CHAPTER 5

Conclusions and Future works

5.1 Conclusion

Unlike conventional evaluation methods, the approach proposed in this research overcomes the incomplete and unstructured nature of the data and information needed. The results of this research have shown that convention approach to IT asset management during its life cycle, while heavily relying on the financial evaluation methods, is not applicable. This is due to the fact that there is no direct relationship between the investment in the IT asset and the revenue of the organization from this investment. In other words, it is practically difficult to determine the return on investment from the IT asset. This is in contrast to other assets such as the power transformer, whichis installed and operating on the power system network, and could influence the revenue of the company. Hence, the investment on the IT asset is typically viewed as the cost center or sunk cost of the organization. As a consequence, this leads to an unstrategical investment policy. Moreover, the results of the research have also shown that the IT asset does have the life cycle in terms of operation and maintenance for the consideration. This is similar to other types of physical assets, though it is shorter than others according to Moor's Law. Hence, the investment policy needs to take into account the optimal solution throughout its entire life cycle (not just on a yearly basis) and the complexity of having a group of IT asset with different life cycle stages.

Instead, in this research, experiences and knowledge of the experts, who have worked on the IT asset, are utilised and modelled. This developed knowledge model represents the learning curve of the experts on operation and maintenance of the IT asset. This provides rationale behind decision making activities of the IT asset as well as the strategy in problem solving which could then be used as part of the IT asset management framework. To assist in the decision making for the most suitable

investment option, this research proposes and proves that the university learning model in asset management can be constructed and utilised. The results given in this thesis show that by applying the KE methodology (commonKADS) the learning curve of the experts can be developed systematically and contains knowledge model across the life cycle of the IT asset. Furthermore, this thesis shows that the service performance model focusing on the quality of investment option and the balancing mechanism proposed are more applicable and provides greater flexibility.

The asset management framework applied in this research requires the knowledge gained over a period of time through organisational learning experiences with respect to corrective, preventive, predictive, and proactive operation and maintenance of IT assets. The results of this research have shown that by applying the knowledge engineering and management methodologies, the learning curve of experts on the IT investment and operation and maintenance can be constructed explicitly and systematically. The proposed investment framework evaluates the investment options by balancing costs, performances and risks associated with the asset (tangible and intangible aspects). This is surely different from conventional view which considers IT as the cost centre resulting in the emphasis on financial evaluation technique.

Since IT investment in the university does not relate directly to the revenues or financial productivity, the evaluation method based on the financial technique would result in bad investment scenarios most of the time. However, university has no choice but to keep spending on the IT infrastructure to support the academic activities and to maintain the satisfaction of the stakeholders. This investment obligation can also be found with other organisations where the investment in the IT cannot be mapped to the revenues, and hence, the proposed investment framework is still applicable. Unlike the conventional evaluation methods, the proposed IT investment framework can assist the university to choose the most suitable investment option by considering the costs and benefits across the whole life cycle. Furthermore, it assists in deciding the most suitable maintenance options to minimise costs and risks as well as maintaining the service performance. This could then allow the university to make the most of its investment.

Although the proposed alternative IT asset management framework can be considered as the main contribution of this thesis, many aspects of this research are equally important and present some originality. The novelties of this research can be summarized as follows:

- This thesis proposes an alternative asset management framework to manage non RoI types of asset. This framework is comprised of the economic model which represent costs and risks associated with the asset, and the service performance model which represents the reasoning engine for decision making.

- In terms of the development of the economic model, this thesis proposes an application and utilization of knowledge engineering methodology, more specifically the CommonKADS. Experiences and knowledge are captured and modelled into a learning curve. This organizational learning model is proposed in this research to perform as the costs and risks decision framework in the economic model.

- In terms of the decision engine of the asset management framework, this thesis proposes to utilize the service performance model as a reasoning engine for the investment and policy decision. Unlike other decision engine, the proposed service performance model reasons through the knowledge concepts contained in the developed organizational learning model from the quality perspectives (functions divided by requirements). This represents the possible feasible space for the investment solution while balancing objectives from different parties involved.

- Instead of looking at IT asset as all similar, this thesis proposes to classify the IT asset into different types based on the functionality. This asset categorization together with other methods used in the proposed framework allows more solution options to manage the IT assets, not otherwise available with conventional methods. These options include life extension to increase operating periods, upgrade or refurbishment, relocation, and replacement.

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5.2 Future Work

This thesis proposes and presents an alternative IT asset management framework to overcome the difficulties of incomplete and unstructured data, of the type required to make a relevant decision. Although the results shown in this thesis indicate that the proposed framework performs better than conventional approaches which rely heavily on financial evaluation methods. This can be seen from the reduction of costs and risks over life cycle periods. With the time constraints placed on the research and the assumptions made, future work can be conducted to extend the proposed framework as follows:

- applying this proposed framework to manage other types of IT asset since in this research only the PC type is tested. This may require new classification (asset categorization based on functionality) appropriated to the IT asset in consideration.

- Managing more than one type of IT asset at the same time. The complexity may occur due to a different life cycle of various types of IT assets. Hence, new decision engine needs developing. This may come from the extended version of the proposed service performance model.

- Applying this proposed IT asset management framework with other types of organization. Since this proposed framework is tested with in the university context, in which the maximum of profit is not always its top priority, modification of the service performance model based on quality in this thesis may need to be modified to take into account the business objectives. This includes for example, the profit maximization.