

# DEVELOPMENT OF ICT USAGE GRID MODEL FOR ASIA PACIFIC

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**Abstract**— it is generally considered that a key element of fast development in the future will be Information Technology (IT), as a means of enhancing the tasks and enabling governments to present many opportunities with regards to business, security, education and many others. With the growth in usage of Information Technology in many areas makes analyzing and understanding the trends of using IT is substantial. This paper aimed to present a clear overview on trends in use Information Technology in Asia Pacific over the last seven years. In addition, the latest trends of IT application and the challenges to use IT in Asia Pacific are elaborated.

**Index Terms**—Information Technology trends; Asia Pacific; trends in IT application; IT Challenges.

## I. INTRODUCTION

It has been noticed widely that Information Technology (IT) became the leverage and differential factor of all leading organizations in the world. One of the important reasons that led organizations to adopt IT is due to the effective impact of IT services on business processes.

The significant value of IT in firms was noticed when firms are capable of obtain advantages from using IT over those who do not. These advantages are varied from one firm to another depends on IT application involvement corresponding to the business processes. In education purposes, as [1] pointed out the learning process using IT is highly appreciated, for example students may engage in collaborative and active learning, perceive real-life simulations and interact with the learning materials. As a result, many applications have been developed for teaching and learning purposes. On the other hand, in business domains the most valuable benefits of IT are to present accurate decisions that help business in a certain area beside present accurate analysis. Due to IT application's capabilities to provide characteristics such as timely and relevant information, IT applications are one of the attractive issues to successful firms who try to sustain in global markets.

Since there is a diversity of interest to the use of IT in many domains, at the same time there are many annual reports issued by many organizations worldwide which present

accurate situation of IT progress in many firms over wide countries. However, trends and status of firms towards using IT is very vital to be classified and organized due to direct influence to firm's long-term mission. Therefore, this research will be focused on trends in use of Information Technology in Asia Pacific countries to explore the role of IT in these countries. In addition to analyze the current situation of Pacific countries to use IT based on NRI (Network Readiness Index) assessments which are issued by World Economic Forum (WEF) [2]. WEF is Global Information Technology report covered more than 140 economies worldwide and we used it in this study WEF reports from 2009 to 2015 to give a comprehensive analysis to develop the proposed model.

## II. BACKGROUND OF IT TRENDS IN ASIA PACIFIC

Occasionally, countries in Asia Pacific aim to adopt IT as a solution to eliminate the barriers in cultural and economic terms by providing a bridge of communication to share the knowledge [3]. Information Technology have been played essential role in firms to disseminate this concept, also IT is supporting firms to process and manage information to utilize their resources as much as possible.

Through observation of Asia Pacific governments on the importance of IT, they contributed in —Global Information Infrastructure Commission (GIIC) in 1994, according to [4] definition, this confederation could engage the top management of business firms in the development, manufacture, deployment, operation, modernization, financing, and use of services and products based upon information and communications technologies.

A highly appreciation of Information Technology in Asia Pacific have started during Asia financial crisis in 1997, when the world has seen several major economics events that have directly involved the information and communication technologies sector to be supportive upon to these environment. Furthermore, the Asian Pacific Economic Cooperation (APEC) leaders signed the Multilateral Information Technology Agreement (MITA) [5]. As it was observed by many analysts this agreement considered as a strategic agreement that

changed business practices through opening the way to promote the concept for e-commerce which can help to ease the business process, reduce cost and create an aspiration market for small projects which show its effect on Asian markets.

Due to the importance of IT, Asia Pacific noticed the necessity to establish technology powerhouse that attract all research scientists, engineers and technology experts. Research & Development (R&D) technology centers are guided to meet the demand of industry's requirement for quality of the highest level of technology [6]. In fact many R&D organizations in public and private sectors have significant influence on IT development in Asia Pacific in such a way that consistence with the current and future trends of IT "Fig. 1".

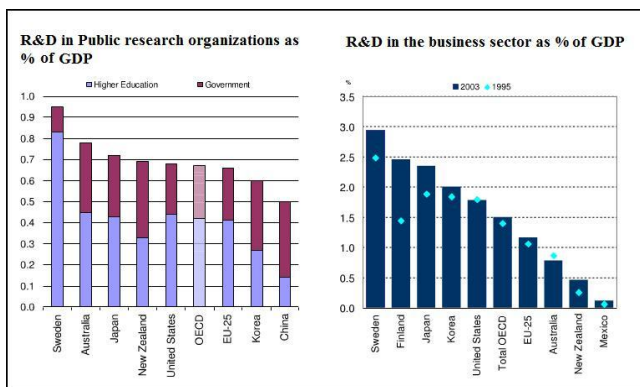


FIG .1. DEFERENCE IN THE PERFORMANCE IN R&D, SOURCE: ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OCED) 2005.

### III. THE CURRENT INDICATORS TO USE IT IN ASIA PACIFIC

This section will illustrate the current indicators on use of information technology in Asia Pacific region:

#### A. The Usage of IT in Asia Pacific

Generally many countries in Asia Pacific have drawn their approach successfully by adopting interesting examples of successful IT strategies to improve national economic growth and development. Based on NRI results as shown in Table 1, there are three countries in Asia Pacific achieved well-deserved top ten in NRI 2009 to 2015 report. Singapore as one of the strongest IT economies in all of Asia obtained first place, Taiwan was obtained with significant progress the fifth place, and Korea on the tenth.

Besides Singapore, Taiwan, and Korea there are other countries which improve their evolution in IT strategies and have made a significant progress in the usage of IT. In general comparing WFE 2010-2011 report with the previous reports

the effectiveness usage on IT in Asia Pacific is increasing while as mentioned in WFE 2008-2009 report just Singapore was one of the top leading countries in Asia Pacific. This inspiration has led other Asian countries to adopt the latest strategies in order to ensure the complementarity and flexibility in the use of IT.

TABLE 1: COMPARISON AMONG ASIAN PACIFIC TRENDS TO USE IT FOR THE LAST SEVEN YEARS, SOURCE: WORLD ECONOMIC FORUM, 2015

No	Countries	NRI 2009	NRI 2010	NRI 2011	NRI 2012	NRI 2013	NRI 2014	NRI 2015	Income level
1	Singapore	4	2	2	2	2	2	1	High
2	Japan	19	21	19	18	21	16	10	High
3	Korea	11	15	10	12	11	10	12	High
4	Hong Kong	12	8	12	13	14	8	14	High
5	Australia	14	16	17	19	18	18	16	High
6	New Zealand	22	19	18	14	20	20	17	High
7	Taiwan	13	11	5	11	10	14	18	High
8	Malaysia	28	27	28	29	30	30	32	Upper Middle
9	China	46	37	36	51	58	62	62	Upper Middle
10	Indonesia	83	67	53	80	76	64	79	Lower Middle
11	Timor	134	139	136	132	134	141	134	Lower Middle

Basically, in order to give a comprehensive idea on the trends in the use of IT in Asia Pacific, the authors proposed to categorize country's status in the use of IT into four quadrants. The status is referred depends on activities to utilize IT which is proposed in this research as following: Initiate, Explore, Keen or Innovative. In addition the status will be based on two main attributes (IT income and IT demand). IT income is the benefits or rewards from using IT which is the main goal for firms that using IT. While IT demand represents the total investment on IT which is required by firms that using IT.

The result of each country usage of IT is given upon on intersection of "IT income" and "IT demand". This is because those values will indicate the usage level of IT, besides it will show clearly whether this usage is sufficient or not. For example it is widely accepted that countries with low IT demand and High IT income will have "Keen status" in using IT which means use IT more than countries that have high IT demand and low IT income which is referred in this research as "Explore" status in using IT as shown in "Fig. 2".

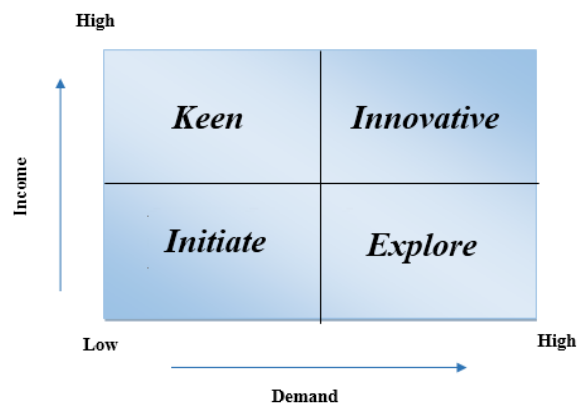


FIG. 2: THE PROPOSED ICT USAGE GRID IN ASIA PACIFIC

#### B. Trends of IT applications in Asian Pacific countries

With no doubt IT is still the leverage for most industries in Asia Pacific and demand for new applications are growing continuously. Regarding to the trends of applications in Asia Pacific, there are many interests to control risks and privacy in social networks, thus IT have still to improve the security concerns with the growth of social network applications. According to [7] there are many projects and researches have been adopted in Asia Pacific in order to focus more on the social media and it is growth cycle to protect sensitive data and information from illegal access.

In addition, as [8] pointed out trends in Internet banking or (online banking) have increased over the last two years when digital transactions have recorded definite issue in Singaporean banks. According to Data monitor's consumer survey, IMPACT in 2001, security is only a concern among consumers in the US and the UK once they are already using online financial services. Therefore in meanwhile issues on Internet banking in Asia Pacific should be accomplished with providing secure online banking system.

Trends in cloud computing services are increasing in Asia Pacific 2012 due to the development and efforts that guided towards redefine the approach enterprises do businesses [9]. Based on [10] survey in 2010 Asia/Pacific, Europe, the Middle East and Africa, and North America spent between forty and fifty per cent of the cloud budget on cloud services. However the report shows that there are initiatives in 2011 from firms to higher growth by increase the investment in cloud computing. Above all else, the cloud computing services are classified as "fastest-growing segment" in IT industry in Asia Pacific region in 2012 [19]. It is expected there is extremely growth for this technology in 2013 compared to recent years. However, it is expected also there are many efforts will be made in privacy issues for cloud services. This is because it can bring negative impacts on this technology in certain regions in Asia.

Furthermore, it is widely noticed there are many attempts in Asia Pacific to develop document editors to be used as instant messaging that enable users of a document to edit as well as approve them for faster processing. Based on Springboard Research it showed there are trends to use real-time editing option as second collaboration tool after e-mails. The interviews conducted with 469 CIOs, IT managers and business managers in over 400 large and SMB enterprises in Australia, New Zealand, China, India, Malaysia, Philippines and Singapore [11].

Finally, it is worth to mention that mobile market in Asia Pacific is one of the strongest markets in worldwide. According to [12], Japan and South Korea are the world's most sophisticated mobile markets; China is the largest; India is the fastest-growing. Currently there are trends in Asia

Pacific to use mobile for analytics of businesses to be provided to decision makers [13]. Until now efforts are still in progress to navigate analytics, reports, workflows and other processes.

#### C. Trends in attracting IT professional to Asia Pacific

One of the important aspects that showed interests to use IT applications is users or IT professionals. After the Global economic crisis occurred in 2009 that effect negatively on the recruitments in Europe and US. The Asia Pacific is still considering as one of the most popular destinations for technology executives who were interested in relocating both from the U.S. and Europe [14]. As observed by many analysts there are many multinational IT companies relocated in Singapore, Hong Kong and Malaysia. Besides all above, many renowned firms have branches in these countries to improve reputations of IT in Asia Pacific. In addition firms and universities as well are funding many researches with an aim to attract as much as possible of IT professional besides getting the knowledge and best experience through these solution to revive their markets.

#### IV. CHALLENGES FACED ASIAN PACIFIC COUNTRIES

Despite of the opportunities that IT services offer to develop organizations in Asia Pacific, there are certain challenges that required observing while using IT. According to [15] which show that countries in the Asia-Pacific are facing the challenge of supporting the information and communication revolution which supposed to be steered by their government and business. At the same time government and business continually demanding reliable information at the right time to support real-time decision making.

Furthermore, according to [15] which show the —rapidly expanding datal represent one of the challenges that faced organizations to adopt and use IT. When the growth noticed in usage of IT then there is a numerous of data that required to handle, thus we can notice that many techniques nowadays has been arisen such as data mining, data modelling, and data warehousing and many more.

In addition, with relating the challenge of numerous data to the business commitment to IT, a research by Hewlett-Packard (HP) [16] indicated only eighteen per cent of senior business and technology executives in Asia Pacific believe that IT provides them with the information they need all of the time. This challenge to use IT is increasing with expectation of many analysts that this rate is increased as well due to inability of some organizations view to strategic alignment to business objectives during system design.

At last, change organization structure or behavior is another

essential challenge to organizations in Asia Pacific due to IT involvements in many domains [17]. Hence any replacement plans should be counted and reviewed many times. In addition organizations need to emphasize on IT professional within leadership background that must be able to energize employee to adapt best practices in IT [18]. Therefore, we can summarize the challenges to use IT in Asia Pacific countries in "Fig. 3".

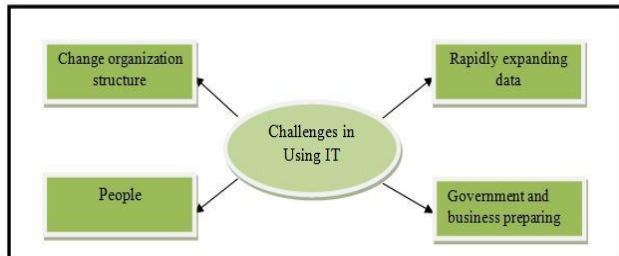


Fig. 3. Challenges in use IT in Asia Pacific

### CONCLUSION

Many studies showed that the Information Technology usage in Asia Pacific region was initiative and supportive to the growth and the prosperity in region's market. With an aim to poise the rapid economic and infrastructure development, Information Technology in Asia Pacific region was successful involve the technical innovation to the business processes. This research highlighted basic information on trend in using IT in Asia Pacific. There are many efforts as this research discussed moved into invest and use IT application, The region spans the entire rankings from second-best Singapore to third-to-last Timor-Leste according to NRI 2015, which means it hosts one of the most successful and most dynamic economies. Finally as it is observed the diversity of Asian Pacific countries from high ranking to low ranking in NRI 2015. They are still at least getting lower-middle income and this could lead to more motivations that increase the usage of IT in Asia Pacific region.

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