyber Crime Law • Electronic Transactions Law	• Has officially recognized national CIRT as CERT SA. • No official recognition from national and sector-specific cybersecurity framework for Cybersecurity.

		• Do not have cybersecurity framework for the certification and accreditation of national agencies and public sector professional in Saudi Arabia.

Table 2: Legal and Technical Measures of Information Security Policies in Bahrain, United Arab Emirates, and Saudi Arabia [9]

CONCLUSION

Based on the reports and information security policies list in table 2, I can interpret that most developed countries in the Muslim countries are not well prepared in protecting confidential information throughout the Internet. For example, Bahrain, which have a high level of ICT readiness for the citizen. However, the level of information security protection that involving the policies from legal and technical measures are not strong enough in defending the advance technologies such as Bahrain itself still do not have an official recognition from the national and specific sector on their cybersecurity framework. Confidential information may leak through the Internet by any hackers, spammers or even viruses. Those attackers are demanding in going through well-developed countries. That is how attackers work.

In compared to United Arab Emirates (UAE) which left behind from Bahrain in term of ICT readiness. But United Arab Emirates (UAE) will ensure that there is a law for electronic commerce and transaction because people are more into internet banking. Besides, Saudi Arabia has the same law on the electronic transaction with United Arab Emirates (UAE).

The selection and presentation of applicable protections and security assistance may help in protecting government resources, employee information, organization reputation and other tangible and intangible assets. Unfortunately, security is sometimes viewed as thwarting the mission of the organization by imposing poorly selected, bothersome rules and procedures on users, managers, and systems. In summary, the government of the countries should not depend and stay with the current information security. Improvement of policies must be continuous and risk assessment must be identified. It is because the growth of technologies is not fixed. Technologies keep on upgrade after six months and attackers will use this chance for those who forgotten in defending their assets.

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