ONTOLOGY-DRIVEN ACCOUNTING INFORMATION SYSTEMS

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Chapter 1

Introduction

1.1 Overview

Corporate governance practices have come under increasing scrutiny for more than a decade. Corporate Governance (CG) is broadly defined as the rules and incentives by which the management of a firm is directed and controlled so as to maximize the profitability and long-term value of the firm to the shareholders, while taking into account the interests of other stakeholders (Berle and Means 1932). In particular, after a number of major corporate financial scandals, good corporate governance has been called for to raise the level of shareholder protection. This is recently being concerned through the Sarbanes-Oxley Act (SOX) of 2002 (SEC 2003). For example, Section 404 of SOX addresses the need of investors to have confidence in the financial reports issued by a company and also the processes and control that are an integral part of producing those reports (KPMG 2004).

Information Technology (IT) plays an important role in modern business and it has become an integral part of business’s process that attracted an attention of the public interest. As IT provides facility day-to-day operations and this contributes to a competitive advantage. In addition, IT is used to perform more functions from the input devices to sophisticated financial management planning and processing systems. Li et al. (2007) suggest that most companies’ business transactions are processed electronically routine. Companies are now facing with greater expectation from the public for providing more accurate, visible, and timely information while ensuring the privacy and security of their corporations’ information assets. IT is expected, in the terms of corporate governance issue that stakeholders and executives would claim corporation, not only for delivering
business value and generating a return on investment but also moving from efficiency towards the value creation (Li et al. 2007).

Accounting Information Systems (AIS) manage organizational resources through financial information together with conventional accounting controls: inputs, process and outputs (Jones and Rama 2005). Thus study of AIS is crucially important due to the fact that it covers not only just the study of accounting but also it involves the development of accounting systems which include design, implementation and monitoring of accounting information. Accounting data has been represented in computing systems, operated on by automated procedures and then modeled in business settings.

Kabak and Beam (1990) point out that there is a need of two dimensional accounting. The first dimension is traditional way of recording and presenting information for financial reporting purposes. The second dimension is related to managerial questions which may need a different ways of presenting information such as eXtensible Business Reporting Language (XBRL). XBRL is introduced to answer for the electronic communication of business and financial data reporting. Initial idea for this language is to introduce a mechanism that tackles non-standardization of controls, continuation of the controls, fraud detection and lack of transparency of transaction changes. With XBRL taxonomies, it can incorporate business rules and add data layer validation as well. Premuroso and Bhattacharya (2008) suggest that there is greater transparency to the corporate governance and operating performance by adapting XBRL format. The reason is that XBRL endorses standardized data formats for exchanging data. In turn, it promotes standardized controls, standardized testing, and lastly improved audit processes. However, XBRL is mainly used as a means to exchange data between applications and maps between current systems.
Changing of business environment has signified companies the need of new ways to compete effectively with counterparts and to survive successfully (Spathis and Constantinides 2004). Sound CG and AIS are the essential factors for companies to gain a competitive advantage and maintain sustainable development in growing hostile business environment.

1.2 Research Problems

Sonde (2008) argues that several accounting systems have not met expectations of several organizations because information is not easily accessible. In particular, for accounting information perspective, this leads to asymmetric information problems. Since AIS have been developed using Web technology, it opens another channel of information disclosure and makes accounting information available on the Web for external users which are related to corporate financial transparency. However, users of such information on the Web still face on difficulties due to lack of common understanding of accounting and financial theories, unfamiliar terminologies, poor quality of information, and inaccuracy of information.

1.3 Research Objectives

a) To investigate issues arise from the asymmetric information

b) To investigate issues associated with the corporate financial transparency

c) To investigate issues related to the corporate information disclosure

d) To investigate the proposed ontology-driven AIS framework to improve or to resolve issues identified from a) to c) in the Stock Exchange of Thailand environment.
1.4 Research Hypotheses

H1: Using ontology minimizes the asymmetric information problem.

H2: Using ontology improves corporate financial transparency.

1.5 Research Scope

This study focuses on issues of asymmetric information problem, corporate financial transparency, and information disclosure in AIS.

1.6 Research Contribution

With integrated ontology in AIS, the proposed research direction is expected to improve the transparent of accounting information such as managing, retrieving and extracting accounting information within organizations. Besides, sharing information should be performed in a line of “common agreement” in practice. In this way, users have further access to financial and accounting information of their targeted corporations. Thus it contributes to weakening the asymmetric information problem, improving corporate information transparency and information disclosure.
Chapter 2

Literature Review

This chapter will review related previous studies in the areas of ontology, accounting information systems, and corporate governance. Therefore, this chapter will be divided into four sections. The first section presents previous studies of ontology specified to ontology application and ontology evolution. The second section relates to accounting information systems including accounting controls, XBRL, and other related works. The third section deals with the regime of CG narrowed down to agency theory, asymmetric information and transparency and disclosure requirements. The last section summaries the chapter.

2.1 Ontology

Ontology refers “a formal explicit specification of a shared conceptualization” (Gruber 1993, p. 2). Borst (1997, p. 28) elaborated ontology as “a formal specification of a shared conceptualization”. Conceptualization is an abstract view of the world that we wish to present for a purpose. For example, the viewpoint of a company’s accounting cycle includes inputs, processes and outputs. The term shared conceptualization refers to knowledge accepted by a group rather than an individual with agreement. The accounting cycle is associated with relevant information to individuals and groups such as transaction data, journals, ledgers, trial balance, financial statements, and other external reports. That is, accounting practices are explicitly specified with formalized documentation standards. Both definitions of Gruber and Borst aim to clarify that ontology seeks to demonstrate a clear understanding of a domain of interest. Gómez-Pérez (1999) suggest that the ontology
aims at capturing domain knowledge in a generic way so that it provides a commonly agreed understanding of domain that can be reused and shared through extension of the current Web (well known as the Semantic Web). In the Semantic Web, ontology is well structured within ontological vocabularies for its terminologies and relationships (Berners-Lee et al. 2001, p. 30).

Since the World Wide Web is utilized as a mean of information disclosure in AIS, it is important to investigate how information is presented on the Web and implication of ontology to the Web. The current Web resources (e.g. Web pages, and financial documents) in the current Web do not normally contain metadata (data about data) which means what their relationships to other resources are. For example, Web resources are linked to each other by using a hyperlink (e.g. linking one document to another document online) which is hypertext reference (href) in HTML (HyperText Markup Language). However, it does not provide adequate information on the kinds of relationships the resources have.

Figure 1 An example of information on the current World Wide Web

Figure 1 shows an example of how information is represented in the current Web using hyperlinks. There are four Web resources that are linked each other. Normally, these documents can be navigated by clicking the link on the Web browser.
Figure 2: An example of partial ontological information for SET.

Figure 2 shows an example of Web resources with ontological information, where the node is shown as an ellipse, the resource represented as a rectangular, and the link as an arrow (W3C 2003). Thus Figure 2 illustrates more informative relationship among Web resources than Figure 1 above. In this example, the links relatedTo, hasMission and knownAs are more informative than simply a link of href. In Figure 2, the resource of “the Stock Exchange of Thailand” is identified by the Uniform Resource Identifier (URI): http://www.set.or.th/SET. This resource has properties such as name (knownAs) and mission (hasMission). The property relatedTo describes a University name that stands for “The University of the Thai Chamber of Commerce” identified by URI http://www.utcc.ac.th. Thus we can say that URI http://www.set.or.th/SET can be read as “The Stock Exchange of Thailand that is related to The University of the Thai Chamber of Commerce.”

In relation to the Semantic Web and ontologies, James Hendler (2001) forecasts a vision of the Semantic Web Ontologies, as shown in Figure 3. It can be explained that the first step of its use is to create web pages with ontological information. This means
knowledge experts and individuals can develop decentralized small-sized ontologies. Overtime, one or more ontologies can be linked to other ontologies to allow sharing of repositories. The second vision of the Semantic Web Ontology is the definition of services in a machine-readable form. This means that ontologies can be used to agree on terms and constraints for web services. For example, AIS use ontology for sharing and reuse of information for software agents. The final vision of the Semantic Web Ontology is the use of logics and software agents. Logics and rules are being used to improve description of software agents’ services. In particular, intelligent software agents are communicating with other agents using the terms represented in ontologies, then exchanging portion of other agents’ ontologies, as well as merging other agents’ ontologies.

Figure 3 The Semantic Web as a layer cake (Source: Berners-Lee et al. 2001, p. 30)

One of the challenges in the development of AIS is the difficulty in accurately representing knowledge explicitly, particularly in the domain of interest. A domain expert often finds that it is difficult, if not impossible, to expressively describe his or her
knowledge to the system engineer. Thus, the need for building better and more interoperable interpretation approach is essential to solve the ambiguity problem in knowledge representation. There is also a need to share meaning of terms or a set of names as those used in a given domain knowledge by an individual or the community. In order to effectively deploy shared terms or vocabularies, a clear understanding of the particular domain has to be agreed by the community of practice. In other words, a way to conceptualize the given domain by the community has to be broadly agreed and published among the interest groups. This approach ensures situations where misunderstanding and misinterpretation of conceptual modeling is likely to occur. Thus an ontological approach not only provides a clear understanding of terms but also unambiguous definitions of complex concepts and classifications.

2.1.1 Ontology Applications

From the application perspective, ontology application scenarios can be classified into four categories: neutral authoring, ontology as specification, common access to information, and ontology-based search (Jasper and Uschold 1999). The first category, neutral authoring refers to using a single ontology and applies it to various operational applications. This way, having a single ontology in multiple applications means it improves the use and reuse of knowledge as well as maintainability of the applications. Ontology Builder and Ontology Server are examples of this type of application to provide industrial strength ontology management as well as other commercial applications (Das et al. 2001). In addition, Ontology Builder is suggested as a multi-user collaborative ontology generation and maintenance tool, whereas Ontology Server is a server that drives e-commerce applications with ontologies (Das et al. 2001).
The second category, ontology as a specification is specifying a term or a vocabulary according to the requirement so that it gives reliable specification of the requirement. An example of ontology that has been applied and used as a specification is a knowledge-sharing system called Eureka developed by Xerox (Powers 1999). It contains 40,000 technical documents and it allows intellectual capital to be shared. Ontological design has been used to represent natural language to get rid of redundancies in Eureka’s documents (Everett et al. 2002). Other well specified ontologies reported in the literature include Health Level Seven (HL7) data types and Top-Level Reference Information Model (RIM) classes and the United Nations Standard Products and Services Code (UNSPSC). This category of application allows rich knowledge expression in terms of specifying a set of terms or vocabularies to prevent potential ambiguities.

The third category, common access, refers to using shared or mapped ontologies to enable various developers or multiple target applications to have access to heterogeneous source of information (Jasper and Uschold 1999). An example of this category is Ontolingua, developed by the University of Stanford, to provide users with the ability to publish, browse, create and edit ontologies stored on Ontology Server online (Farquhar et al. 1995). The architecture of Ontolingua is to build and reuse commonly acceptable, reusable and adaptable ontologies in a variety of community over “the Internet”.

Finally, ontology-based search is used to minimize searching time in search engine because information is more precisely and well presented in web resources. To meet further comprehensive requirement of various applications, it may be necessary to merge one or more ontology application scenarios discussed above.

Each of the ontology application scenarios described above has the underlying assumption that ontology remains unchanged in a static way, that is ontology remains the same throughout the life cycle of the application, especially, the case for application
scenario of common access to information. In particular, once the ontology is written and integrated to applications, little or no consideration is taken regarding possibility of changes made to the ontology. In practical sense, very often it is necessary to review changes in ontology when specification of conceptualization changes (Heflin and Hendler 2000; Kang and Lau 2008; Plessers et al. 2007).

### 2.1.2 Ontology Evolution

The numbers of Websites have evolved over the last decade. The Netcraft reported that there were about 200 millions websites on February 2009 compared to 12 millions in 1998 (Netcraft 2009). For that reason, it is not surprising that ontology will also evolve over time. Ontology can change as a result of extension from previous ontology, or as a result of updating of ontology over time (Plessers et al. 2007). As a result, issues of ontology interoperability and handling of multiple ontologies need to be considered.

A change in ontology also leads to two aspects of ontology expressiveness and vagueness. For expressiveness perspective, an ontology language can state anything precisely as any other natural language, if and only if the ontology language has the capability for being precise. Otherwise, the ontology defined in terms of the ontology language could not be accurate. Paradoxically, the ontology language minimizes vagueness by increasing its range of expression. Expressiveness of ontology can be achieved using constraints, syntax to limit the terms of concepts. For vagueness perspective, the more expressive the ontology language is the less ambiguous the concept is. Figure 4 depicts a balance of ontology language between two different aspects of expressiveness and vagueness.
In brief, when the ontology language is used in a comprehensive manner for a domain of interest, it needs to be expressive within the scope of its use. On the other hand, if the concept cannot be expressed in a concrete manner due to vagueness, then its expressiveness will be limited.

More importantly, ontology does evolve over time. These changes can occur when new information is learned in the domain knowledge when vague concepts are not well expressed in the domain knowledge, those concepts may need to be redefined in a more concrete manner. In particular, changes in ontologies can be caused in three different ways. Firstly, changes in ontologies can be caused by changes in the domain. To support new domain knowledge, in most case, we use what we already have rather creating new ontology. Thus, this type of change is required when domain is altered. Secondly, changes in the shared conceptualization are caused by different views on the domain. In this kind of changes occur, when we adapt the ontology based on new concepts. Finally, a change in the explicit specification is related to the semantics of ontology, and is caused by syntactic interoperability problems (Klein and Fensel 2001).

To address issues dealing with evolution of ontology, a few possible approaches have been discussed in the literature to handle such changes. This includes ontology
versioning and ontology library system. Ontology versioning has been used to reduce interoperability problem caused by evolution of ontology. Noy an Klein (2001 p.76) defined ontology versioning as the ability to handle changes in ontologies by creating and managing different variants of it.

From the methodology point of view, ontology versioning can be classified into three requirements: identification, change specification, and transparent evolution. The identification requirement phase provides an unambiguous reference to the intended definition for every user of a concept or a relation, and a version framework (Klein and Fensel 2001 p.84). The change specification requirement is to have a pointer that can be used to derive the relation from one version to another of the ontology. The second viewpoint of the change specification is to relate concepts and relations in the previous and current version of the ontology. Within the minimal change principle, the underlying proposal is to retain as much information as possible between the previous and current concepts and relations. The transparent evolution requirement is to have a mechanism that should automatically transfer or transform concepts and relations between the formal and the current ontologies, preferably in backward compatibility.

An ontology library system is a system capable of offering various functions for managing, adapting and standardizing groups of ontologies (Ding and Fensel 2001 p.1). This system mainly focuses on facilitating ontology reuse and it also addresses the ontology maintenance issue. There are three phases as shown in Figure 6. The
management phase concerns with functionality of open storage, identification and versioning support. It offers easy accessibility and efficient support for re-using existing relevant ontologies. Then an open storage specifies easy accessibility to classification of ontology. It manages existing categories, the modularity structure of ontology library systems. The identification functionality deals with unique identifier in the ontology library system, while the versioning functionality deals with consistency among different version of ontologies. The adaptation phase is concerned with capability of facilitating the functionality of finding, extending and updating ontologies such as functionality of searching, editing, and reasoning (Ding and Fensel 2001). The standards phase includes instances of standardized ontology representation. For example, a language is selected within commonly use ontology language such as RDF, DAML+OIL or OWL. Standardized taxonomies or structures of ontologies are considered to capture and model the basic concepts and knowledge that can be reused (Ding and Fensel 2001).

![Figure 6 Illustrated ontology library system.](image)

In ontology library system, the phases of the management, adaptation and standardization aspects are discussed to focus on reuse of ontologies. It is worth noting that the functionality of adaptation in the ontology library system is similar to ontology revision in brief. In ontology library system, it provides functionalities to search the term then let the user edits the terms. Even though there is no specific editing and checking
consistency functionalities, implication of applying changes back to ontologies is worthy note while.

2.2 Accounting Information Systems

Accounting Information Systems (AIS) are computerized systems that transform financial and other data into useful information (Bodnar and Hopwood 2010; Bagranoff et al. 2007; Beard and Wen 2007; Gelinas and Dull 2008; Sajady 2008). AIS exist at the intersection of two important disciplines: accounting and information systems (See Figure 7). The accounting field includes tasks performed by AIS to create information for accounts payroll, accounts receivable, accounts payable and others. AIS also perform integrated tasks such as maintaining general ledger, financial planning, and distributing financial reports. Information Systems refer to computer systems that, for example of accounting in practice, collect accounting data, store it, and process it for end users (Hurt 2008). Data are referred to raw facts such as a set of raw numbers on a sales record. Once data are processed, information is further considered to be useful or meaningful. For example, sales record might be the daily sales reports.

![Figure 7 Accounting Information Systems](image)

AIS analyze and record business transactions for the purpose of preparing business transactions, financial statements and providing the financial information necessary to
manage their organizations. Thus AIS are also considered as a subsystem of Management Information Systems (MIS). It means that AIS operate functions of data gathering, processing, reporting financial events for effective decision making and control in organizations (Boockholdt 1999). Since IBM developed the first modern accounting unit that designed for banks in 1933, computing has been important part of business (Drucker 2002).

2.2.1 Accounting Controls

In particular, AIS use modern Information Technology (IT) with traditional accounting controls: input, process, and output.

![AIS Components](image)

Figure 8 AIS Components. (Source: Bagranoff et al. 2007, p.7)

The input includes standardized data entry, Electronic Data Interchange (EDI), and electronic commerce (e-commerce) via the Web enabled technology. EDI is the direct computer-to-computer exchange of data via a communications network. An example of EDI is a set of interchanges between two parties: a buyer and a seller in general retail businesses. Messages from the buyer to the seller could include request for quotation (RFQ), purchase order, receiving and payment instructions. Messages from seller to buyer could include bid in response to RFQ, purchase order acknowledgment, shipping notice and invoice. These messages may simply provide data of receiving instruction or purchase
order. By using EDI, the processing of messages is processed by computer only. Thus it eliminates costly and error-prone paper works because human intervention is typically intended only for error conditions. E-commerce has made a major impact on business transactions via communication standards with privacy issues across organizations. For example, US online retail sales revenue will grow from 12.3 billion in 1999 to approximately $176.9 billion in 2011 by Router (Sage 2009). The rapidly increase of sales revenue is because the businesses can accelerate the processes of buying and selling and also can reduce the cost of such as paper works, tracking the status of product dispatched.

The process of the data entry involves the double-entry accounting system from individuals to large scale enterprise using personal computers and servers. With EDI and e-commerce have more impacts on the traditional model of performing transactions. For example, AIS facilitate the rapid sharing of information in an organization’s information system from several information sources.

The outputs include any type of financial reports via computer display, or electronic communication devices for EDI and e-commerce. Moreover use of the Web technology, made it possible the rapid dissemination of information to external users (stockholders and buyers) and internal users (managers and board members) via an e-commerce environment. However such provisions present few challenges of trust and security of the medium. For trust, eXtensible Business Reporting Language (XBRL) facilitates the exchange of financial statements over the Internet as a means of the SEC (Securities and Exchange Commission) financial reporting requirements in making outputs. Literature shows that XBRL is beneficial for decision making in several financial areas such as cost savings, greater efficiency, accuracy, reliability using financial data and disclosure (Bonsón et al. 2009; Reyes et al. 2007; Roohani et al. 2009).
Studies have shown that AIS are growing continuously as an important factor for the businesses both in facilitates day-to-day business operations and in contributing to a competitive advantage (Hubber 1990; Simon 1987). In the past decade, companies pay more attention to meet higher expectation of faster data processing as well as government in demanding of more accurate, visible, and timely accounting information, while maintain privacy and security of their companies’ information assets (Li et al. 2007). Moreover, the changing of business environment has signified companies the need of new ways to compete with rivals or to be successful (Spathis and Constantinides 2004). It means that decision makers seek more alternatives than just financial reports on a daily or weekly basis to find the solution of the problem. This points out that AIS are a vial factor to generate information needs for operation processes, managerial reports, budgeting and control within organization to gain competitive advantages and keep sustainable development in growing hostile business environment.

Sonde (2008) suggested that many accounting and finance systems have not met expectations of many organizations because information is not easily accessible. Moreover, the changes effected by the Sarbanes-Oxley Act (SOA) of 2002, that is, there are more challenging use of computerized systems in accounting. For instance, the board of directors, management and other personnel need to provide reasonable assurance in the efficient and effective operations, reliable reporting and compliance with applicable laws and regulations ever.
2.2.2 XBRL

Many companies use Web pages to post financial information on the Internet that is normally written in HTML (HyperText Markup Language). Figure 9 shows an example of fragmented HTML code that provides the trading summary as of 22 April 2011 from the Stock Exchange of Thailand (SET). There are six the <tr> tags presenting table rows and four the <td> tags presenting table columns in the table <table> tag. The <tr> tag allows the system to present type, buy, sell and net of the trading summary. The <td> tags hold numeric values of those items.

```
<html>
<head>
<title></title>
</head>
<body>
<table border="1">
  <tr>
    <td>As of 22 Apr 2011</td>
    <td></td>
    <td></td>
    <td>Unit: M.Baht</td>
  </tr>
  <tr>
    <td>Type</td>
    <td>Buy</td>
    <td>Sell</td>
    <td>Net</td>
  </tr>
</table>
</body>
</html>
```
<table>
<thead>
<tr>
<th>Institution</th>
<th>Value 1</th>
<th>Value 2</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>1,472.69</td>
<td>3,669.56</td>
<td>-2,196.86</td>
</tr>
<tr>
<td>Proprietary</td>
<td>3,566.01</td>
<td>3,583.03</td>
<td>-17.03</td>
</tr>
<tr>
<td>Foreign</td>
<td>3,249.64</td>
<td>2,801.03</td>
<td>448.62</td>
</tr>
<tr>
<td>Individual</td>
<td>19,555.98</td>
<td>17,790.71</td>
<td>1,765.27</td>
</tr>
</tbody>
</table>
Chapter 2

Literature Review

Figure 9 An example of trading summary in HTML (Source: http://www.set.or.th)

Figure 10 provides what that HTML code generates. One disadvantage of using HTML is that the HTML tags are meaningless due to no relationship between tags. That is, it can be said that there is no semantics. For example, the tags `<td>19,555.98</td>` do not hold valuable insights by themselves, unless the user extracts them from the Web page and then analysis it.

```
<tr>
    <td>Total Trading Value</td>
    <td></td>
    <td></td>
    <td>27,844.32 M.Baht</td>
</tr>
</table>
</body>
</html>
```

Figure 10 An Example of Webpage

<table>
<thead>
<tr>
<th>Type</th>
<th>Buy</th>
<th>Sell</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>1,472.69</td>
<td>3,669.56</td>
<td>-2,196.86</td>
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<tr>
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<td>-17.03</td>
</tr>
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<td>Individual</td>
<td>19,555.98</td>
<td>17,790.71</td>
<td>1,765.27</td>
</tr>
<tr>
<td>Total Trading Value</td>
<td>27,844.32 M.Baht</td>
<td></td>
<td></td>
</tr>
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As of 22 Apr 2011

Unit: M.Baht

more>>
Businesses need to obtain detailed and specified data and quickly process it. Therefore, it needs to have a speed move of information between computerized systems. XML (eXtensible Markup Language) is the way to provide the information to the business. XML is widely used for financial reporting and exchanging financial information electronically. In addition, it is a standard for the electronic exchange of data between computerized systems. Moreover, the need of XML is the difference between HTML and XML. that is, XML tags are “extensible”. HTML tags are inextensible as “prefixed”. It allows users to define their own tags such as <buy>. For example, if the SET wants to report the trading summary of individual 19,555.98 in “Buy” (refers to Figure 10 for data). It could use the XML tags <buy>19,555.98</buy>. The possible XML solution is as follow:

```
<xml version="1.0">
	<tradingSummary>
		<trading>
			<date>As of 22 Apr 2011</date>
			<unit>M.Baht</unit>
		</trading>
		&type>
			<institution>
				<buy>1,472.69</buy>
				<sell>3,669.56</sell>
				<net>-2,196.86</net>
			</institution>
		</type>
	</trading>
</xml>
```
<proprietary>
    <buy>3,566.01</buy>
    <sell>3,583.03</sell>
    <net>-17.03</net>
</proprietary>

<foreign>
    <buy>3,249.64</buy>
    <sell>2,801.03</sell>
    <net>448.62</net>
</foreign>

<individual>
    <buy>19,555.98</buy>
    <sell>17,790.71</sell>
    <net>1,765.27</net>
</individual>

<totalTradingValue>27,844.32 M.Baht</totalTradingValue>
</tradingSummary>

Figure 11 An example of trading summary in XML 1.0
A problem with XML tags is likely lack of consistency amongst users. For instance, one company might use the XML tag `<individualBuy>` but another company might use `<buy>`. In other words, without standardized XML tags, users cannot exchange financial information or extract data from XML files directly for validating financial information.

XBRL (eXtensible Business Representation Language) can solve this problem by describing financial information in the standardized format for public and private companies and other organization. XBRL is a language for the electronic communication for business and financial data based on XBRL taxonomies. XBRL taxonomies define the tags that present accounting and financial terms used in XBRL documents. XBRL is widely adapted for GAAP (Generally Accepted Accounting Principles). GAAP are a combination of authoritative standards and the commonly accepted ways of recording and reporting accounting information (Hurt 2008, p. 307). For instance of an XBRL document, a beginning tag `<ifrs-gp:CashCashEquivalents>` and a ending tag `</ifrs-gp:CashCashEquivalents>` define a value. Within these tags, the term “Cash and Cash Equivalents” is defined unambiguously with optional entities to identify currency units (e.g., “THB”). That is, as long as these tags appear in XBRL instance documents, it means “Cash and Cash Equivalents” with Thai currency unit. Figure 12 provides an example of XBRL code.
To illustrate a use of XBRL in AIS, this section discusses about the SET pilot project. The SET project demonstrates the use of XBRL for company financial statements and the benefits it can offer to investors, companies and public. Firstly, the objectives of the pilot project were to reduce the redundant data production process for all stakeholders in the whole supply chain. Secondly, it is to create transparency, accuracy and time-to-market transmission of financial reports to the investors. Thirdly, it is to create an opportunity to publish financial data of Thai listed companies to wider audiences, especially foreign investors. Finally, it is to develop standard financial reporting for Thailand comparable to global standard.

It is worth noting that conventional SET financial reporting process (see Figure 13). Firstly, either a soft copy (e.g. Microsoft Excel file) of the trial balance or financial statements are submitted in a form of disk or email to SET. Secondly, auditors enter received data into auditors’ database with a format of auditor templates (e.g. Microsoft Excel file). Auditors may produce a balance sheet, a profit and lose statement, a cash flow statement, and his/her opinions with notes. Thirdly, a hard copy of the auditor’s work is submitted for a listed company database. Fourthly, the financial reports are submitted via SET Community Portal (SCP). Fifthly, the SET manually re-enter submitted data (e.g.
balance sheet statements) into the SET database. Sixthly, the SET disseminates the financial statements and related news in a form of soft and hard copies to users such as financial analysts of SET. Finally, the analyst extracts data from soft copies then manually re-enters into his/her database. This particular task may include producing several different formats of the financial reports and analyst reports.

Figure 13 Conventional SET Financial Reporting Process (Source: Kulruchakorn 2007, p.5)

There are several important issues for discussion, during the SET financial reporting process, several data production processes cause unnecessary data redundancy. It means that there is a need to have reusable financial concepts (known as taxonomy) that may standardize the output of data production processes. The manual data re-entry processes cause inaccurate data due to typo-errors. To resolve the data inaccuracy during the input process, the SET standardizes the submission of listed companies with the XBRL
format by using XBRL enabled mapping tools or software. Delay occurred in information dissemination to the investors or other users due to manual re-entry processes as well. To resolve the delay, the SCP provides XBRL reports that are available for download.

![Diagram of SET XBRL Pilot System]

Figure 14 SET XBRL Pilot System

### 2.2.3 Related Works

The studies in The Stock Exchanges of Tokyo, Shanghai, Spain and New York show that the successful exploitation of XBRL depends on the available of local GAAP or use of the IFRS (International Financial Reporting Standards) taxonomies (IASC2008). There is little evidence of existing use of XBRL for reporting by listed companies even though XBRL had been promoted as a tool for financial reporting. The reasons for the lack of use of XBRL reports are incapable accounting software and information systems, and difficulties in exploiting XBRL outputs according to international and local GAAP.

Some general principles are observed by researchers to overcome the obstacles. Church and Smith (2005) investigate an ontology-based dynamic enterprise model that applied for planning sustained compliance with the Sarbanes-Oxley Act (Church and Smith 2005). This model uses the resource-event-agent (well known as REA) framework that supports an integrated view of enterprise processes.

Cormier et al. (2009) present the use of Web sites as a disclosure platform for corporate performance that apparently takes into account for valuation of corporate
earnings. Moreover, Chou et al. (2008) show that ontology of accounting makes it possible to share a common understanding of accounting theory in particular for the specific structure of the profit and loss account statement. According to their studies ontology is limited to relatively small part of AIS. Furthermore, Adams et al. (2002) investigate ontology of public authorities for electronic transaction services based upon the Enterprise Ontology. Their study was still towards defining and characterizing terminology for the domain of transaction services.

In summary, this section introduced the concepts of AIS. Accounting internal control is discussed in detail to show the state of recent changes in accounting as well as its use of XBRL. The final section includes the various scholarly approaches to advance AIS.

2.3 Corporate Governance

The concept of corporate governance is difficult to define because it potentially covers a large number of different pluralistic phenomena such as economic, social, political, cultural, and institutional contexts (Chau 2011; Letza at al 2008; Young and Thyil 2008). Different researchers have provided different definitions that basically reflect their special interests in the field. However, traditionally, corporate governance is associated with a principal (owners or shareholders, or investors) and agent (managers) relationship. That is, shareholders employ managers to manage firms to maximize shareholders’ benefits (Mayer 1998; Shleifer and Vishny 1997). This is known as Agency Theory.

A basic question arising from shareholders is how can they effectively monitor managers and exercise control so that the managers will act in shareholders’ interests. In theory viewpoint, the shareholders and the managers will sign the contract in which specific what the managers do with the funds, and how returns will be allocated (Shleifer
and Vishny 1997). The managers know about the firm than the owners. However, it is very hard to write contracts that can guarantee that the managers will run the firms in the best interests of the shareholders. In other words, it is impossible to write such perfect contract that can specify all possible future decisions on how the firm’s resources and assets will be used and allocated by managers effectively (Prowse 1998). This makes it difficult for shareholders to ensure that their funds are appropriately managed in attractive or profitable projects in order to bring them the returns (Shleifer and Vishny 1997). As such, managers will have more freedom to operate firm’s management in their interests, which may conflict with those of shareholders, and intensively affects firm performance. Thus accountability has been embraced due to the need to ensure the quality of the service by managers. It is naïve to assume that accountability in the process of disclosing relevant information (known as information disclosure) and intestinally proving the appropriate amount of information (known as transparency) to the public (in particular shareholders) (Greiling and Spraul 2010). At this point, information disclosure and transparency are understood as a mechanism of accountability. That is, information disclosure as a mechanism of visibility, and transparency as the degree of information accessibility to the public. In this regard, it has been suggested that the good corporate governance and its mechanisms can alleviate those problems arise from the separation of owner and managers (Hoshi 2001; Shleifer and Vishny 1997; Tirapat 2001). They will also strengthen and improve the efficiency of governance system, as a result firm performance increases.

It is important to enhance understanding of corporate governance and captivates its related field of studies such as agency theory, asymmetric information theory, and transparency and disclosure requirements. This section is organized as follows. The first section will deal with the principal-agency problem. The second section will illustrate
theory on asymmetric information. The third section will discuss about transparency and disclosure requirements.

2.3.1 Agency Theory

Traditional neoclassical economic theory, a firm is regarded as a homogeneous entity, which aims to maximize its total value and the discounted value of its expected future cash flow. In the modern corporations, Jensen and Meckling (1976) define a firm as legal fiction that serve as a nexus for a set of contracting relationships among all related parties (for instance, managers, shareholders, suppliers and customers). This can be explained that a firm will raise funds from investors that can do by borrowing from creditors or banks, and issuing equity shares. In the case of borrowing, creditors or banks are promised to have priority to be paid before any payments issue to equity shareholders. Equity shareholders, in contrast, will receive claims on the income after payments to all other parties (including creditors, management, employees, and suppliers) have been done, this is so called ‘residual claim’. It is possible that the equity shareholders may receive nothing if the firm’s benefits are all run out after the payment to all other parties.

In the modern corporation concept, there are a number of investors or financiers invest their money in the firm. As a result, ownership becomes dispersed, and it is separated from the management. It should not be surprising that the existence of the ‘separation of ownership and control’ can create agency problems (Berle and Means 1932; Fama and Jensen 1983a, b; Jensen 1986; Jensen and Meckling 1976). This is relied on the fact that, it is the shareholders (who provide risk capital for an opportunity to receive appropriate returns from profits and increasing of firm’s value) hire managers as their agents to run the firm’s business. This includes making decisions that are supposed to maximize shareholders’ wealth and value of the firm. In this regard, it has been argued
across the literature that it is possible that when the shareholders are dispersed (or so-called small shareholders), the significant of the controlling power in the firm is transferred to managers. The managers, however, are likely to make less effort to managing firm’s resources and may transfer firm’s resources to maximize their own interests.

The conflict of interests can be also incurred between equity shareholders and debt shareholders/creditors. Creditors, especially banks, have the right to insert their power over the borrowing firm’s management. They usually prevent firms, for instance, from investing in high-risk projects. This is because, in general, debt contracts provide that if an investment obtains returns well and above the face value of debt, equity shareholders capture most of the benefits. If the investment fails, banks bear most of the cost (Aoki 1994; Blair 1995; Prowse 1992; Shleifer and Vishny 1997). As a result, banks have a strong incentive to monitor the lending firm’s management and decision-making in order to ensure that firm’s management allocates the funds efficiently in their investments (Aoki 1994; Gorton and Schmid 1996; Hoshi et al. 1990; Prowse 1992). Such an interest of bank can conflict with those of the management as a result of the agency problems between them arises. This issue will be discussed further in terms of the costs and benefits of debt financing in a later section.

2.3.2 Asymmetric Information Theory

Information asymmetry refers to reluctance to disclose information. In brief, asymmetric information appears to be an important determinant of financing options for firms since different stakeholders and managers have different access to information about the firms. Therefore they have different abilities to monitor firms’ behavior. Myer and Majluf (1984) argue that the separation of ownership and management is one of the causes of asymmetric information problems. That is, the managers, will know about the firm
more than the owners. They can use information of the firm they have, which is not available to shareholders, for their own benefits (Gitman and Madura 2000; Greiling and Spraul 2010). Where shareholders are dispersed there are large information asymmetries between those shareholders and managers. In general, small shareholders lack of expertise and incentives to substantially close this information gap and monitor managers to act of shareholder’s benefits. This is because the benefits they received in doing so sometimes cannot offset with the cost they have to bear.

Some studies suggest that asymmetric information problems occur when there is an announcement of issuing new equity (James 1987; Myer and Majluf 1984; Luo at al 2002; Mayer 1988). This can be explained that when managers control firms, they tend to finance the firm’s investments by issuing new securities rather than borrowing from external sources, such as banks. This is because, in borrowing, if managers cannot provide payments according to the debt contracts, they will be in a difficult situation. For example, banks may force the firm into liquidation, reorganize the firms or seize the firm’s assets (Blair 1995; Harris and Raviv 1990). In contrast, if managers issue the new equity in financing their projects, they can postpone paying out dividends to those equity shareholders when the firm faces with a financial distress (Wiwattanakuntung 2000). Moreover, when firm issues new shares, outside investors will assume that managers of such firm know more about a firms’ value than them (Myer and Majluf 1984). Then the managers will act in the interests of existing shareholders by issuing new equity when it is overvalued. This action conveys negative information about the firm to the market, consequently, this negatively affects the firm’s share prices.

Furthermore, researchers (Myer and Majluf 1984; James 1987) argue that if managers act in the interests of existing shareholders, they will refuse to issue shares because their stock prices will be under-estimated by the market. However, in some case,
firms with high concentrated ownership will prefer borrowing to issuing new shares to finance the firm. This is because they attempt to avoid the dilution of their concentrated ownership (Limpaphayom, 2001). To finance the firms, researchers (Myer and Majluf 1984; Myer 1984) suggest that firms should start with internal finance. If this is not sufficient, then low-risk debt will be required. This is because debt provides a positive signal of the manager’s confidence in future earnings. Issuing equity then should be used as a last source. Other researchers (Fama 1985; Myer and Majluf 1984) suggest that bank loans are a form of inside debt as banks have information about the borrowers, which is not available to other securities holders.

So far the reflections show that the managers may use the information asymmetries to his or her advantage including overloading or withholding strategically relevant information. It is in line with the agency theory that the managers also make use of asymmetric information for her or his advantage.

### 2.3.3 Transparency and Disclosure Requirements

The quality of transparency and information disclosures contributes to an effective of shareholders’ protection system (Limpaphayom 2001). Firm’s information disclosed to shareholders should be complete, adequate, reliable, creditable and timely. Firm’s information usually includes financial situation, list of major shareholders and board of directors’ members, governance structure, and firm’s objectives and its policies. These should be disclosed regularly both on the positive and negative features. However, such information should not confuse or mislead users. This is because shareholders as well as outside investors need such information for a decision-making and evaluating the management performance.
In addition, the quality of transparency and information disclosure significantly depends on accounting and auditing standards as well as financial systems. It has been documented that international accounting standards is needed for the contribution to higher quality of transparency and information disclosure of the firm. Also, independence of auditing and good financial reporting systems should be called for. This is because these can ensure that information disclosed to shareholders and other investors would be reliable and credible adequately (Asian Development Bank 2001; Limpaphayom 2001; OECD 1999). In the US and UK, for example, accounting standards are set by professional bodies of accountants, who ultimately understand the rules. In some countries, for example Thailand, there are an inadequate number of well-qualified accountants and auditors and the profession’s self-regulatory body (Alba et al. 1998; Prowse 1998). In 1999, the SET has required all listed firms have to establish audit committee to be responsible for examining the quality and reliability of firm’s financial reports.

Overall, regarding to those agency problems and information problems, shareholders attempts to finds the way to guarantee or ensure that they will receive fair returns back from their investments. Shareholders charge accountability through the disclosure process and transparency. Therefore, good corporate governance and its mechanisms are called for.
Ontology-Driven AIS

OntoAIS (Ontology-Driven Accounting Information System) aims to develop a well-formed conceptual framework of the financial data obtained from the SET. Then we have applied an ontological engineering approach to build our own ontology. The former information is already available in the SET and the latter is available inside and outside the SET that maintains details in a semi-structured format. With the well-formed framework of the financial data, we produce a reliable query processing module which can be integrated into an existing system through a 3-tier client-server architecture.

3.1 Systems Development Methodology

It is common to follow a system development methodology to information systems development. This section follows the systems development life cycle approach (SDLC) with ontology engineering methodology. SDLC consists of the following stages: 1) system planning, 2) system analysis, 3) system design, and 4) system implementation.

3.1.1 System Planning

The system planning phase identifies the need for a new or enhanced system. We investigate possible ways to deal with knowledge user, sharing and reuse of information in a means of the corporate financial transparency and information disclosure in OntoAIS. The proposed system incorporates new functionalities into users’ daily work rather than developing a new system from scratch. We investigate the scenarios in which both human and software agents use a specific domain that deals with a specific ontology; that is the
domain knowledge of the SET. Ideally, the software agent accesses information available on a corporate server using its own ontology that has a common semantic source. The semantic source maps the concepts and their relationships to the SET server. Thus both human and software agents are able to use the same domain knowledge to answer query. This is known as reasoning. This study uses the Semantic Web technology which has the capacity of reasoning to customize the user queries in a form of frequently asked questions (FAQ).

3.1.2 System Analysis

During the systems analysis phase, we consider tasks associated with information retrieval and knowledge representation. In the current business world, a comprehensive view of knowledge management approach is on demand to support emerging global economy. It results in knowledge representation become more complicated, and requires a more systematic approach to analysis.

During this phase, we thoroughly study a large number of ontologies have been developed by different researchers using different methods, methodologies, languages and tools. This set of efforts is referred to as ontological engineering. In particular, we use the Uschold and King’ method that consists of the following four steps: 1) identify purpose and scope, 2) building the ontology, 3) evaluation, and 4) documentation (Gómez-Pérez 2004).

![Figure 15 Illustrated Uschold and King’s Method (Source: Gómez-Pérez et al. 2004, p.115)](image-url)
Ontology-Driven AIS

The first step, identifying purpose and scope, includes clear understanding of possible uses and intended uses of the ontology. It may include identifying the relevant terms on the domain. This study’s early finding in Chapter 2 shows that the SET has six categories on its website: About SET, Companies / Securities Info., Prices & Statistics, Products & Services, SET News and Supervision & Regulations. Each category has several subcategories, for example, About SET has Mission & Vision, SET Overview, Corporate Reports, SET Holidays, Job Opportunities and Map to SET. Our current approach focuses on a self-adaptive development to deal with the dynamic requirements and user involvement (Holsapple and Joshi 2002). Once we have an idea of what we want to know, we start to list the important terms that we need. These include basic concepts, properties (characteristics of a concept) and relationships. It is a repeated process when there are inconsistent, duplicated or missing concepts. For instance, we had not considered the term ‘Company’ in our initial examination as it is not a part of the SET. However, we have to define it in our ontology to allow contact details of the company to be asserted, which are not available from the SET. Therefore, we have decided to include company as a term of interest as well as properties associated with ‘Company’ which are available from independent sources. As we continue to build up our ontology, we are implicitly defining the scope of our ontology.

The second step, building the ontology, consists of three activities: capture, coding, and integrating existing ontologies. Ontology capture includes identifying key concepts and relationships in the domain of interest, producing precise unambiguous text-definitions for such concepts and relationships, identifying terminology that refers to gathering concepts and relationships, and reaching an agreement. Ontology coding involves specifying the ontology by placing the underlying representational terms, choosing a
ontologies refers to joining all or part of existing relevant ontologies together. Thus, we construct concepts by starting from categorizing different terms according to their relations in the ontology.

The third step, evaluation, refers to “the correct building of the content of ontology, ensuring definitions… in the real world” (Gómez-Pérez 2004, p.3). In this step, it includes evaluation of each individual definition and axiom, a collection of definitions and axioms imported from other ontologies, and definitions that can be inferred using other definitions and axioms (Gruber 1993). For illustration purposes, we will use the trading summary as shown in Figure 9. The trading summary in the SET ontology have several concepts (classes) and its sub-concepts (subclasses) from their relationships. All classes are subclasses of Thing. For example, there are three subclasses: SET, By Date and Investor. Each subclass has several subclasses of its own. For example ‘Investor Group’ consists of ‘Buy’, ‘Sell’ and ‘Net’. ‘Investor’ consists of ‘Local Institutions’, ‘Proprietary Trading’, ‘Foreign Investors’ and ‘Local Individuals’. In OWL (Web Ontology Language), we say that the subclasses of ‘Investor’ are disjoint; that is, there is no instance that belongs to another subclass. These relationships can help us to do reasoning. For example, the property ‘hasValue’ of ‘Buy’ tells us that if we want to prove 2,426.79 million Baht, we know that it has value 2,437.43 million Baht. The property ‘hasValue’ of ‘Sell’ is 4,864.22 million Baht. Thus, we can conclude that the property ‘hasValue’ of ‘Net’. The simple SPARQL query can return for that result. SPARQL is the query language for RDF (Resource Description Framework) as well as OWL (W3C 2001). RDF is a simple standard model that allows data to be shared on the Web.
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Ontology-Driven AIS

Figure 16 Ontological information of the Trading summary in the SET ontology

The query consists of two parts: the SELECT clause identifies the variables to appear in the query results, and the WHERE clause provides the basic graph pattern to match against the data set as shown in Figure 17.

Figure 17 Example ontological information of the trading summary in the SET ontology
The fourth step, documentation, includes setting up guidelines for documenting ontologies so that it can address the problems of inadequate documentation in the knowledge base and ontologies such that the fundamental concepts are defined in the ontology.

### 3.1.3 System Design

In the system design phase, both logical and physical designs are transformed into a technology-specific system. For the purpose of demonstration, we focus on an application of corporate governance based on information from the SET. We constructed concepts started from categorizing the different terms according to their relations in the ontology. A main idea of constructing such an ontology is to share common understanding of domain knowledge, in this case the SET. Concepts (also known as classes) are built by categorizing different terms according to their relations in the ontology. Figure 18 shows a graphical representation of the SET ontology that specifies the concepts of SET related information, services and products for decision support in financial practices, and sharing of accounting data within the organization. There are over 100 defined concepts of the SET ontology, for instance, the concept of Stock has 11 sub-concepts (See Figure18). Each sub-concept of Stock is disjoint which means that it must belong to an industry only. That is, company ‘α’ that is classified as the ‘Technology’ industry cannot be classified as a ‘Resources’ industry at the same time.
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Ontology-Driven AIS
Ontology-Driven AIS

Figure 18 SET ontology with partial information

Financial data may attract considerable public attention in the media due to the reason that it is one aspect of a corporation’s disclosure, which must provide about the status of intangibles, corporate governance practices, and so forth. For this task, in brief, the client accesses ontological information available on an application server using its own ontology which has a common semantic source that is built with the SPARQL query. The semantic source maps the concepts and their relationships about the SET. A database server stores additional information such as instances of the concepts (known as classes of ontology) and value of their attributes (known as properties of the classes).

Figure 19 OntoAIS application on the Semantic Web environment

3.1.4 System Implementation

During the system implementation, systems specifications are turned into a working prototype system. In addition, our current approach to the systems development also focuses on a self-adaptive development process which is known as agile methodologies. The reason is that the system has dynamic requirements and continual user involvement.
In Figure 20, two remote clients (IP addresses from 172.17.28.21 and 172.17.28.20) access SET ontological information (named as SET 1.3 Ontology) available on the application server (IP Address 172.17.28.22). Using its own built-in SPARQL query, the clients can access additional information such as instances of the companies and value of their attributes, which are mapped and stored, in the database server (named as SET 1.3 Ontology DB).

Using prototype, we illustrated how the system works over the Semantic Web (Kang et al. 2010). A domain expert of the SET provides information to build a possible ontology for its domain. Several of the questions that can be answered by our developed prototype, for instance, ‘Which is the list of the SET listed companies, and what is their contact information?’ To answer these questions, we will illustrate how to locate the company’s records in the knowledge base (known as instances). The following figure shows an example of listed companies from the SET in our knowledge base. In practice, it should include all companies listed on the SET with all comprehensive information.
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Figure 21 An example of listed companies from the SET.

First, the user inputs “Company” in the form window in Figure 21. Then the company record can be extracted, for example, the company name ‘CPI’: CHUMPORN PALM OIL INDUSTRY PUBLIC COMPANY LIMITED is shown in Figure 22 with comprehensive information.
Suppose we are interested in locating all listed companies of the SET and their contact information. We can build and locate all companies that match the criteria we have specified. To create a query, we selected one class (Company), and one slot (Listed) within that class. We set ‘Listed’ slot as a ‘true’ value to retrieve the listed companies (as shown in Figure 23). In this way, the query can be tailored to the need of the users.
Secondly, the user has to locate terms that related to the interested companies in the ‘all listed companies of the SET’ query as shown in Figure 23. After that, the list of companies, according to the query terms, will show on the “Search Result” as shown in Figure 24. There are 599 companies on the SET and 173 delisted in 2009 (SET 2009). For demonstration purpose, there are 61 limited and delisted companies in our knowledge base.
Figure 24 Results of lists of the SET listed companies and contact information

As shown in Figure 24, the Web application makes it possible to browse the knowledge associated with the SET ontology on the Web. For demonstration, a simple SPARQL query is implemented to provide the result in the browser window. In Figure 25, the following code shows how to find the company information from the given data graph with the main building blocks of the SPARQL query. The query consists of two parts: 1) the SELECT clause identifies the variables to appear in the query results, and 2) the WHERE clause provides the basic graph pattern to match against the data graph.

```
PREFIX set: <http://www.owl-ontologies.com/set.owl>

SELECT ?companyName ?aBBR ?contactPhone ?fax ?website ?address ?zipcode
WHERE
```

Figure 24 Results of lists of the SET listed companies and contact information
Ontology-Driven AIS

Figure 25 OWL code for the SET listed companies and contact information

```
{
  ?x set:isListed "true"
  ?x set:Company_Name ?companyName
  ?x set:ABBR ?aBBR
  ?x set:Contact_Phone ?contactPhone
  ?x set:Fax ?fax
  ?x set:Website ?website
  ?x set:Address ?address
  ?x set:Zipcode ?zipcode
}
```

Figure 26 An example of Web application using the SET ontology.

An advantage of this approach is that the SPARQL query provides a means of sophisticated integration over distributed source of information.
3.2 Further Study

This section will focus on the further study which as be discussed as follows. In terms of accounting regime the researcher can further study in area of relationship between the level of information technology development and the firm performance. In part of information technology as the query engine is directly dependent on the repository being used. In this case, when multiple ontologies are stored in using file-based systems, it may face on computation limitation. Thus the design decision on how queries are to be translated should be based on optimization techniques.
Corporate governance practices have come under increasing scrutiny over the past decade. After a number of major corporate financial scandals, good corporate governance has been called for to raise the level of shareholders’ protection. Many researchers suggested their underlying views of corporate governance in the principles of corporate law, accounting, finance, economics, ethics or relevant disciplines.

A key objectives of this research was to investigate issues arise from the information asymmetry, transparency and disclosure in the SET environment. Our findings show that since AIS have been developed using Web technologies, which improved the channel of information disclosure and made more accounting information available on the Web for the public, such efforts made corporate financial transparency better in general.

In fact, the information distribution is normally asymmetric because limited knowledge of organizational practices is available. It is not unusual for the public sector to have shared responsibilities to meet different and sometimes conflicting accountability provisions. Achieving this level of shared understanding is not simple as the third party may reluctant to disclose relevant information. Moreover users face unfamiliar accounting terminologies, poor quality information and inaccurate information for public sector accountability. Thus information can be distinguished by its level of richness which depends on its capacity.

As the recommendation, OntoAIS framework is illustrated to model information use in organization through standardization of terminologies but also better information
reuse and sharing. By using formalization, information is explicitly specified with documentation standards. In addition, by shared conceptualization, the viewpoint of SET knowledge domain is well formed with relevant information to individuals and different groups of users with agreement. Together with conventional accounting controls of AIS, ontology offers the intention to share information and motivate corporations to provide appropriate information. As a result, it weakens the asymmetric information problem, and improves corporate financial transparency.
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