A peer-to-peer trust modeling analysis for decreasing B2B monitoring costs

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Abstract—In businesses, uncertainties and risks occur all the time. Uncertainties may come from customer's demand, consumer purchase. Risks can come from competitor company, transport products. These can cause costs of switching and transaction. Trust can decrease transaction and switching costs. Moreover trust can increase profits too. Most business concern these trust management cause exchangeable information between internet and communication network. Grid technology is a service for sharing that information and solving problems in commercial enterprise. Grid environment is a distributed computing to perform very large tasks by using access control including policies, certificates, and private keys. In businesses, there is a need to share resources such as file sharing, document sharing, and so on. Peer-to-peer system is an appropriate architecture for these sharing in trust management affecting the performance of profit. This paper is to study appropriate models and technologies to decrease costs for Business to Business (B2B). Moreover they assure security techniques such as cryptographic for privacy retrievable information. They can share information for reducing uncertainties demand and increase duration when the quantities of orders are high. Because they can be occurred all time. The experiment of comparative studies with grid, peer-to-peer and social networks are methodologies for decrease costs.

Keywords-B2B; trust; total costs; grid technology; peer-to-peer; social network

I. INTRODUCTION

Nowadays, Business to Business (B2B) uses electronic commerce to buy and sell products and services. These are the convenient ways that companies can support customers. The companies can increase efficiency of transactions among companies that have business relations [12]. There are many uncertainties and risks when businesses use online methods for their transactions [1]. In turn, a number of techniques have been developed to alleviate these concerns. For example, security such as cryptography for privacy retrievable information, digital signatures, authentication for authority and access control are some of these techniques [18]. Businesses can share information for reducing uncertainties demand and increase the duration when the quantities of orders are high [22]. Other than sharing information, it means resource sharing for managing complex processes in a distributed network [10]. There are some types of total costs in business (see Section II). Costs will be decreased by trust (see Section III) and technologies (see Section IV).

II. LITERATURE REVIEW

If businesses share more information the total costs will decrease. It means that information sharing reduces uncertainties demand in business [17]. Costs deject customers from products or services that include time, effort and customer's knowledge. They are called customer switching costs [15].

A. Switching costs

Switching costs have three types of disciplines: strategy, economics and marketing. For strategy, switching costs have two kinds of work: competitive strategy and competitive advantage. Competitive strategy means managers have to conceive about threat of entry, supplier power, buyer power, substitutes and rivalry. When they understand them, they will bring business to achieve competitive advantage [28]. For economics, switching costs mean unwillingness of customers to switch suppliers and help to describe appearance of business [19]. For marketing, switching costs mean relationship between businesses and customers. Relationship has made businesses be attracted and retain customers [20]. There are three types of switching costs in market consumers. Firstly, previous investment means transaction costs that consumer switch services and goods between different suppliers in the same brands. Secondly, potential investment means learning costs that consumers use one brand for a long time but sometimes they may transfer to use the other brand of the same product. Lastly, opportunity costs mean artificial or contractual switching costs that a business can retain customers by signing a contact with business [19].

B. Transaction costs

There are four types of transaction costs: Firstly, search costs include the costs of locating and evaluating trading partners. Secondly, contracting costs include the costs of writing and negotiating for an acceptable agreement. Thirdly, monitoring costs refer to the costs of monitoring the agreement of obligations. Lastly, enforcement costs refer to ex post bargaining and empower trading partners [31]. Business can decrease switching costs and transaction costs by increasing the flow of information with its network partners. Trust can solve these problems and to reach the benefits of market.

III. TRUST

Trust is considered as a good predictor that can reduce uncertainties in an organization. Trust decreases transaction costs between businesses [24]. The author's representation to depict trust in B2B is shown in Figure 1.
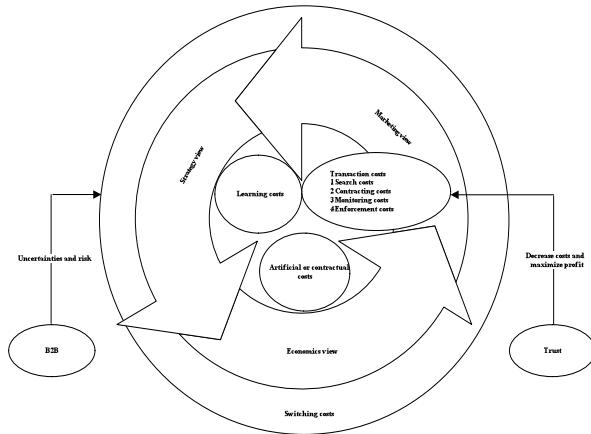

Figure1: Diagram for Trust related Total costs

In economic view, trust has two functions: (1) decrease transaction costs for modifying condition in the market, (2) amend information sharing to maximize efficiencies [9]. Trust may decrease transaction costs in this way. If trust transactions are high, they will use less time for contracting costs. It means that they assure equal payoffs [8].

A. Hypotheses related to trust

There are three related hypotheses for trust emerging from literature review.

Hypothesis 1: If the supplier trust the buyer the exchange partners will decrease contracting costs [33].

So, the greater the trust, the less before transaction costs occur.

Hypothesis 2: The supplier certainly shares more information to the buyer if the supplier trusts the buyer [4].

So, the greater the trust, the more valuable information is shared.

Hypothesis 3: If trust can reduce transaction costs not only it will reduce the total costs but also it will maximize profit performance [16].

So, the greater the trust, the more the profit.

Based on these, it can be argued that it is the aim of this research to pursue the following hypothesis: Customers can share their experience by using trust. "The more valuable information about trusting the company shared by customers, the more likelihood potential customers of the company."

In turn, the aim of this research study is to identify whether the greater the trust, the more customer's

experience are shared and thus the less transaction/switching costs involved.

B. Trust management

There are two types for managing trust in business.

Firstly, policy-based trust management concerns distributed services architectures that explain the problem of license and access control in system. Policy-based can be used with strong protection in complex rules that it is changed easily. Policy-based must be used with grid, this will be explained in the next Section.

Secondly, reputation-based trust management involves electronic commerce system. It will manage trust in public key certificates. Reputation-based is used with boundary of information in network systems. Then it will appear available information that it is based on experiences and the comment of users. Reputation-based must be used with peer-to-peer systems. Thus, the following section provides an overview of related information technologies for business to business interactions.

IV. INFORMATION TECHNOLOGIES FOR BUSINESS TO BUSINESS (B2B)

Business to business (B2B) plays a high performance role in the world economy. Many companies exchange information via the internet and communication technology networks [3]. Distributed systems involve technology that they could make decision by themselves [29]. Distributed systems concern grid computing architectures. These enable resource sharing from one node to another node that is available from a network [11]. Several nodes can use the same services and come together to process complex transactions based on the trust of the nodes [14]. In business, a product can be advertised in the form of texts and banners via social network [7]. Social networking is a methodology studying the relationships between nodes in a network [27].

A. Emerging technologies

The grid technology or grid environment is a service for sharing computer power and data storage capacity over the internet [6]. Grid environment offers many advantages over other information and communication technologies [13]. Grid technology is an emerging technology that uses the power of CPU cycles and data processing from disperse networks to a distinct network [30]. Grid computing is distributed computing to perform very large tasks. This technology has been applied to intensive scientific, mathematical, and academic problems and it is used in commercial enterprises for diverse applications [5].

Grid accesses resources and services include documents, accounts, and other data over the internet by using an access control system such as policies and certificates [23]. Businesses admit trust by revealing for certificates such as one business can prove the other business through digital certificates. When businesses use trust, they need to understand about access control. It means that grid can be satisfied set of digital certificates [21].

The method that client and server are followed equally. They are called peer-to-peer architecture. Peer-to-peer includes files sharing, online auction, and supply chain network [32]. Trust model concerns the factors of risk and it has high performance when it is supported by a peer-to-peer system. Trust management need to keep data in efficiently storage via a peer-to-peer network and can access data all time [25]. Peer-to-peer communities can be executed on top of peer-to-peer network such as Gnutella. Grid technology, peer-to-peer system are attended unicast communication on network address. This address is allowed to use bandwidth, fault-tolerance and network dependence. Communication network reliability depends on the sustainability of both hardware and software. Fault-tolerance is used to how reliable particular component of network. Bandwidth and fault-tolerance usually work together. There are two basic techniques for information and maintenance. If fault-tolerance decrease bandwidth will be decreased too. It is called hard-state registration. On the other hand, if fault-tolerance increase bandwidth will be increased too. It is called soft-state [2].

There are two properties of networks: Firstly, think about degree correlations. Social networks are positive but the most other networks are negative. Secondly, think about clustering network. Cluster in social networks are greater than expectance by risk [26]. Social networks offer services for finding friends like MySpace, Orkut and Friendster, for sharing photos like Flickr, for sharing videos like YouTube and Google Video, and for writing blogs like Live Journal and Blog Spot.

B. Discussion

Uncertainties and risks are caused total costs in business. Total costs include switching and transaction costs. Trust can decrease these costs [4, 9, 16, 24, 33]. Moreover trust can increase profit too [8, 16]. Likely person believes in someone that they can avoid risky relationship. When using trust in business, they can share information via communication technologies. There are two types for managing trust policy-based and reputation-based trust management. In addition social network can be worked with trust such as accessing personal information, filtering data, and incorporating email client. Most business concern these trust management cause exchangeable information between internet and communication network.

Grid technology is a service for sharing that information and solving problems in commercial enterprise. Grid environment is a distributed computing to perform very large tasks by using access control including policies, certificates, and private keys. In businesses, there is a need to share resources such as file sharing, document sharing, and so on. Peer-to-peer system is an appropriate architecture for these sharing in trust management affecting the performance of profit.

V. THE PROPOSED RESEARCH

This research interest is to provide appropriate models and technologies to decrease costs for B2B. This is because businesses using online methods for buying and selling involve uncertainties and risks. Moreover they assure security techniques such as cryptographic for privacy retrievable information. They can share information for reducing uncertainties demand and increase duration when the quantities of orders are high. They are called transaction costs. They are parts of switching costs in market consumers. These costs include customers' time, effort, and knowledge that they invest in products, services, or relationships. So the less of transaction costs mean the less of search costs, the less of contracting costs, the less of monitoring costs, the less of enforcement costs. But monitoring costs are higher costs when they compare with the other costs [8, 31]. Because they can be occurred all time. Trust model can decrease transaction costs. If this research will reduce costs from transaction costs by enabling trust it can say that the more trust the less costs in terms of the specific transaction costs. If this research develops trust model will lead to lower costs in term of monitoring costs. The experiment of comparative studies with emerging technologies will be the approach for this research.

VI. OBJECTIVES

A. To investigate current trust models forB2B with particular regard to monitoring costs.

A state-of-the-art literature review of trust models and monitoring costs in B2B will be offered. To investigate and understand problems of B2B with costs. To inspect total costs including switching and transaction costs in business. Both switching and transaction costs don't have feedbacks filters of transaction. Buyers are risk about incomplete and misrepresent information from sellers. So they need to be used trust model to solve these problems [1, 8, 9, 12,15, 18, 20, 24].

B. To identify technology behind those relevant trust models.

To perform a literature review about technology for trust management. This will specify suitable and useful technology, how trust can manage that problem. Trust models mean decentralized trust data management and trust operation. These involve online connections. When business use online connections they can share information too. Some hypotheses can be stated that the supplier certainly share more information to the buyer if the supplier trusts the buyer [3, 10, 11, 18, 22, 29].

C. To investigate comparative studies with emerging technologies.

This will focus in the use of comparative studies with appropriate emerging technologies such as grid technology, peer-to-peer technologies and social networks. These technologies can be comparatively studied under three testing criteria that include bandwidth requirement, fault-tolerance and network dependence. These technologies can be used for doing trade between people that create market from them. Businesses can use these technologies for maximizing the profit [2, 6, 7, 10, 13, 14, 26, 27, 32].

D. To develop a trust model for decreasing B2B costs.

To understand and solve problem of costs by developing a trust model. Trust will help and clarify the iterative process. Trust has many dimensions; for instance, economics, marketing, and psychology. Moreover trust models can be explained that how they can decrease the total costs in B2B. This process is to design models that involve grid technology and peer-to-peer systems. To create and modify rule for test models [9, 21, 23, 24, 25].

E. To undertake model evaluation and test it as to validate the hypothesis.

To test model and validate hypothesis. This process will refine the development of validation hypothesis. From previous process, this process will test rule of hypothesis. To modify boundary for appropriate environments. To analyse and implement result. The evaluation procedure use for peer-to-peer trust model [4, 16, 33].

VII. CONCLUSION

This research identified two types of costs that occur in business. They include switching costs and transaction costs. Companies can reduce these costs by using trust. This research develops trust model for leading lower costs in term of monitoring costs. Trust support three emerging technologies. Firstly, grid accesses resources and services over communication technologies. Secondly, peer-to-peer system is the method that client and server can share information. Lastly, social networks suggest services in network. This research tests these technologies with comparative studies that include bandwidth requirement, fault-tolerance and network dependence.

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