Enterprise Architecture Planning as New Generation Cooperatives Research Methods

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Abstract. New Generation Cooperative is new kind cooperative. Preliminary literature and document exploration found only little information about New Generation Cooperative from information systems and technology perspective. This research will investigate New Generation Cooperative from information systems and technology perspective using Enterprise Architecture, and implementation based on Open Business Model. Research design used in this mix method research is Sequential Exploratory Design. This research uses several approaches to accomplish each step of deliverance. Initiation Layer of this research mostly uses Literature Exploration. Business Analysis Layer at Preliminary Analysis used Literature Exploration in Case Study, Business Analysis Layer at Enterprise Observation mostly used Observation and interview in Case Study. Enterprise Architecture Layer use mostly One-Shot Design Research. Implementation Product Layer use One-Shot Design Research. Outputs of this research are New Generation Cooperative Enterprise Architecture, New Generation Cooperative Enterprise Resource Planning Prototype, Open Business Strategic Management.

1. Introduction

New Generation Cooperative is new kind cooperative. Open Business is new kind of business based on implementation of open source software and products. Preliminary literature and document exploration found only little information about New Generation Cooperative from information systems and technology perspective. This research will investigate New Generation Cooperative from information systems and technology perspective using Enterprise Architecture, and implementation based on Open Business Model [1].

New Generation Cooperative needs a technical organization model. Enterprise Architecture is purposed to be technical organization model and also complete the Technology part of Strategic Management of the New Generation Cooperative. Enterprise Architecture Planning [2] is framework chosen to build the New Generation Cooperative Enterprise Architecture. Open Business Model can be used as Enterprise Architecture Planning implementation base.

Enterprise Architecture is one approach for technical systems standard of enterprise [3]. An enterprise architecture framework defines how to create and use enterprise architecture.
According to Spewak [2], the method to build Enterprise Architecture is Enterprise Architecture Planning (EAP). Enterprise Architecture Planning is the use of enterprise business information and the implementation plan for the process of defining architecture. According to Ramos & Vacconcelos [4], Enterprise Architecture Planning procedure can be done by partitioning and iteration to: (1) accommodate the agility of development and (2) achieve shorter time to develop enterprise architecture.

Enterprise Architecture Planning [2] consists of four layers that will be the steps to build New Generation Cooperative Enterprise Architecture, and the layers are: (1) Initiation Layer, (2) Current Condition Analysis Layer, (3) Enterprise Architecture Layer, (4) Implementation Layer. Figure 1 shows New Generation Cooperative Enterprise Architecture Planning (NGC-EAP) layers, sub layer, and deliverance in every layer.

![Figure 1. Enterprise Architecture Planning [2]](image)

2. Research Design

This research uses several approaches and all being combined in Mix Method Research and Pragmatic Paradigm, because of the “research problem as central” and applies combination of approaches to understanding the problem. Mix Method Research also has mixed ontology and episteme [5]. Research design used in this mix method research is Sequential Exploratory Design [6]. Characteristic of Sequential Exploratory Design is mix method research design that sequentially do qualitative data collection and analysis first, then followed by quantitative analysis. Purpose of Sequential Exploratory Design is to use qualitative results in explaining the quantitative analysis result. This research uses several approaches to accomplish each step of deliverance. Initiation Layer of this research mostly uses Literature Exploration. Business Analysis Layer at Preliminary Analysis used Literature Exploration in Case Study, Business Analysis Layer at Enterprise Observation mostly used Observation and interview in Case Study. Enterprise Architecture Layer use mostly One-Shot Design Research. Implementation Product Layer use One-Shot Design Research, including Enterprise Resource Planning.

Figure 2 shows about the New Generation Cooperative Enterprise Architecture Research Design. This research uses Sequential Exploratory Design [6], and the steps are:

- Case Study is study of real-life instance of the business [7]. Case Study design, part of Qualitative Method [8], with case study of Malaysia's best cooperative. Data collection for this case study uses:
  - Documents and Media Publications as secondary research data for Preliminary Business Analysis [2] as Condition 1a Enterprise Observation and Interviews as primary research data for Current Business Analysis [2] as Condition 1b Interviews subject will be (1) Manager of the Cooperative to get the tactical business processes, and (2) Board Member of the Cooperative to get the strategies of the cooperative.
  - One-Shot on Case Study design, part of Experimental and Quantitative Method [5], with purpose to Develop: (1) Enterprise Architecture as Condition 2, and (2) Enterprise Resource Planning as...
implementation prototype to simulate the Enterprise Architecture [2]. The Experiment will compare Condition 1a (Preliminary Business Analysis), Condition 1b (Current Business Analysis), and Condition 2 (Enterprise Architecture).

Figure 2. Mix Method Research: Sequential Exploration Design

3. Research Procedure

Enterprise Architecture Planning (EAP) is the framework chosen to build New Generation Cooperative Enterprise Architecture. Enterprise Architecture Planning is the use of enterprise business information and the implementation plan for the process of defining architecture [2]. This research need to make a small modification in EAP to have a clear “apple to apple comparison” for Experimental analysis. Figure 3 shows description about New Generation Cooperative Enterprise Architecture Planning framework.

Figure 3. Theoretical Research Framework

3.1. Initiation Layer

This layer will explain the EAP initiation steps [2] so the project has certain mission direction, certain project time duration, and certain people that involved in the project. Literature and document exploration and study will be used for this layer. Figure 5 shows the steps of the Initiation Layer are: (1) Research Planning, and (2) Enterprise Profile, and deliverance in every step.

Research Planning [2] is the initial part of the research. Research Planning will deliver (1) Enterprise Architecture Scope, (2) Enterprise Future Vision, (3) Development Tool Set for the research. Enterprise Profile is identity of the New Generation Cooperative. Enterprise Profile will deliver (1) Enterprise Value, (2) Enterprise Principles.
3.2. Current Business Analysis Layer

Process defining the business is called Business Modeling. Business Modeling [2] is part of Current Business Analysis layer of Enterprise Architecture Planning. This layer consists of three steps, and they are: (1) Preliminary Business Analysis, (2) Enterprise Observation.

Preliminary Business Analysis [2], which identifies the business functions, brief descriptions of the business functions, and identifies organization unit that performs each business functions. Business functions and procedures are included in Value Chain Analysis of the business. Value Chain Analysis Also Technology part of Strategic Management. Literature and Document exploration are used to complete Preliminary Business Model. Business Strategies are the fundamental based to build the enterprise. Business Strategies phase will deliver (1) Business Drivers, (2) Business Goals, (2) Business Objectives. This research only describes the most common ground of the Business Drivers from New Generation Cooperative and other kind of Cooperative in this research. Most of the Business Drivers can be found in most company profile of the Cooperative. Literature and Document exploration are used in Preliminary Business Analysis to find most common Business Drivers. Findings in Preliminary Business Analysis will be used for case studies comparison, observation checklist, and interview questions in Enterprise Observation phase.

Business Organization Analysis [2] is the components that build the enterprise and part of business processes in the enterprise. Business Organization phase will deliver (1) Organization Structure, (2) Business Location, (3) Business Actors and Roles. Most of the Business Organization can be found in most company profile of the Cooperative. Literature and Document exploration are used in Preliminary Business Analysis to find most common Business Organization. Findings in Preliminary Business Analysis will be used for case studies comparison, observation checklist, and interview questions in Enterprise Observation phase.

Business Functions Analysis [2] is the dynamical part of the enterprise and part of business processes in the enterprise. Business Functions phase will deliver (1) Value Chain, and (2) Business Process. Literature and Document exploration are used in Preliminary Business Analysis to find most common Business Functions. Findings in Preliminary Business Analysis will be used for case studies comparison, observation checklist, and interview questions in Enterprise Observation phase. Current Data and Current Application Analysis [2] are the supporting part of business processes in the enterprise. Literature and Document exploration are used in Preliminary Business Analysis to find most common Current Data (as Database) and Current Application (as Software). Findings in Preliminary Business Analysis will be used for comparison to Enterprise Observation phase.

Current Technology Analysis [2] is the supporting part of business processes in the enterprise. Current Technology phase will deliver: (1) Current Hardware, and (2) Current Network. Literature and Document exploration are used in Preliminary Business Analysis to find most common Current Technology.

Enterprise observation [2], which step to explore the true situation of the enterprise or organization in certain area that been purposed. Case Study, Field Observation and Interviews of Directorial and Managerial Layer of Personnel will be conducted to complete the Enterprise Observation. Observation checklist and interview questions will be available after completing the Preliminary Business Analysis.

3.3. Enterprise Architecture Layer

Enterprise Architecture Layer [2] is the design phase of the Enterprise Architecture Planning. Business Architecture identifies business process as result from Business Analysis Layer. This phase will deliver (1) Role / Function Matrix, (2) Business Use-Case Diagram, (3) Business Activity Diagram. Unified Modeling Language (UML) will used as notation for the diagrams.

Data Architecture [2] identifies data that being produce by business process in Business Architecture. This phase will deliver (1) Entity Definition, (2) Conceptual Data Diagram, (3) Data Entity/Business
Function Matrix, (4) Application / Data Matrix. Unified Modeling Language (UML) will used as notation for the diagrams.

Application Architecture [2] identifies application that will be used in business model. Application Architecture should be related to Open Business, so the application can be implemented within low budget possible. This phase will deliver (1) Applications Catalog, (2) Application/Organization Matrix, (3) Role / Application Matrix, (4) Application / Function Matrix, (5) Open Source Software Solution.

Technology Architecture [2] identifies technology that will be used in business model. Technology Architecture should be related to Open Business, so the technology can be implemented within low budget possible. This phase will deliver (1) Capability and Category Catalog, (2) Technology Strategies, (3) Application/Technology Matrix.

3.4. Implementation Layer
Implementation Layer [2] is the part where Enterprise Architecture is formulated and prepared for implementation. In this phase, the business model, Information Resource Catalog and the three architectures are used to build an implementation plan.

4. Research Tool Set
This research will use some tool and instrument to achieve the objective. The research tools are: (1) modified Enterprise Architecture Planning (EAP) for Enterprise Architecture framework, (2) Value Chain Analysis for strategic management and part of Enterprise Architecture Business Analysis, (3) Mathematical formula to simulate financial flow of the Enterprise Architecture for the Application Architecture concept, (3) Unified Modeling Language (UML) for diagram notation in Enterprise Architecture Analysis and Design, (4) Open Source Web Programming set to build Enterprise Resource Planning Prototype, and they are: Ubuntu for operating systems, Apache for web server software, PHP for web programming language, MySQL for database programming language, Yii for web programming framework.

5. Conclusion
Enterprise Architecture is purposed to be technical organization format and also complete the Technology part of Strategic Management of the New Generation Cooperative. Outputs of this research are New Generation Cooperative Enterprise Architecture, New Generation Cooperative Enterprise Resource Planning Prototype, Open Business Strategic Management. Outputs of this research are New Generation Cooperative Enterprise Architecture, New Generation Cooperative Enterprise Resource Planning Prototype, Open Business Strategic Management.

6. References
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