ICT AS A TRANSFORMATIVE DRIVER FOR SOCIO-ECONOMIC DEVELOPMENT

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ABSTRACT

This paper presents findings from an ICT transformation lab implemented by one of the state in Malaysia with the aim to demonstrate the important role of ICT as a driver to hasten the socio-economic development of the state. The lab was deemed necessary and timely considering the low ICT adoption and below the national average internet penetration experienced by the state, which make it even more challenging to deploy ICT as an effective tool for the development of the state. The one-month lab gathered experts from the ICT and telecommunication industry as well as related government agencies at the state and federal levels to identify potential ICT projects that can contribute to the development of the state. Numerous techniques for data gathering such as focus group discussions, brainstorming, technology impact analysis, critical success factor analysis, presentations and mappings were carried out. Analysis was based on the National Strategic Framework for Bridging the Digital Divide and mapped against a strategic importance matrix that identifies potential projects classified according to three categories: quick-wins, mid-term duration, and long-term. Results of the lab identified 26 ICT projects, 15 of which were seen to have the potential to become transformative drivers with impact for socio-economic development of the state.

Keywords: *Diffusion, Adoption, Value-Creation, Digital Divide, Quick Wins*

1. INTRODUCTION

ICT should not only be viewed as a technology that can be used to increase productivity and effectiveness of the delivery systems, ICT should also be viewed as a technology that has the potential to create value that can contribute to the social and economic status of a country. This is supported by [1] and [2] who state that the usage of ICT is one of the indicators to measure the socio-economic development of a country. The Malaysian Government formulated a national strategy for ICT that can tap its potential as an agent for development. The National Strategic Framework for Bridging the Digital Divide (NSF-BDD) which forms part of the government transformation program to provide access to ICT in underserved communities to enable ICT adoption, which eventually evolve into activities that can add socio-economic value to the community [3]. One of the states situated in Malaysia was looking into how ICT can be a transformative driver that can hasten the development of her socio-economy. This was done through a transformation lab where series of focus group discussions were held for a month as inputs to the state–level economic transformation plan. The identity of the state however will not be disclosed for reason of anonymity. In this regard, a series of brainstorming sessions and focus group discussions based on sectors were carried out in the month of September, 2013 in the form of a transformation lab as inputs to the formation of a particular state economic transformation plan. Twelve sectors were involved which include Urbanization, Agriculture, Human Capital Development, Entrepreneurship, Tourism, Infrastructure and Logistics, ICT, Career Development, Water Supply, Water Resources and Energy, Housing, Industry, Investment and High-Technology, and Finance.

2. TRANSFORMATION LAB

The lab initiative undertaken by the state government received much coverage. The transformation lab was organized by the state economic planning unit with collaboration from the Corridor Regional Development Implementation Agency (CRDIA) as its secretariat. Malaysia has established five CRDIA covering the northern region, southern region, eastern region, and East Malaysia each covering the states of Sabah and Sarawak [4]. The lab was aimed at formulating a

strategic direction and a long-term action plan for transforming the state into a peaceful and prosperous state. The state government invited several parties that include the academics, NGOs, professionals, senior officers from the state and federal government agencies, politicians, chambers of commerce, and individuals having expertise in the respective areas/sectors. The aimed was to generate ideas and suggestions for the state plan and strategy that can move the state forward into an advanced socio-economic development stage within the corridor economic region by the year 2025. The objective of which was to bring gradual changes towards a modern and progressive society from a society that is very much conservative and traditional in nature.

3. METHODS

Similar to the transformation labs implemented at the national level, the state transformation lab also gathered experts and intellectuals from the government as well as the private sectors, the academia and related agencies and non-governmental organizations. The lab took place in the whole month of September 2013 to identify high-impact ICT projects capable of advancing the state to a development level based on socio-economic value. The approach taken by the lab includes techniques such as brainstorming, focus group discussions, and presentations from the ICT industry which were methods used to obtain relevant information based on the current situation in the state.

Lab participants comprised of twenty organizations from state and federal government agencies, telecommunication and ICT companies, and academicians from institute of higher learning. Participants were chosen upon invitation from the state government to their respective heads of departments, vice chancellors and companies' CEOs. Overall, the participants were well qualified and experienced in their jobs which were either directly or indirectly related to ICT policy and/or implementation. Forty percent of the participants came from the state agencies including the state ICT centre, local councils, district offices, and state's subsidiaries. Twenty-five percent of participants comprised of the telecommunication companies who are also the ICT service providers for the state. Fifteen percent of the participants were from the IT companies, whilst the other 15% from the federal agencies. Universiti Utara Malaysia is the only institution of higher learning participated in the lab represented by members of

its academics both as facilitator and participants. The lab session begun with a brief mandate by the state executive council in-charge of the ICT portfolio. This will enable participants to understand the objectives and aspiration of the state government and focus on the issues involving ICT development and the state ICT direction. Based on the mandate, the state ICT vision and mission were formulated as follows:

State ICT Vision

ICT as a driver for the state socio-economy transformation

State ICT Mission

Increase broadband penetration to 75% by 2015; Provide quality internet access to all citizens of the state; Optimized ICT adoption as value-added to other main sectors.

As the lead facilitator, the author adopted a less formal atmosphere to encourage free flow of ideas. This includes focusing on the new ICT vision and mission statements in addition to ICT solutions that can support the main sectors. Flip charts were used assisted by the secretariat who acted as a scriber to key-in information on a PC connected to an overhead projector so that ideas were displayed in "realtime" mode for everybody to see, verify and validate. Subsequent sessions were held interleaved and crisscrossed with presentations from the ICT and telecommunication service providers, all focusing on ICT solutions and projects that can bring the state closer to meeting its new ICT vision and mission. At the end of the day, the information gathered was compiled and combined with other subsequent sessions for the day and distributed to the email addresses of the participants. Participants were encouraged to read through and verify for the second time, and gave feedbacks when the lab session continued the next day. This is to ensure that the information that gets documented has reached consensus and represents ideas from the group. Any disputes arising from an idea will be further deliberated, KIVed and/or put off depending on its effect to the state's policy, by-laws and regulations. Relevant authorities were consulted on or off site before a final decision were made on the dispute. After thorough deliberations, ideas that were found to have the potential to support the state ICT vision and mission will be included in the list of potential ICT projects to be implemented. The sessions ran for several weeks and ended with

series of sessions for several days that analyze the project list aimed at identifying the project prioritization.

The method used to identify project priority was a mapping technique based on the effect of the project implementation to the socio-economic impact on the state. This was carried out using the National Strategic Framework for Bridging the Digital Divide (NSF-BDD), which is a national framework that defines digital divide according to the state of ICT development and its impact on the socio-economic development [5, 3]. The NSF-BDD has been used in a study by [6] as a tool to gauge ICT penetration at the sub-district (*mukim*) level. The NSF-BDD has also been applied in the development of a conceptual framework for e-Village [7]. In a recent study, the diffusion and adoption of ICT were examined to look at their effect on value creation using the NSF-BDD as the theoretical framework [8]. The study found strong relationships on both diffusion and adoption on value creation.

The framework acts as a guide for underserved groups to have access to digital opportunities by providing affordable telecommunication and ICT infrastructure and services within reach. The framework defines 3 generation definitions of digital divide, that is, diffusion, adoption and value creation. The framework underlines ICT projects or initiatives at the value creation stage are capable of achieving the highest socio-economic impact compared to the diffusion and adoption stages. In turn, the adoption stage is capable of achieving a moderate impact to the socio-economy higher than the diffusion stage. These relationships can be depicted in the shapes of the S-curves and their elasticity along the Time and Value dimensions as represented in Figure 1.
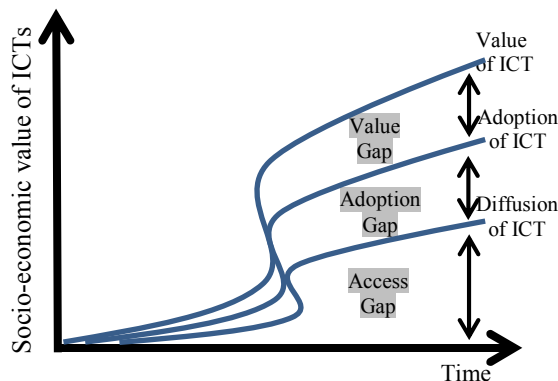

Figure 1*: Impact Of Value To The Digital Divide*

ICT projects at the diffusion stage focused on the development of ICT and telecommunication infrastructures which includes telecommunication towers, fibre optic cabling, wifi towers, earth station satellites, public internet centres, broadband, computers and operating systems. The adoption stage focused on using the devices and equipment available from the infrastructure. At this stage there is positive reaction on the use of ICT up to a point where users feel the necessity of using ICT, just like the ubiquitous use of the social media presently using the cell phone infrastructure. Once this occurred, a "technology pull" has been reached where there is now a demand for the use of ICT and ICT services, a shift from the "technology push" phenomenon marked by the diffusion stage. ICT related spending will increase, thus contributing to a more significant value to the economy. The intensity of the ICT adoption stage, coupled with better and efficient infrastructure and high-speed broadband, will lead to more efficient service delivery, increased production and job performance, which will contribute to higher income and value creation. This is the stage targeted in the government transformation lab and Digital Malaysia program, so that the use of ICT and ICT services could be fully optimized to give maximum impact to the socio-economic development of the country.

4. DATA ANALYSIS

Based on the methods specified in the preceding section, data analysis was performed on information gathered by the lab participants. Initially, the state government formulated a strategic direction to move the state to become a developed state in line with the national agenda. This was communicated to all lab participants so that everyone has a clear understanding of the state's vision, mission and objectives. Based on the strategic direction, the ICT transformation lab identified three main sectors where ICT can play a significant role to create value and transform the state economy. The three sectors were agriculture, tourism and entrepreneurship. These three sectors were identified based on the current emphasis by the state to make these three sectors as the impetus for the state economy due to their strong fundamentals. Beneficiaries from these three sectors made up the bulk of the underserved groups within the NSF-BDD frameworks. The framework categorized the underserved into nine groups, ie. rural, urban poor, small, medium and micro enterprises (SMMEs), youth, elderly, women, indigenous, children, and disabled [5]. ICT can be

used to facilitate the movement of agricultural products along the supply chain, from the upstream agricultural activities such as seeding, fertilization, planting to cultivation, reaping, product gathering, logistics, packaging, marketing and distribution at the downstream activities. The existence and building of more rural and urban transformation centres would help facilitate product sourcing that match the needs of consumers based on smart partnerships and alliances among producers and entrepreneurs [9]. Likewise the use of ICT in the tourism industry will not only provide information about places of interest which the state is famously known, but also the development of attractive dynamic tourism packages based on crowd sourcing the state can potentially offer with involvement from local (largely from rural and urban poor dwellers) and overseas operators. As for entrepreneurship, special ICT schemes, incentives and training programs have been available particularly to small, medium and micro enterprises (SMMEs) to encourage the use of ICT in their businesses, and provide opportunities for entrepreneurs to access information useful for their business, in addition to reach out and promote their products and services [10, 9].

During the month-long lab, a number of initiatives and incentives have been suggested based on extensive deliberations among the participants. Table 1 summarized the state ICT initiatives and incentives based on their impact to the socio-economic development of the state. The initiatives and incentives however, were not only limited to supporting the three main sectors identified in the lab. Whilst participants were encouraged to keep in mind contributions of ICT to the three main sectors, they were allowed a free-flow of ideas that encompassed the other sectors. This is reflected by the initiatives and incentives/activities identified by the lab participants that includes other sectors but placed emphasis on the three main sectors particularly entrepreneurship.

Table 1. State ICT Initiatives And Incentives/Activities

Initiative	Incentive/activities
Increase broadband penetration	State to facilitate approvals of permits for wifi and wire ducting
Infrastructure ducting for new township	Public Private Partnership incentive scheme for housing developer and telcos.

Initiative	Incentive/activities
Quality wireless infrastructure at selected public places	Special allocation/permits for: Schools Government buildings Transportation hubs Food courts Tourist/Recreational areas Community centres Headman's office
Increase subscription	Introduce special packages from telcos.
Content development	Incentive to develop local content in the Malay language especially in the areas of education, healthcare, religion, job opportunities, government incentives and local places of interest, historical sites and tourist destinations.
E-Government applications – G2G, G2B, G2C	MAMPU to advice on online counter and other E-G related services
IT Savvy program	ICT competition Collaboration with universities
ICT Centre/Digital Centre	Support ICT development by sector (agriculture, tourism and entrepreneurship).
E-Business programs	Incentives for business websites and blogs
Establish online business community	Establish virtual integrated hubs for product sourcing and global sourcing
Cluster SME project - Cluster development (or cluster initiative or economic clustering)	Public-Private partnership involving SMEs in the supply chain development, market intelligence, incubator services, entrepreneurship training, joint R&D projects, product sourcing etc.

5. FINDINGS

The initiatives and incentives identified in the preceding became the focus of deliberation in identifying potential ICT projects. ICT projects identified from the discussion and idea generation sessions were mapped against the three stages of ICT development based on their impact to the

socio-economic development of the state as discussed previously. The results identified 11 projects at the diffusion stage, 3 projects at the adoption stage, and 12 projects at the value creation stage. However, identities of these 26 projects were not specifically disclosed in this paper due to the confidentiality of the information. Neither the projects identified were not only focused on the three main sectors as mentioned in the preceding section. This is in keeping with the spirit of the lab in encouraging free flow of ideas and not to limit the thinking of the participants beyond the three sectors. A conceptual mapping of the proposed projects is depicted in Figure 2.

Figure 2. Mapping Of Proposed Projects

The figure is based on a strategic importance matrix modified from the original McFarlan's Application Portfolio described in [11]. All 26 projects were mapped and categorized according to their strategic importance based on the state's strategic direction. The matrix comprised of four quadrants, that is, strategic, key operational, high potential and support based on implementation time frame and the project's impact to the state socio-economy. Strategic projects are those high value creation projects that have significant impact to the state's socio-economy. This should be given top priority, particularly categorized as "quick-win" projects. Projects in the key operational category are the "must haves" and their implementation should also be given priority since their presence will determine the fundamental strength of the state ICT infrastructure that would enable projects in the strategic and other categories to be implementable. High potential projects are those that have the potential to be transformed to the strategic category in the future when the investment and/or technology are readily available and affordable. Projects in the support category are "nice to have" projects that will add value and help to facilitate the state in terms of ICT adoption. Decisions to

categorize a project under a quadrant were made after careful deliberations by the participants and consensus being achieved. Subsequently, a mapping was done against the three stages of the NSF-BDD. Using the vertical axis of Figure 2 to represent the impact to the socio-economy of the state, the figure is divided into three horizontal areas corresponding to the three stages of the NSF-BDD. The upper portion represents the value creation, whilst the middle portion represents adoption and the lower portion represents diffusion.

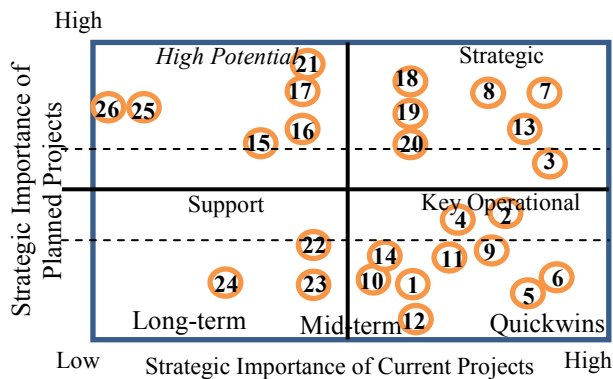A summary of the state ICT projects categorized according to the three stages is presented in Table 2.

Table 2. General Categories Of The State ICT Projects

Value Creation
12 projects based on online digital content and applications comprising of e-Learning, e-Entrepreneurship, e-Flagship applications such as e-Community, e-Business, e-Agriculture, e-Tourism, e-Health, e-Mosque etc., urban and rural transformation centres, fibre optic installation for new housing projects, big data analytics, and a creative innovation hub
Adoption
3 projects including e-Government applications and 1GovNet, and e-Banking in rural areas
Diffusion
11 ICT infrastructure and telecommunication projects comprising of cellular coverage at selected tourist locations, wifi installation at public focus areas and government departments, internet access at new housing areas and business premises, and implementation of universal service provision to cover state-wide designated underserved areas

Project prioritization was carried out to assess the projects' impact to the state's strategy and direction. Once again project mappings were carried out, but this time they were based on time duration. *Quick-wins* projects are high-impact that are capable of giving quick return in a short time frame with positive impact to the social or economic development of the state. An example is a project in which funding is available, either has been allocated by the federal government or private sector, has the potential to be widely implemented, and benefits the citizen. *Mid-term* projects are projects that have the potential to contribute significantly to the socio-economic development of the state, have been earmarked for implementation, but would require submission of proposals for funding and would likely take between 1 to 3 years

to implement. Long-term projects are large-scale high-impact projects that require a long period of implementation between 3 to 5 years.

Results of the one-month long lab analysis identified the 26 ICT projects, 15 of which were viewed by the participants to have the potential to become ICT transformation projects capable of giving impact to the state socio-economic development. From these 15 high-impact projects, 5 projects were categorized as *quick-wins*, which are projects with available funding and can be implemented immediately. These projects were related to teaching and learning, entrepreneurship, banking, and a number of flagship applications. Three *quick-wins* projects were related to infrastructure at the diffusion stage. Other ICT projects included in the mid-term and long-term categories were divided according to the diffusion, adoption and value creation stages.

6. CONCLUSION

The state ICT transformation lab had successfully gathered intellectuals and ICT scholars from both government and private sectors to deliberate on the best strategy for the state ICT agenda that can support the state vision and mission to become an economically advanced and developed state at par with other developed states in Malaysia. The lab had successfully identified prioritized ICT project implementation based on 3 timeframes, in which the focus was upon quick-wins value creation projects which give impact to the socio-economic development of the state. To ensure effective project planning and sustainable project implementation, participants also proposed the establishment of a Project Management Office (PMO) so that the projects are implemented according to the priority and based on a planned schedule. An important thing to be considered is the expansion and strengthening of the ICT infrastructure as the foundation for the state ICT transformation, without which none of the ICT projects identified in the lab would be able to implement effectively. Even though the ICT infrastructure is at the diffusion stage and its impact to the socio-economy is low according to the NSF-BDD, without a strong basic ICT infrastructure, it is almost impossible to achieve the adoption and value creation stages due to the mind-set and behavior of users themselves. Users who do not perceived ICT as important will tend not to use ICT, even though ICT facilities are within reach. The situation is even worse if ICT facilities were non-existence and the opportunity to access ICT services was not available.

Similar ICT transformation labs can be extended to other states in Malaysia. This will quicken the efforts to hasten the socio-economic growth at the national level. Involvement of stakeholders from the various state and federal agencies, private sector, the ICT industry and the academia is important in order to formulate the best strategy for ICT rollout programs, based on the state's current fundamentals and future strategic direction. Future studies could delve into examining actual impact of the high-impact ICT projects to the state economy and social well-being of its citizen. As quick-win projects are readily implementable, immediate evaluation on its effectiveness can be conducted to measure the extent of its success in meeting the strategic direction of the state. As the implementation involved short, medium and long-term strategies, mid-term reviews should be conducted, possibly with the same participants, to identify short falls and opportunities.

On limitation of the study, one major factor that can disrupt the smooth flow of the lab is the continued commitment of the participants throughout the month-long duration. Whilst majority of the participants were committed and gave their support continuously, a few were unable to do so due to work commitment and other responsibilities that could not be relegated. Whilst replacements could bring in fresh ideas, they could slow down the progress of the lab, which at times could become stressful on the part of the lab secretariat to meet the dateline.

Overall, the transformation lab had been very successful with all parties involved were satisfied with the outcome. Participants were satisfied with their contributions and became much attached to each other due to the lengthy discussions and deliberations. There was a positive feeling and spirit of collegiality with a common goal of making a contribution to the state. Based on the presentation of the findings, the state government was also satisfied. The Chief Minister in thanking the participants expressed his gratitude and was very satisfied with the outcome, which according to him were ideas "out of the box". The state will carry out a transformation plan that will detail out the actions to be taken in implementing the proposed projects.

With the implementation of the ICT transformation program, the state would be able to achieve sustainable socio-economic growth in an

inclusive manner. The state would then be able to bridge the digital divide as what have been experienced by the other developed states in Malaysia. Only then the state would be able to position itself to become as what it has envisioned: a peaceful and prosperous state.

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