

## CHAPTER 5

### CONCLUSION AND RECOMMENDATIONS

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#### 5.1 Discussion

This research has been conducted to further the understanding of technology appropriation by focusing on the experience sharing of RFID technology adoption for Malaysian LSPs. The primary objective of this study is to investigate how the local LSPs percept and use the technology through the conceptual model by Carroll et al. (2002), the Model of Technology Appropriation (MTA) which the appropriation process operated at three different levels as depicted in Figure 2.1.

At the initial stage, the local LSPs are attracted to the technology due to the promising attractors such as supply chain visibility (SCV), government incentives, a trend in logistic industry, overall adoption costs and customer service improvement which valuable to the LSPs. The RFID project was strongly pushed by the IT director in Malaysia and research head officer in Singapore to promote the technology to be implemented in the warehouse environment. The project obtained approval from the management board and headed by a project manager and several local IT personnel. One vendor was selected among pool of available RFID vendors to provide the RFID's equipments to be installed in the warehouse. Hence, the LSP proceed to the pilot test on the RFID technology to

further evaluate the capability of the technology primarily via funding support from the government.

The second level of the MTA is further assess the benefits and challenges faced by the local LSP if they persist on the use of this technology in the logistic industry. At this stage, the RFID system is being implemented on a smaller scale for pilot test with the collaboration from the vendor, internal IT personnel and operators. Training on the newly installed system is provided by the vendor to the LSP's personnel for operating the system. Throughout the entire pilot test, the vendor work closely with the internal IT personnel to obtain the constant feedbacks from the operators and continuous improvement on the RFID system. This research has leads us to the criteria of disappropriation whereby the disadvantages of the technology are beyond the tolerance level of the local LSP and once the pilot test completed, there were no further action taken. The study highlighted the primary factors that impede the RFID technology adoption are the overall costs associates with the technology, inconsistent standards (e.g. frequency and patterns) and the unsolved technical glitches during the test.

The final stage of the model emphasise on the longer-term continuity use of the technology where it is appropriated and engraved in the logistic daily operation. The study suggests that operation efficiency is one of the crucial determinants that ensure continuity of the technology in the industry. At the end of the day, the

LSPs aim is to have a speedier processes and better inventory management. By achieving operation efficiency, the LSPs able to reduce overall costs (e.g. reduction in labour costs, reduce waste and improve assets utilisation) and increase revenues which is the reason for any establishment of an organisation.

The MTA was selected for this study is justified because the model able to explain the later stage after the initial introduction of a technology in which most of other frameworks do not cover (Rahim and Alias, 2006). The model encapsulates the entire RFID adoption process from the initial introduction of the technology to the long-term sustainability of the technology in the logistic context. At every stage of the MTA, different factors are influencing the LSP adopter decision to continue and persist on the use of RFID technology in the industry.

The study suggest that two primary determinants that influence the LSPs to continue persists on the use of RFID technology are the continuous innovation on the RFID technology to improve operations efficiency and the cost reduction for adopters in future. Once the technology is appropriated and feasible for the adopter, these two influencers will ensure the ongoing use of the technology.

Implementation of RFID technology in warehouse assisted the LSPs to achieve operation efficiency. One of the RFID capabilities such as process automation

reduces error rate as the manual ways of doing thing being eliminated. Without the needs for line of sight and having the simultaneous scanning capability, it allows faster logistic processing in the warehouse. The evaluation given by one of the research officer: *“Scanning information from the products is a repetition task which can be automated via the RFID capability; therefore the workers can concentrate on more important tasks rather than performing manual scan which is a waste of time.”* This allows the warehouse operations to be more efficient which is reinforced over time as repetition tasks and error rate able to be reduced or eliminated.

The subsequence influence is minimising operation cost. The main purpose of LSPs adopting the RFID technology is to help them to achieve operation efficiency which leads to cost minimisation in long-term future. In any industry, minimising cost and achieving profit maximisation would be the primary objective. Although there have been many studies being conducted on the higher cost associated with adopting the technology (Wu et al. 2006; Li et al. 2006), yet we may observe that the adoption is becoming more affordable in the near future. Reduce inventory handling costs, reduce logistics costs and improve assets utilisation are among the cost reduction that achieved through the pilot test conducted on the RFID technology. The line supervisor mentioned: *“There are more than 10 workers handling the scanning activities prior the implementation. But now, it takes less than 5 men to monitor the job which is automated.”*

According to Carroll et al. (2002), as long as the technology fit well with the industry; the usage will be reinforced and stabilised. Therefore, continuous improvement of the technology is mandate as to adapt the ever changing business environment to persist the ongoing use of the RFID technology. When the industry needs are no longer satisfy its demand, the RFID technology will be disappropriated and abandoned.

## **5.2 Limitations of the Study**

The limitation of the research is this study is being conducted based on one logistic service provider found in Malaysia. However, the narrative data gathered provides us a better understanding and explanation on the RFID adoption in Malaysia.

## **5.3 Conclusion**

The model described in this study provides a comprehensive answer towards the research questions through the conceptual model; the technology appropriation model which processes at three different stages (prior adoption, during the adoption and long-term persistence use of the technology). The model explicitly explained each determinant that influences the LSP's manager to pursue, adopt and use the RFID technology at different stages.

The findings have three major implications for the IS developers at each different stage of MTA. During the initial stage (Level 1), RFID vendors need to consider the criteria that attract potential adopters to invest in this technology. The widespread of RFID technology in logistic industry is very dependent on the affordability and being a common technology (necessity) that owned among the supply chain members. It simply means it takes two hands to clap. RFID's manufacturers should address the technical glitches and unsolved problems raised in the study to further improve the RFID technology in the industry (Level 2). Extensive study should be conducted by the RFID producer on how to assist LSPs to achieve better operation efficiency and reduce operation cost (Level 3) which will increase the adoptability of the technology. These factors are important as it determine the long-term persistent use of RFID technology in the logistic industry Malaysia.

The formulation of the RFID adoption model could act as a guidance or evaluation tool to provide the potential LSP's adopters in evaluating the suitability of the technology in the Malaysia logistic industry. Hence, it helps the organisation to better understand on how RFID technology can be utilised to fulfil their business operation and investment decision making.

The theoretical contributions of the study would be the proposed of the Model of Technology Appropriation (MTA) for RFID technology in logistic industry

Malaysia. At this moment, the RFID adoption research via the MTA is consider radical in Malaysia context. Additionally, the RFID research is lack of theoretical foundation in Malaysia which is the significant of this study.

#### **5.4 Suggestion for Future Research**

The study is being conducted in Malaysia whereby the penetration of the RFID adoption is at premature level. The extent of the study conducted on others developing countries would be crucial to support or validate our findings. Apart from that, examines the success of the adopter is important to strengthen our understanding on the technology appropriation. Hence, further investigation by extending the model to others technology would be encouraged.