

A Framework of Digital Collaboration Networks for SME's Sustainability

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Abstract. Research on strategic collaboration has been interested for many years. Collaboration is believed as an effort to balance between competition and sharing which will take many benefits to create a strategic advantage between collaborating parties. With the growth of the Internet and ICT, the conducting of collaboration through WWW platform will transcend the barriers of time and horizon. It will also expand the spectrum of collaboration. However, Indonesian small and medium enterprises (SMEs) have been hesitant to utilize ICT in their business. This paper discusses architecture and basic requirements for creating digital collaboration network (DCN) for SMEs in Batik industry, Indonesia. We also describe in detail a four step which contains necessary activities toward the successful outcome of digital collaboration. This DCN is believed as a pathway to sustain the community of SMEs in specific industry.

Keywords: Digital Collaboration Networks, SMEs, Sustainability

1. Introduction

Today, the Internet economy accounts for 1.6% of Indonesia's GDP [1]. The forecast of its grows is three times that of overall economy for the next five years and it is predicted by at least 2.5% of Indonesian GDP in 2016. Researchers have shown that Indonesian SMEs are starting to utilize the Internet to expand their market opportunity which will lead to monetary benefit. SMEs have been identified as an enterprise which differs with large enterprise. Despite those limitations, the sustainability of SMEs is the most important factors to support the economy of developing countries, particularly Indonesia. However, government and non government institutions more concern on the utilization of ICT to expand the market share only, there is little or no effort to advance the benefit of using ICT for strategic collaboration.

The World Wide Web (WWW) provides a platform enabling SMEs to transcend barriers and engage with current or potential stakeholders globally, and expand business horizons which result in their economic growth. Moreover, a growing number of SMEs who conduct online business or online interaction with their partners bring a challenging task on how to sustain this community. Particularly, in an industry by which SMEs produce similar goods and service, collaboration between them will bring many advantages. Moreover, SMEs have had face difficulties to survive by themselves since their limited resources and facilities from government. With this globalization era, SMEs have to compete internationally with limited support and facilities from government. Therefore, in order to increase their competitive advantage, the SMEs actors have to be a united and working each other to develop their sustainability. One of strategy that can be used is by creating vulnerability collaboration culture. In order to speed up their collaboration, a virtual web platform which will be connecting them instantly and continuously is important.

Several researches have been discussed the benefit of creating virtual collaboration for SMEs [2-5]. However, there is little or no research that concern on how to sustain collaboration between members in particular industry of SMEs. Most of research concern on how to expand their marketing through online activities. Moreover, some research which proposed c-collaboration (commerce collaboration) do not focus on specific industry by which SMEs engage in a community as they are producing similar goods and services. In this paper, we present architecture of digital collaborative networks (DCN) for SMEs within an industry with a particular reference of Batik Industry in Indonesia. Batik is a cultural heritage of Indonesian arts which has international potential market [6]. This industry has been growing very fast since the government

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formalize this product as a national society identity. Unfortunately, large enterprises as well as SMEs within this industry are facing a high competitive situation from international markets. Such countries have an effort to produce the similar product with cheaper price. Hence, in order to sustain the community of actors in Batik industry Indonesia, this research is conducted to mapping the potential of digitally connecting all the business actors within this industry. This network can be seen as a digital highway which tries to balance between collaboration and competition. Moreover, to identify the necessary steps for conducting virtual collaboration, we also present basic requirements to sustain this network. Later, we present four steps to frame the work of this DCN.

2. Literature Review and Related Work

2.1. SMEs Virtual Collaboration

Virtual collaboration can be defined as a strategic and long term interaction which based on mutual agreement and share resources to create a mutual advantage between collaborating parties [7]. Casals [3] developed framework for SMEs collaboration and identify essential aspects and factors. There are three dimensions which are strategic dimension, management dimension and social dimension that influence the successful of SMEs collaboration. However, besides those three dimensions, there are internal and external factors that also have to be considered. The internal factors are SMEs profiles (size, professionalism, IT capabilities, employees knowledge, work practices, structure etc) while external factors are changes in the markets, competitors, learning opportunities etc. This framework is interesting since it is a multi perspective, however, the networks that can be assumed as networked nodes have not been more discuss. Braun [5] suggests that social network is relevant factors for vulnerable collaboration. Moreover, social networks can be seen as a network that contains interpersonal values of other which enrich the utility of a relationship.

Brunetto [4] presents that trust, commitment, loyalty, shared value and beliefs will make the networks ties stronger. Moreover, virtual collaboration community will not sustain by themselves without real hand maintain it. Sharing common values helps virtual collaboration members to predict how their strategic partners will act in the future, and gives them the assurance that the collaboration partners is unlikely to act contrary to the shared values [8]. Business performance and the successful of partnership, strategic alliance, customer relationship management has been identified as the outcome of trust that play on it [9]. However, trust cannot arrange itself either at individual level or business network level. Individuals and network members should attempt to stipulate trustworthiness in every relationship as because trustworthiness can be developed and trust earned. Additionally, Das and Teng [10] argue that the basic roles of trust, control, and confidence level are important in any types of business alliance. Relevant reviews [10-12] also argue that control mechanism is important for trust building in strategic alliance. In order to address one characteristic of virtual business network by which the absent of vertical control, hierarchical authority and formalized procedures and policies explain the role of control actions in virtual environments [13-14]. Vlaar [14] argue that control mechanisms is significant in successful of business network, however, they note a little amount of research on developing a theory of control mechanism for virtual business network. Their research provides a methodology for designing control mechanisms in inter-organizational virtual network.

2.2. Related Works

Several works proposed a creation of virtual community for collaboration among SMEs. The discussion also provides strengths and weakness of this virtual collaboration. Recent research also discusses some basic requirements for virtual collaboration, benefit of virtual collaboration for SMEs, and barriers to encourage SMEs to join into the community [4] For example, Hoyer and Hoyer [7, 16] proposed a collaborative e-business process modeling for SMEs. The framework is derived from the concepts of Balance Scorecard. The perspectives of user, working process, innovation and learning and financial are basis of their holistic analysis. However, the collaboration is not for SMEs within the same industry so that the basic activities on producing goods and services might be different. They also do not consider social network and knowledge network on the model.

Pappas et al [2] presents a web-based virtual collaboration platform namely, DiCoDev, that can be used during manufacturing product and process design evaluation. Their platform is designed to collaborate the

work of designers, engineers and managers. Nonetheless, the proposed work mainly useful for manufacturing and production process within a company. It needs to improve the usability for SMEs within a specific industry. Moreover, social networks and knowledge network are beyond their discussion. Further, Mesquita and Lazzarini [4] integrated resource-based view, transaction cost economics, and institutional theory to model how collaboration among SMEs in environments which have weak infrastructure and institution. The model is utilized to help SMEs reach better opportunity to reach global market and cost efficiency for product innovation. This model may improved by considering social networks as relationship capability and knowledge network as willingness to share so that although the SMEs are in weak infrastructure, however, the collaboration runs well based on social culture strength. Based on above discussion, architecture of virtual collaboration amongst Indonesian SMEs within Batik industry can be depicted in Figure 1.

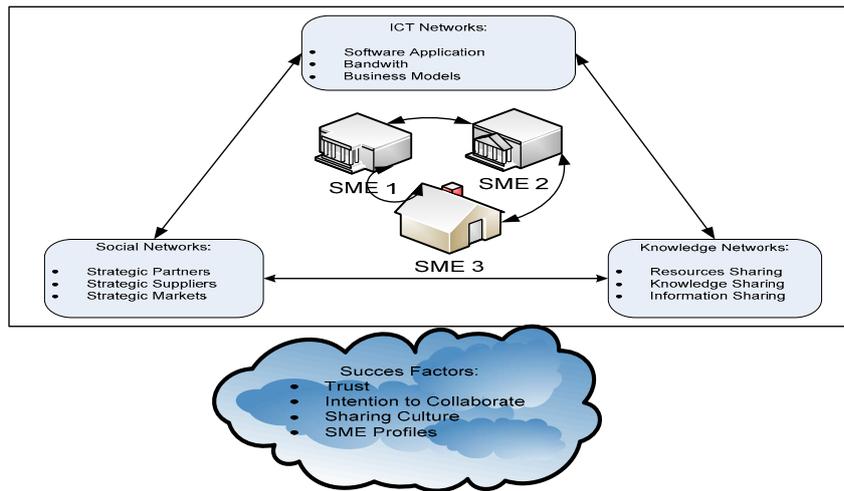


Fig 1: DCN Architecture for SMEs in Batik Industry

The first network, ICT network is shown to make an understanding that by connecting virtually, the SMEs are linked their business process digitally. It is a hope that interoperability of business models among SMEs is accessible between them. The knowledge network is an embedded network in the DCN. By collaborating virtually, the SMEs can learn each other and share their training module vulnerability. However, this knowledge sharing has to be support by sharing culture. This is because one party may see that her/his knowledge is a private asset that cannot be acquired by other parties freely. However, once the SMEs join in this virtual environment, the collaboration of knowledge which can speed up the information transfer. By connected virtually, it will be easier for the SMEs actors to improve their ability in virtual interpersonal attitudes and collecting social capital.

3. Proposed Framework

The objective of the framework is to create an integrated, distributed pervasive network for SMEs and industry members which cooperates and exchanging dynamically resources, applications, services and knowledge which we call it DCN (Digital Collaboration Networks). It will constitute a global digital collaboration which able to continuously evolve aimed at fostering SMEs economic growth through networked nodes of activities. This framework consists of four steps which are: partner search and identify, achieving business agreement, monitoring and evaluation. The framework is depicted in Figure 2.

3.1. Step 1: Partner Search.

First of all, a SME as task giver, through the administrator of the DCN, describes and offers a set of tasks or details of a project in SMEs virtual community. Media such as the community's web, wiki or online advertisement can be used to announce this project and seek members in the same community who are willing and able to finish a required task. The asking SME or collaborating partner candidates incur their task willingness for every task request. The willingness of a candidate to become a partner in such collaboration

is assumed based on his/her task interest. S/he will assess some task component such as the clarity of task and the resources provided by the task requester that are required in order to complete this task. Furthermore, they are also required to calculate the value of task. The value of undertaking the task in terms of the reward provided, the level of challenge and the candidate's perception about the ease of executing the task are some of the key criteria which determine whether or not the task is interesting. Some studies argued that a high degree of task interest leads to higher performance [18]. Therefore, in generating the ordered list of team member candidates that are eligible to help, each candidate's past interactions and the current task are considered. This list of candidates, based on the perceived likelihood of having a task interest, can be viewed as an ordered ranking of member candidates who are most trustworthy. On the other hand, a task giver will assess his initial level of trust toward these candidates. It is based on the willingness and capability of these collaboration team members to finish a task that has been set.

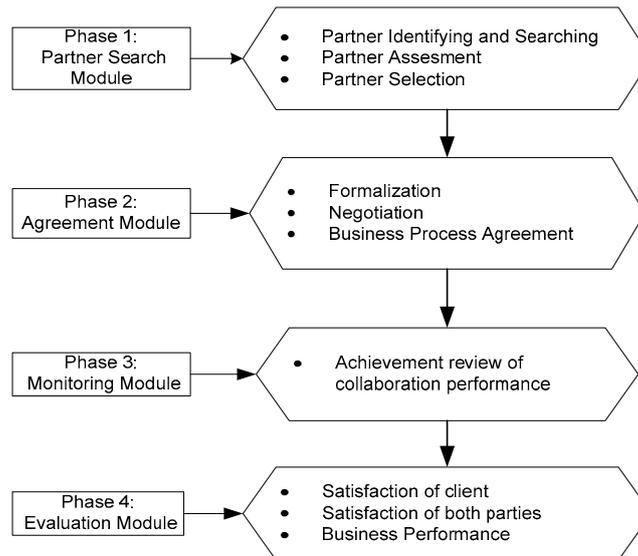


Fig 2: A Framework of DCN for SMEs in an Industry

3.2. Step 2. Agreement Module

Once a task giver finds suitable partner(s), the next step is they have to engage in task formalization and negotiation activities to achieve mutual collaboration agreement. The further step in this agreement module is goal setting. Goal setting is an activity to depict statement of results to be achieved within specific time frame. Moreover, task description is the foundations for goals, standards and competencies. Goal achievement is described and agreed in task description which plays as benchmark measurement for the outcome of collaboration. Participation in goal setting process and proactively monitor the task based performance is one way to guarantee the achievement of collaboration. A technique that facilitate mutual agreement is therefore, moving plan into action and follow through while continually evaluate progress of action. Setting goal together will support availability of trust and confidence, increase satisfaction, and inspire motivation that yields lasting results and goal achievement [19].

3.3. Step 3. Monitoring Module

Once collaboration parties reach their mutual business agreement, the next module is monitoring. It is important to note that feedback of performance in each action should be provided. Feedback gives collaboration partners able to compare perceptions of expected outcomes with real outcomes and make necessary changes in their accomplishment of goals. Both parties should be flexible in change of actions, if however, does not necessarily change the goal of its task. Monitoring module provides performance feedback that helps collaboration parties understand what they should continue doing, stop doing, or start doing to attain goal. This module is designed on how both parties perform evaluation of each other periodically in the strategic collaboration. The platform should clearly state the expectation for accountability of performance. By this module, performance progress against goals visible to all parties that may through the use of wikis, dashboards, and other visual reporting devices.

3.4. Step 4. Evaluation Module

In this step, collaboration parties evaluate the outcome of collaboration. The evaluation of collaboration outcomes can be seen as the level of satisfaction of parties who requested to collaborate, satisfaction of both parties who has finished collaborating and their business performance as a result of collaboration. An extended version of this evaluation is by comparing task performance with and without collaboration.

4. Conclusion and Future Work

SMEs in some developing countries such as Indonesia are enterprises that still need help and support to maximize the benefit of ICT in their business activities. Moreover, to encourage the vulnerability of SME to join and collaborate in virtual community is a challenging task. The SMEs itself is a main pillar during the economic crisis which defend this countries in early 20th century. Despite the importance of sustaining the SMEs, an effort to unite them in a digital community is discussed. The digital community of the SMEs is build based on three major networks which are ICT networks, knowledge networks and social networks. Since they assumed that forming and sustaining such collaboration will be not practical, we present four steps to make it clear the effectiveness of each steps to gain the maximum benefit of collaboration. Partner search is the first step that may be executed carefully. The next three steps are based on the reliability of partners identifying module. The four steps in the framework is an initial effort to motivate SMEs within Batik Industry Indonesia in creating collaboration between them. This framework is proposed conceptually, we plan to implement and examine this framework into real action, particularly to SMEs within Batik Industry in Indonesia. A huge effort to understand various factors that makes this DCN success will be presenting in our forthcoming work.

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