Understanding Technology Changes for ICT4D Projects through Modelling

Cheah WaiShiang, Nurfauza Jali, Muhammad Asyraf Khairuddin and Hamizan Sharbini
Faculty of Computer Science & Information Technology,
Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia.
wscheah@unimas.my

***Abstract*—ICT4D involves the study of design and development of ICT technology to the community. Based on our experience, most of the ICT4D projects are happening in one off solution. The projects will deliver with off the shelf products or services and hand over to the community upon the deployment and training. There is neither plan nor development to deal with changes. Hence, it may lead to the failure and unsustainable projects. We believe that dealing with technology changes is essential for sustaining the ICT4D projects. However, how to handle the changes in technology on ICT projects? This paper introduces a preliminary study on technique to handle the changes of technology through modelling. From the modelling, it showcases how the requirements have led to the technology change and how the business models affect the decision in designing the technology or solution for ICT4D projects. We adopt actor network theory to study the technology changes on ICT4D projects. We extend the actor network theory with networked actor modelling to study the actors' needs and the impact of cost (e.g. business models) to deal with the technology adoption, translation and development for ICT4D projects. The agent oriented modelling is introduced as the modelling process for actor network theory. The agent modelling consists of models based on the integration of agent models and e3Value model. In order to evaluate the work, we demonstrate how the model can understand the technology changes (e.g. adoption and adaptation) for an electronic health record system (EHR).**

***Index Terms*—EHR System; ICT4D; Modelling; Technology Changes.**

I. INTRODUCTION

ICT4D is the introduction of ICT to support the socio-economic development of the rural community. In Malaysia, ICT4D has been introduced almost a decade. The aim of the ICT4D is to bridge the digital gaps between the rural and urban; improve the digital literacy among the communities and promote the business development in the rural area for better livelihood. To date, various ICT4D projects have been introduced in Sarawak. Among them, telecenter or Pusat Internet 1 Malaysia (PI1M) is a platform to promote ICT among the rural community in Sarawak. The telecenter known as rural internet Centre (Pusat Internet Desa, PID), Mini RTC, Kedai Com, USP Communication Centre (UCC), Rural Broadband Library, Universal Service Provision (USP), and Bestari.Com [1].

The telecenter or PI1M is a place or one stop station that equip with ICT infrastructure like computer, the internet, printers, digital camera. Also, it can serve a multi purpose hall in which the training is conducted in the PI1M, meeting and other events. With PI1M, the community will attend various ICT or general training program (e.g. business training, talks), competition (e.g. drawing competition), and serve the Internet. They are a total of 1,945 telecentres are operational in Malaysia nowadays. From the review [1], the benefits of a telecentre in Malaysia are following.

i. community development in which the telecentre is served as a centre to embodiment and enrichment of social, physical, and spiritual aspects of the rural population [1].
ii. to increase ICT literacy of the rural community
iii. to improve access to computers and provide opportunities for online activities
iv. to promote the development of networking and telecommunication with outsider through email, SMS, etc
v. to access the government electronic system for services such as payment of taxes, registering complaints, etc
vi. to help students to obtain information online through telecentre programme in schools

As telecenter has much beneficial to the community, it has been suffered from the issues of sustainability. Based on our experience, most of the ICT4D projects are happening in one off solution. The projects will hand over to the community upon the deployment and training. There is neither nor plan or development to deal with changes. This may lead to the failure and unsustainable projects. We believe that dealing with technology changes is essential for sustaining the ICT4D projects. However, how to handle the changes in technology on ICT projects? We adopt actor network theory to study the technology changes on ICT4D projects. We extend the actor network theory with networked actor model in order to study the impact (e.g. cost) of technology changes for ICT4D. The agent oriented modelling is introduced as the modelling process for actor network theory. The agent modelling consists of models based on the integration of agent models and e3Value model. To evaluate the work, we demonstrate how the model can estimate the cost as the potential impact of electronic health record system (EHR), an EHR project for rural community Sarawak.

Section II presents the related works in dealing with technological change. It covers the adoption of ANT in the study the technology changes, and general usage of ANT. In addition, we present some of the issues of ANT in dealing with development studies. Section III presents the proposed modelling process to understand the technology changes for ICT4D studies. The section first elaborates the modelling process. This is followed by a run through an example of applying the modelling process to electronic health record system for the rural community of Sarawak. Section IV presents the lesson learnt and conclusion of this paper.