# Chapter 5 Research Discussions and Limitations

In this chapter, the managerial and technical implications of the research results are discussed. According to the research model, prototype implementation, and two case studies, we summarize the research implications and limitations in the following sections.

## 5.1 Research Implications

The major discussions of this research are described as follows:

- We provide the method of storing B2B integration knowledge for a company. The company did not have a standard way to store B2B knowledge using traditional B2B integration. The knowledge and experience of B2B integration is usually not integrated and shared. However, our research keeps the knowledge in the ontology. In the ontology we built, we can trace the relations between processes, the transmission requirement of business process and the business constraints. Moreover, we analyze the business entities and properties of business document. Different trading partners and different B2B standards may use different terms to describe the same thing. Ontology just right is the technology to handle the semantic integration.
- We provide a shared ontology for B2B standard integration. More and more B2B standards are using XML as the exchange medium between trading partners, but these standards may not be designed according to the same aspects. The B2B ontology modeling method that we propose tries to create a B2B domain using one aspect. We analyze the components of B2B integration and use them to construct our ontology template. Different B2B standards are modeled in similar steps to form a single shared ontology. Using the same aspect to describe the various B2B standards can be helpful to heterogeneous integration.
- An ontology provides more powerful connections between terms than a mapping table. A mapping table solution was simple to implement, but lacked powerful connections. A mapping table is enough for a one to one mapping. It makes a term of one system correspond to a term of another system. The mapping table is the method of “Mapping of terms”. However, the mapping through a shared ontology is a “Mapping of sense” It allows computers to realize the “one to one”, “one to many”, “many to many” correspondences. It also allows the computers to perform the transformation easier by following complicated situations: same term, different meanings; different terms, same meaning; different terms, different meanings, but close. A mapping table cannot handle the complex correspondences and transformations. A mapping table cannot perform the semantic transformations, but

ontology can. Ontology can help automate the maintenance of mapping when the ontologies are changed, because both of the structure of the B2B terms and as well as its data is represented by ontology. The relationship between changed term and other correspondence terms will connect automatically. Mapping table cannot represent the structure. When one terms is changed, you have to modify the related records. Although the ontology approach may have higher initial costs than mapping table, but it can be maintained more easily and would provide a more powerful substrate for reasoning.

- Our research provides the ability to deploy new B2B projects rapidly. In our research, our model will spend more effort in building the ontology at beginning, especially in the first process of each B2B standard. We need to establish the additional feature of each standard into our ontology and build the relationship between each business entity. However, this situation will be improved in the next project. For example, each RosettaNet PIP message defines many business entities, but there are many repeat entities in different PIPs. RosettaNet PIP 3B2, the process of shipment notification, specifies 120 business entities and properties and PIP 3A4 has 143 business entities. However, there are 59 repeat business entities between two PIPs. The repeat rate of PIP 3B2 is 49%. The more related processes have the higher repeat rate. For example, the repeat rate of entities between PIP3A4 and PIP3A8 is even as high as 92%. As new processes are continually added to our ontology, the ontology becomes more abundant. The workload of ontology creation is decreasing. However, the knowledge we can retrieve from ontology is increasing. Through enriching our ontology, we can deploy a new B2B project more rapidly.
- We provide a fundamental base of B2B integration for knowledge management. Because we help companies to build the B2B ontology. This ontology is a good basis for inference and query purpose.
- We develop a function to transfer from DTD to OWL, despite the fact that DTD is an older technology than XML Schema and DTD has less ability to depict entities it is still in widespread use in many areas. We provide the ability and possibility of conversion, although the DTD is restricted to define the business document format in this research. The DTD only specifies the structure of business documents and it does not provide the semantic descriptions about each entity. Regarding this issue, we provide an additional information import function. Using this function, we enrich the description of business entities to achieve semantic supplements. We use ontology to provide meaning for XML standard.

## 5.2 Research Limitations

Due to time and resource constraints, this research has several limitations and may improve in the future. We describe the limitations as follows:

- In this research, the B2B ontology is developed for a specific industry. The ontology is designed to store the domain knowledge of the B2B transaction in one industry. We have not proved that our B2B ontology supports cross-industry purposes. The knowledge of B2B for crossing multi-industry barriers is more complex. We need more resources to analyze the feature of multi-industry ontology.
- We do not implement the ontology inference. The inference is an important application and skill in ontology. We may find the potential information through the inference. Such potential information may be helpful for B2B integration. We do not implement the ontology query either. That is, we do not examine the advanced application of ontology.
- XML Schema is becoming popular, however we only discuss the transformation from DTD to ontology. This research is only suitable for the document format defined by DTD. Another research (Trastour, Preist and Coleman, 2003) has discussed the possibility of the transformation from XML Schema to ontology. Due to time constraints, our prototype does not implement the import XML Schema function.