Information and Communication Technology (ICT) Policy;
Significances, Challenges, Issues and Future Research Framework

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Abstract: This paper presents the significances, challenges, issues, background of the problem, recommendations for future research prioritization and direction in ICT policy analysis and management. Unfortunately, the topic has received little attention especially among academicians, despite its important roles in ICT governance. The paper provides a framework for future researches in ICT policy analysis and management. This paper is mainly the result of organizational documents and academic literatures review. However, some of the organizational documents used are based on conducted preliminary surveys. The research has aimed at Malaysian Public Institution of Higher Education (MPIHE). Combination of various techniques/methods are used/proposed in accomplishing ICT policy analysis research. Qualitative research methodology in collecting data, Viable System Model (VSM) in analyzing collected data and Business Process Modeling (BPM) in formulating the outcome. This paper has been accepted as the PhD research proposal.

Key words: ICT policy, ICT governance, research framework, BPM, VSM, MPIHE, Malaysia.

INTRODUCTION

Information and Communication Technology (ICT) is a powerful tool that helps organizations to participate in the global market through promoting political accountability, improving the service delivery and enhancing opportunity’s development. In today’s world where ICT is considered as the enabler in business and where organizations take competitive advantages from their ICT, being able to compete, organizations need to unlock the power of the technology and align their ICT to the business objectives. However, organizations are increasingly spending on ICT, but a long history of ICT failure or at best mitigated success (Schwalbe, 2006), reveals that organizations need to improve the way ICT is invested and exploited. In other words, many aspects will be left out without innovative ICT policy. Therefore, one of the elements of having strategic ICT aligned with business goals is to standardize, direct and control the current technology installed and running and realizing if there is any need for improvements, upgrades or changes. Thus, a mechanism is essential to ensure that ICT investments and operations are effective, efficient and acceptable. This paper provides a guideline in producing such a mechanism.

However, ICT policy development life cycle is an essential consideration prior to embarking on any ICT policy analysis. It is important to distinguish between different processes constituting ICT policy development in order to establish a well-founded and comprehensive ICT policy management mechanism. Therefore, according to the literature, ICT policy development life cycle as the main driving force that serves as the policy central nervous system comprises of four main phases or processes; 1- development, 2- implementation, 3- monitoring and 4- evaluation. Development phase outlines all the required processes in ICT policy formulation (Mashinini, 2008). Implementation phase outlines all the necessary processes in ICT policy awareness raising, training or education, interfaces mediation or adoption (Kalika, 2007) and enforcement (Reza Alinaghian, 2008). ICT policy monitoring outlines all the processes required in environmental scanning to ensure users’ requirements satisfaction and value adding. Monitoring helps measure ICT policy against defined goals and ensures that goals have been achieved. At this stage gap during implementation are identified, which results in making potential adjustments in order to address problems and close gaps. The last ICT policy life cycle phase is the policy evaluation. Evaluation should be designed to measure and understand both internal and external elements having an impact on policy, such as changes in political landscape, economic issues, social challenges, technological challenges and internal regulations and so on (Mashinini, 2008). However, concerning most of ICT policy researches problem starts at the implementation phase, where ICT policy is not usually implemented or implemented successfully. Subsequently, the literature indicates that ICT policy monitoring cannot take place if ICT policy is not implemented. Consequently, ICT policy evaluation is only achieved if ICT policy has been implemented and monitored. In other words, failure at implementation phase stops the ICT policy life cycle. Additionally, according to the literature delay in ICT policy implementation might require policy amendment or re-formulation. Therefore, it is indicated that management of the ICT policy development life cycle provides insightful understanding of issues and risks and the situation is presented in a dashboard format enhancing interpretation and expediting decision-making processes (Mashinini, 2008). In other words, the main objective
of any ICT policy analysis study is to guide and assure ICT policy is well formulated and does not stop at the implementation or any subsequent phase(s).

**MATERIAL AND METHODS**

The research has intended and aimed at Malaysian Public Institution of Higher Education (MPIHE) as the case study. Governmental and organizational documents in addition to academic literatures in ICT governance, ICT policy analysis, knowledge management, Viable System Model (VSM) and Business Process Modeling (BPM) were used in formulating the research proposal. However, the research is to be carried out through utilization of qualitative research methodology. Policy research is usually undertaken with qualitative research methods that can provide a profound insight into a complicated phenomenon (Galit Cohen-Blankshtain, 2004). According to another ICT policy literature, this method 1- allows close interaction between researcher and community, 2- helps identify different properties and dimensions with their relationships and connections for the purpose of analysis, 3- is more reflective of reality especially the current challenges regarding the status of ICT policy, 4- assists researchers to be collaborative and discursive in nature, being in continues interaction with ideas and in the generation of ideas through constructive criticism and discourse, 5- has no preconceived ideas, it is shaped and detected by the data from the respondents and 6- is not rigid but flexible as the situation changes (Mashinini, 2008).

Since ICT is very fast changing and ICT policy has fluid and fragmented nature (Chini, 2008) Viable System Model (VSM) is proposed to be applied for the purpose of analysis. Viable System Model as a diagnosing tool to (re-)design organizational process is considered to be “the most usable and developed organizational cybernetics expression (Jackson, 1991). The Viable System Model’s intention is to develop functions within an organization that enable it to survive in its given environment (Sidney Luckett, 2001). It is recursive, variety reducer, quick on the draw and adaptive. The VSM seizes its opportunities, which guarantees survival. The diagnostic power of the tool has proven it to be worthy, which has been determined through its application to all kinds of organizations (Beer, 1981). The VSM is flexible and robust, the two advantages that are a prerequisite in fast-changing environments. It is flexible because new strategic components are easily inserted into any level without having to make dramatic changes to surrounding structures. It is robust because of having long term focus rooted in the identity of the organization (Espejo, 1989).

Business Process Modeling (BPM) technique is to be used and/or proposed in ICT policy analysis. Business Process Modeling is suitable for applications with the essential sense of process or state, in other words, the process oriented-applications with at least one of the following typical characteristics: 1- Long running (the process span hours, days, weeks, months or more from start to finish), 2- Persisted state (the process state is persisted to a database to outlast the server hosting it because the process is long lived), 3- Bursty and sleeps most of the time (the process mostly spends its time asleep and waiting for the occurrence of next triggering event) and 4 - Orchestration of system or human communications (management and coordination of communications between various systems or human actors is the responsibility of the process) (Havey, 2005). Therefore, Business Process Modeling is suited for the application of ICT policy analysis. ICT policy analysis is long running, has persisted state and is the orchestration of system or human communications (Kalika, 2007). In fact, the application of business model analysis in the context of policy analysis is a relatively new approach. It could be a tool for policy makers to better understand ICT innovation dynamics, market developments and accurate assessment of policy’s potential impact. A literature argues that policy makers may take more appropriate measures and illustrations through the application of an integrated business model framework. Such a framework can potentially be an effective cognitive tool shifting emphasizes from specific isolated policy domain or market in traditional policy analysis towards the determinants of successful business models (Martijn Poel, 2007).

The article highlights three main challenges for policy makers and analysts. 1- The ICT market’s dynamic, multi-domain and multi-stakeholder character, 2- The ICT market’s multi-sided nature mediated between various groups of stakeholders and 3- The policy formulation and analysis manifold implications. Therefore, it is less relevant to study ICT policy in isolation. The literature explains that an integrated framework can be more effective than a partial analysis since it helps policy makers to understand ICT developments, monitor progress, identify opportunities and bottlenecks and assess the policy role. Accordingly, the author proposes a new approach (application of the business model in policy analysis) which could be added to policy analysts’ toolbox.
and further work focusing on the combination with other methods (Martijn Poel, 2007). Consequently, ICT policy challenging issues can potentially be tackled through the transformation of knowledge and activities into a process model which enables decision-makers to filter out the irrelevant complexities and focus on essential elements.

**RESULTS AND DISCUSSION**

**Significances of ICT Policy:**

“ICT policy” has attracted little attention among academicians and practitioners. Therefore, it is necessary to recognize and acknowledge the significance(s) of ICT policy which also reflects on the importance and motivation for future research work. Consequently, this section represents role(s) and emphasizes made on ICT policy by various scholars.

The Australian Standard for Corporate Governance of ICT, AS8015, defines corporate governance of ICT as ”The system by which the current and future use of ICT is directed and controlled”. It involves with directing and evaluating ICT plans to support organization and monitor ICT use in order to ensure achievement of the plans. ICT governance includes ICT strategy and policy for using ICT within an organization (Calder, 2008). However, policy is the instrument of strategy (Unit, 2004) and nowadays organizations cannot compete without ICT strategy (Rodgers, 2002). This argument, thus, points to policy intervention as an inclusion issue (Mochrie, 2005). Therefore, ICT policy is the instrument to execute ICT strategic plan which as a result direct and control organization’s ICT. In other words, ICT governance is mainly achieved through ICT policy. ICT governance is also a subset of “Corporate Governance” that can be accomplished by means of positioning deliberate plan of action to guide activities and decisions and achieve the rational outcome (Peter Weill, 2004). ICT policy also backs up ICT vision (Chini, 2008) and the supervised implementations are needed to assist in reaching the organizational goal, objective or vision. It is important to include ICT vision as explanatory factors in the assessment of different policy, especially in the case of ICT (Galit Cohen-Blankshtain, 2004).

ICT goes hand-in-hand with economic growth and that is the motivation to consider ICT policy (Galit Cohen-Blankshtain, 2004). For instance, South Korea in the early 1980s introduced a national development policy of “One Family One Telephone” and delivered on it (Reynolds, 2005). By 2005/2006, South Korea led the world in the digital opportunity index and had reached to the level of high-income countries (Brown, 2008). Additionally, ICT policy is a constituent of knowledge society that encompasses social, ethical and political dimensions; it seeks to ensure ICT is put into service that is enabling rather than disabling (Mansell, 2008, Bindé, 2005). Different aspects of ICT policy empower different stakeholders and that is how ICT can contribute to society empowerment and emancipation (Stahl, 2008).

ICT policy is also a crucial element of academic computing (Mokhtar and Alias, 2006). One needs a certain amount of education in order to participate in society and lead a fulfilled life. ICT policy reflects this standpoint through using ICT as a lever for improving the provision of education to the citizens (Stahl, 2008). In 2001, Dominica Ministry of Education, Sports and Youth Affairs had published a report on ICT policy and identified it as the guide to successful integration of ICT in the education system. ICT policy has the potential to help institutions manage their ICT facilities and resources, provide ICT protection and incentives to users and guide the community on effective ICT use in learning (Mokhtar and Alias, 2006).

ICT policy mitigates a number of ICT issues (including but not limited to) through ICT awareness raising, providing advice in addition to support ICT use and infrastructure development (Hawkins, 2002). ICT infrastructure refers to the ICT environment in which academic computing is implemented (Mokhtar, 2005) and ICT policy encompasses ICT infrastructure (Mokhtar and Alias, 2006). In other words, ICT policy is an underlying structure (infrastructure) which ensures the proper guidance of different ICT-related services (Mashinini, 2008). Therefore, ICT policy is an ICT infrastructure that supports other ICT infrastructure components. It has multiple goals such as improving ICT quality, efficiency, security, legality and ethics. For that reason, it is regarded as a means of ICT control and standardization (Kalika, 2007). In fact, ICT policy is very crucial because the potential of ICT depends on how it is used (DeSanctis, 1994).

**ICT Policy Challenges and Issues:**

ICT policy is defined as the country or jurisdiction’s guide in ICT use and securing the information economy benefits. It deals with issues related to information dissemination, information utilization and technology spread and use (Labelle, 2005). However, a second literature defines ICT policy as a code that clarifies technology stakeholders’ duties, responsibilities and rights and specifies acceptable and efficient ICT utilization. It mostly deals with security and efficiency issues (Kalika, 2007). Another literature describes ICT policy as the support to a range of stakeholders’ important goals and aspirations. It is associated with ICT investment, capabilities to design or use ICT in ways compatible with local, national and regional aspirations’ development (Mansell, 2008). Differences in ICT policy definition and scope variation could be identified at this point. The first definition is very general and scope limits to information and technology utilization. The
second definition is more specific and comprehensive comparing to the first, but the scope is not well described. The third definition describes ICT policy from strategy perspectives. Therefore, different range of incomplete definitions provides different meanings and interpretations, which can result in developing incomplete or ill-formulated ICT policy. Thus, ICT policy can be defined as; a set of guidelines that provide an ICT framework to all technology stakeholders addressing ICT duties, responsibilities and rights. It is concerned with ICT issues and requirements in investment, design and development, strategy, quality, efficiency, security, legality and acceptable use. In the aforementioned formulated definition, attempt has been made to cover all the important areas necessary to be considered in ICT policy.

It is also worth noticing other ICT policy issues and challenges that have potentially appeared as a result of the problem background. The ICT policy issues and challenges also provide insights and motivation into future research work. Although the current ICT policy researches have been conducted in different countries from different continents such as Africa and Europe, they more or less reflect common issues and challenges. According to the current literatures on ICT policy, identified ICT policy issues and challenges appear to be existed in both developing and developed countries such as Egypt, South Africa, Greece, Sweden, France and, etc. Therefore, this section represents and highlights ICT policy issues and challenges using available academic literatures. However, names of the countries are not used at this point due to the similarity and commonality of ICT policy issues and challenges in addition to eliminating the repetition, redundancy and losing the main focus.

One of the significant shortcomings or issues that can be identified with current ICT policy is that it is mostly uninformed about the everyday lives of citizens and their ICT perspectives or perceptions in addition to the evaluation of ICT policy success merely in the form of computer and internet access statistics (Olsson, 2006). These data are not sufficient for evaluating ICT policy effectiveness (Raboy, 1998). They require closed examination with consideration of day to day situations (Moores, 2000). In fact, this is the point that ICT policy becomes problematic because it does not take full responsibility for the visions. Practically, authorities pass the responsibility to the users once computer and internet access are disseminated. Therefore, the ICT policy does not survive an encounter with the users for whom it is made (Olsson, 2006). In other words, there is often a difference between designers or decision-makers and community’s ICT perception (Kalika, 2007).

However, there are arguments about how to strengthen ICT policy initiatives (Mansell, 2008). For instance, the ICT policy has to be aligned with the needs of community. Current ICT policy is mainly developed with either minimum or no consultation with affected people and that is the foremost reason for the policy to not taking into account the community requirements (Mashinini, 2008). In other words, one of the ICT policy identified issues is incomplete formulated ICT policy, especially in supporting all the stakeholders. Therefore, not everybody benefits equally from ICT in such conditions of power imbalance, which indicates the ICT policy to be very weak (Olatokun, 2008). Subsequently, the result is that ICT policy is not reflecting the needs and interests of the people, who in turn do not use them (Olatokun, 2008). In sum, ICT policy mostly lacks a strong human development emphasize in order to extend modern ICT services for everybody’s benefit. That is mainly due to the lack of ICT utility focus, licensing delay, slow ICT policy implementation and fixation on ICT business ownership (Brown, 2008). Hence, it is not only that the empowerment and emancipation are not achieved but the primary aim of the policy in the first place is also not met. The concept of empowerment and emancipation is particularly important in the development which cannot be achieved through seeing community as passive recipients rather than active participants. That is using empowerment as a rhetorical device creating legitimacy for the policy despite the lack of real policy empowerment interest (Stahl, 2008). Eventually, it is argued that articulating ICT requirements unclearly, lack of implementation strategies and identification of user acceptability are due to managers’ insufficient ICT skills (Love, 2004). It is quite common in many countries to blame governments for considering ICT policy very low on the agenda, or for lacking an explicit ICT policy (Liagouras, 2010).

Moreover, there are other issues that negatively affect ICT policy management such as 1- low level community literacy, 2- lack of ICT awareness, 3- inadequate results produced by current ICT programs, 4- inadequate ICT infrastructure, 5- inappropriate ICT policy formulation missing community’s actual requirements (Mashinini, 2008) and 6- under-estimation of ICT policy political implications by considering ICT policy as unambiguous and technical. Therefore, policy makers often rely on very poor, inaccurate, incomplete and outdated data (Olatokun, 2008). As a result, lack of capacity, inappropriate leadership and roles recognition create challenges that lead to failure in ICT policy implementation. In fact, both the ICT policy itself and the implementation are inadequate when all stakeholders are not involved in the ICT policy development process. In addition, environmental scanning to ensure user satisfaction or requirements' fulfillment in order to add value to community is also lacking (Mashinini, 2008).

**Background of ICT Policy Problem:**

It is necessary to identify the background of the problem that has led to all existing ICT policy challenges and issues. In fact, ICT policy challenges and issues are potentially founded by the current and relevant requirements or shortcomings. Therefore, this section discusses the main rationale and motivation for future
research work using the available academic literatures. Background of the problem is discussed from the very root (Corporate Governance) up until the main focus (ICT policy).

The concept of “Governance” has only recently entered the field of social science scholarship (Jessop, 1998) and the topic “Corporate Governance” is ill-defined and blurred (Nigel Graham Maw, 1994). However, after years of research efforts and publications there are aspects still unconsidered. With regards to ICT governance (the sub-set of Corporate Governance) there have been several frameworks formulated and published by practitioners based on the experience, some of which have been used by industry and became standards. To name a few, the two and most widely used or globally well accepted ICT governance frameworks are the ITIL and COBIT. However, the aforementioned and other available ICT governance frameworks missed out considering some aspects such as ICT policy (Reza Alinaghian, 2010).

According to the literature, although the current ICT policy researches are conducted in different countries, but the analysis provides insight into international ICT policy analysis. As some of the countries are among the world’s leading nations in ICT and advanced in ICT policy making (Olsson, 2006). The analysis revealed requirements for further political efforts in shaping the new ICT into a civic tool (Olsson, 2003), which addresses and leverages the conditions, effectiveness and appropriateness of ICT policy because it cannot be left entirely to the citizens (Olsson, 2006). Many countries are currently facing with the difficult task of formulating the national ICT policy development framework that could enable and equally benefit all stakeholders (Olatokun, 2008). In addition, in many cities there is neither a clear ICT strategy nor explicit ICT plan to address ICT as a policy arena (Galit Cohen-Blankshtain, 2004). However, there is a lack of sincerity which betrays dealing with potentially empowering use of technology when analyzing the policy document in detail (Stahl, 2008). In fact, current ICT policy literature is fragmented and also misses several important points (Mochrie, 2005).

In 2003, Ministry of Communications and Transport of the United Republic of Tanzania published a report on ICT policy and declared the challenges in ICT policy as to find mechanisms for policy coordination, creating awareness and many more. In 2005, “Towards Knowledge Societies”, a world report published by UNESCO clearly indicated the absence of a model to ensure that ICT development is performed in enabling rather than disabling (Bindé, 2005). It is also stated that further research into user acceptance, adoption and implementation of ICT policy is needed because the question of ICT policy has received very little attention to date (Kalika, 2007), especially the interplay of two different governance levels of ICT policy (Chini, 2008). Therefore, a relevant and flexible framework is required to address the major challenges of 1- leadership for integration of ICT policy initiatives, 2- culture of compliance with policy, 3- user requirements and value adding, 4- appropriate needs analysis and 5- ICT policy implementation strategy guiding the policy development process and ensuring the success. A policy framework is necessary to provide a route map to guide the process of the policy development life cycle to ensure effective service delivery. The framework needs to be flexible in order to accommodate environmental dynamism (Mashinini, 2008). Research is needed that develops methodological and theoretical approaches focusing on the communication process dynamically and involving power relationships with regards to community empowerment. A useful framework is required to critique the embedded values in ICT policy, a forward-looking research framework to encourage sustainable development. High priority ICT policy research works that embrace the concern for “power of peace and tolerance” and contribute to debate, aim and discover all stakeholders’ interest. The research has to move beyond simplistic and dualistic thinking and address barriers and opportunities for systematic bottom-up policy formation and implementation (Mansell, 2008). In that way, the community move closer and understand the ICT policy contribution to peaceful human relations, a sustainable development (UNESCO, 2001).

However, analysis will fail to trace historical interdependencies if treating a specific ICT policy independently and shifting the focus from material arrangements bringing policy into life to policy document’s ideological study. Therefore, further ICT policy research needs to investigate identities, forms of visibility, techniques and government purposes clearly (Chini, 2008). Eventually, failure at the policy level reflects important shortcomings in technology and innovation conceptual framework (Liagouras, 2010). Thus, an ICT policy management framework is required (Reza Alinaghian, 2010) which has a very important contributions with consideration of the United Nations Charter in 1945 and the Universal Declaration of Human Rights (UN UDHR) in 1948, which obliged all states to establish, protect and enforce human rights at the global, regional and local levels (Montiel, 2007).

**Prioritizing ICT Policy Research Indicator and Context:**

There are different opinions among scholars on which context or indicator has to be given the priority in future ICT policy researches. In other words, whether the highest priority should be given to developing countries in order to take into account what is practical to achieve, or all countries should be considered (Mansell, 2008). However, it is argued that the aim of people emancipation and empowerment is universal. Therefore, it can be applied to western and non-western environments (Stahl, 2008). On the other hand, research has shown that ICT policy initiatives fail if it is made general among different countries (Liagouras, 2010).
Thus, community sector has to be recognized in order to achieve sustainable ICT initiatives (Huggins, 2002). ICT policy research priority is to be given to the context that is actively engaged with people’s everyday lives and preoccupies the material conditions of the community’s life (Mansell, 2008). However, organizations must have access to a framework in order to successfully integrate a technology management style into their current corporate governance (Love, 2004). Therefore, organizations need to develop their ICT policy and strategy frameworks (Labelle, 2005) as a guide in determining their own implementations (Dawson, 2006). ICT policy framework developed for an organization may not be fully applicable or adoptable to other organizations, but comparison of several frameworks can potentially result in introducing a comprehensive one accepted in a wider context (Reza Alinaghian, 2010).

**Conclusion:** This paper is unique in the field of ICT policy. It provides all necessary considerations, motivation and direction to future practical and / or academic works. The paper discusses ICT policy from various points of view. It highlights ICT policy significances that can draw practitioners’ attention towards ICT policy and its importance or contribution in ICT governance and corporate governance, in addition to provide motivation to academicians for future ICT policy analysis research(es). ICT policy important challenges and issues that are mostly common among different studies are accumulated and presented, which provides insight to practitioners and academicians in their future considerations. A guideline for future ICT policy analysis research work is provided that draws a route map. However, there are techniques / methods proposed for future research works such as qualitative research methodology, Viable System Model and Business Process Modeling. Consequently, it can be concluded that every organization needs a model in order to manage its ICT policy. One single model may not fit to all since organizations have their own ICT issues and requirements. In addition, ICT governance structure of one organization potentially differs from others. However, a model developed for an organization can be used as a guide in amending, adjusting, upgrading or developing further ones for other organizations. Additionally, comparison of several models can help in producing a comprehensive model accepted by a wider context.

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