

CHAPTER 5

CONCLUSION

This chapter is summarizing and concluding the research study. It attempts to picture the outcome of the research by repeating the key points of the methodology steps and results. Then the generalization of this research is described, the chapter is concluded by the possible directions of future works.

5.1 Research Conclusion

The main objective of this research is to develop the KMS that provides the dynamic and personalized web services for cluster members by proposing the model of double spiral with JAD as the framework for the system design and development. The double spiral process with JAD allows users to configure their requirements for new system development while new knowledge is created throughout the JAD sessions. However, the beneficial use of the system varies among different types of users. The level of user satisfaction in the dynamic design of KMS prototype is good due to the involvement in the JAD sessions.

The scenario of Lampang ceramic cluster is implemented to depict how the double spiral with JAD improves the development of KMS prototype while knowledge is increasing captured throughout the JAD session. The result indicates

that software content and knowledge content increases as JAD session progresses. The second scenario of new product development also shows that knowledge sharing activities among the cluster members are supported by the prototype. Push technology such E-mail, SMS, and social networking discussion is used to enhance collaboration and knowledge sharing. This allows the users to create and disseminate knowledge from anywhere and anytime.

The evaluation of the methodology has been done short-term and medium-term. During JAD1 to JAD4 sessions, every JAD members respond to the increasing amount of software and knowledge contents to any unclear result based on their requirements and give feedback. Moreover, the medium-term evaluation is highly important for the KMS project. The CDA and members are the key success factors of the KMS as they have to collaborate and share their knowledge via the system prototype. However, there are some difficulties that not every users and stakeholders involve throughout JAD1 to JAD4 sessions. The collaboration and knowledge sharing among clustering members is therefore sometimes uncontrollable.

The architecture of KMS design is based on the dynamic functions on 3 aspects: response, time and events. Social networking WEB 2.0 technologies and tools such as CSS, RSS, social network discussions and Blogs are used during the KMS development. To achieve this, the double spiral model which combine software spiral and knowledge spiral processes is proposed as the framework for the system design and development. Joint Application Development (JAD) technique is applied during the process of double spiral for users' requirement capture.

Finally, from our perspective, although this research shows some significant ideas of selecting key players to be parts of JAD team in the design and development based on the double spiral model, there are some difficulties in the stage of requirement elicitation due to different levels of domain knowledge and human behaviors that affect JAD session handlings. Moreover, the extensibility of applying the double spiral to other different domain knowledge is also discussed. Some issues that could be added to the research such the standards of software, the flexibility of users' customization to the system and JAD automation should be concerned.

The novelty of this research is the idea of the double spiral model which combine the software process with knowledge conversion process in a spiral way. The industrial cluster-typed KMS must be designed and developed in harmonizing with the business process activities which is evolved in a cycle period in which requirements for the KMS is unclear or change every cycle. To achieve this objective, JAD technique is practical an adapted during the double spiral process by dividing the session of JAD into small portion of objective, time and result. Prototyping proposed in every JAD session will help identifying requirements and feedback to the system.

5.2 Generalization of this Thesis

This research is more or less suitable for the organizations or other industrial cluster domains that have similar or related characteristics. Seasoning business process such as tourist and fashion design industries which depends on the festival

seasons and economic condition is likely to have different year's theme. Accordingly, the scenario based events are almost the same as ceramic industrial cluster which can be applied with the same methodology.

The businesses that are operated in the competitive environments have chances to confront with rapid changes. The business process and activities are in a cyclic term depending on how fast of the new competitive conditions. In this aspect, web applications must be served and response quickly to stakeholders. The flexibility of revision in software process and information/ knowledge process is therefore essentials.

Knowledge sharing intensive is another type of business aspect that relies on the high technology and collaborative platform. The need of creating and disseminating information and knowledge requires web based technologies and tools while social network is among major keys to knowledge sharing success. One of the most important and difficult tasks is how to motivate communities share and learn in a sustainable way. The double spiral model is possibly suitable and practical for this type of business.

In supply chain industry where collaborations are activated and transferred between various operating sections. Customers, salespersons and design engineers have to work together for the new product design to create new product prototype and transfer the results such as new product specifications to the manufacturing sections. The midstream and upstream processes also work in the same way. Depending on the

complexities and difficulties of business activities, the software system that supports all the tasks in every section has to be intelligence in terms of the operational and knowledge sharing support.

For group-based or project-based communications which knowledge workers have to work closed together at remote sites or different geographic location requires the internet-based software applications. This is similar to the development of KMS for industrial cluster but in a different perspective.

In fast moving business such as software organization, environment is extremely dynamic: technology and market conditions change constantly, forcing the organization change its behavior. To facilitate new ideas and respond quickly to the dynamic environments, all members in the organization must interact with each other, customers, and external players with relevant knowledge and experience. In other words, to deliver high-quality products and services at a reasonable speed, networking is important.

Therefore, web-based KMS can be helpful for the collaboration within clusters.

Therefore, it is possible to adapt or apply this research in the other similar types of industries.

5.3 Future Works

Knowledge contents which are crucial parts of web applications are to be realized in terms of storage technologies, data structures, and the approach of KM process. In a broad sense, three mutual aspects including Web technologies, Web applications and Web knowledge contents should progress and be developed at the same speed. Moreover, software process which is a very important part of web application development is required the revisions. Therefore, in the knowledge based economy, it is no doubt for the organizations to rapidly adapt themselves in the management approach, IT approach and structural approach to compete in the severe market for survival.

Since this research deals with software development process, software standards should be addressed. The Institute of Electrical and Electronics Engineers (IEEE) is now voting the U.S. to adopt International Organization for Standardization (ISO) 12207. ISO 12207 offers a framework for software life-cycle processes from the beginning through the end. It is intended for two-party use where an agreement or contract defines the development, maintenance, or operation of a software system. Alternatively, ISO 29110 is software engineering standards for small entrepreneur, developed by Software Industry Promotion Agency (SIPA), a public organization within the Ministry of Information Technology and Communication, to create a new standard – Thai Quality Software (TQS) for use in very small software enterprises. TQS is now further developed to the new ISO 29110 standards.

In case of KMS development, this research does not focus on users' customization issue. For future research, it is possible to allow users not only identifying requirements but customizing software is possible beneficial. This supports the objective of the dynamic functions directly as users can customize software themselves based on their needs.

Finally, the JAD session is typically manual process in this research. It is a sort of face-to-face meeting but only informal interactions. To extend JAD session, however, automatic process can be applied. This "JAD Automation" can be done in several ways. Virtual JAD session supported by video conferencing application is alternative. Mobile technology is also helpful.