# Trust, Self Regulation and Social Movement: Partner Selection at Digital Collaboration Network for SME's Sustainability

Olivia Fachrunnisa, Mutamimah, and Gunawan

***Abstract*—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. Member selection is an important decision to be made when creating a virtual collaboration team. A project manager should consider social dimensional factors early in the member creation process. This social dimension variable is critical to the effectiveness of the performance of the collaboration. This paper analyzes two social variables which are trust and self-regulation tactic as basic requirements in member recruitment of a virtual collaboration. Trust is widely argued as a predictor of collaboration performance because of the lack of face-to-face meetings. As trust in a virtual collaboration needs to be established quickly, interest in the task as individual feelings and perceptions of the value or relevance of the task are arguably key factors. A high degree of task interest will lead to motivation and self-regulation which is important when collaborating independently and virtually, and to create a sustainability.**

***Index Terms*—Trust, self regulation, social movement, digital collaboration network.**

## I. Introduction

Asia is fast becoming the world's main manufacturing hub. 80% of the companies (over 35 million enterprises) are SMEs. However, they characterised by improper production management, inefficient use of raw materials, low efficiency technology, etc. A 'shift' is needed from 'competition' to 'collaboration' for their sustainability. 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 [1].

In order to build a competitive strength, the stakeholders need to be in a unity, with the general or similar vision and mission. ICT facilities will help the creating of digital collaboration amongst members in Batik SMEs community. ICT facilities includes the Internet, computers, software, and any device which can handle for data sharing, transfer, send and recieve. While connect virtually they will easily to discuss, negotiate and sharing knowledge or information so that the collaboration can take in the theme of borderless, real time and speed. Collaboration has more advantages than competition. Although it is challenging to implement collaborating environments than competition, an effort to achieve that has to be started. If a network is created, and community members are aware to collaborate than compete, all members will get benefit. Specialization, competence based product will be created and stakeholders will get unique competence to achieve this. Moreover, efficiency and effectiveness are influenced by good perception on collaboration. Degree of collaboration is somehow determined by trust level. Trust can be seen as degree of wilingness and capability to support, appreciate and help others. In industrial network, collaboration level should be established by creating supportive environments, policy design and practices monitoring.

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

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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 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.

In order to form a sustaibale digital collaboration network, one of these efforts is the phase of team forming. In the development of team, team forming is in the first stage. In purpose to have a maximum benefit of creating and having an effective global virtual collaboration, a thoughtful deliberate approach of member selection with regard on some basic criteria is required. It is also to lowering cost of time and budget. Lurey and Raisinghani [2] proved that selection procedure influence the effectiveness of virtual team inclusive its performance and satisfaction level amongst members. Selection procedure as an internal group dynamics is a significant factor in design process of virtual team. If selection process done correctly and precisely, however, building global virtual team teams can deliver even greater benefits than traditional teams. Hence, we propose a conceptual framework for partner selection in digital collaboration network for SME sustainability.

## II. Literature Review

### A. DCN for SMEs in Indonesia

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], [8] 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 [9] 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 [10] 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 Fig. 1.

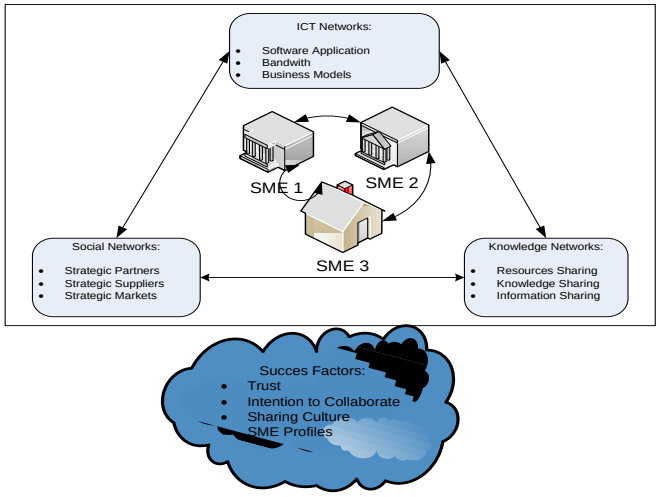


Fig. 1. DCN architecture for SMEs in batik industry

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.

### B. Trust Level Based for Digital Collaboration Member Selection

There are many discussions on selection design for cross functional team and cross departmental team in the existing literature in which individual performance and collaborative performance often use as a basis to select the team members [3], [4]. Moreover, [4] argue that selection of partners in virtual collaboration will influence mutual trust, knowledge sharing and performance. In their study, they propose a method of partner selection in creating a team-oriented virtual organization. Knowledge and collaboration are used as criteria to find a mutual partner to finish a research team as task ordered. Knowledge requirements of partner candidate is measured by the level know-what, know-how and know-who. Social network analysis by measuring centrality, density and closeness centrality is used to measure the degree of

collaboration capability of partner.

Jarkis *et.al* [5] also argue that managing and improving partner selection will improve compatibility among organizations in virtual enterprises. Their research develops a model for partner selection of agile virtual enterprise. Analytical network process by considering both intra and inter organizational capability are used as a basis to select partners. Agility performance metrics such as time, cost, robustness and scope of task should be met by candidate to be able as partner. Moreover, the partners also need to be assessed with regard to how compatible they are among other partners. This compatibility is measured by trust and speed of formation. However, they do not explain how to evaluate trust and speed of formation of each partner candidates.

Furthermore, Hertell *et. al* [11] develop and validate of a web-based selection tool for members of distributed teams. This research expands a conceptual competency that distinguishes KSAs (Knowledge, skill and abilities) regarding task-work, teamwork and telecooperation as factors to select and place members in virtual teams. The first two factors (task-work and teamwork) are derived from conventional team member performance while the last factor, telecooperation is considered as the nature of virtual team. This model disregard trust as selection based for virtual team forming. However, level of knowledge, skill and abilities in task-work can be seen as a component of cognitive based trust. Therefore, trustworthiness is suggested as a basis for virtual distributed team member selection. Regarding the role of trust in establishment of virtual team, Zhang and Zhu [12] discuss key factors that contribute a high performance of virtual teams. The four main team processes, namely virtuality and communication, personnel selection, trust and motivation are the key input in development and formation of virtual teams. Hence, this research suggested trust should be use in personnel selection of virtual team members.

One of research that presents a trust based approach to select virtual team member is done by [3]. They propose a model that explores the dynamic properties of trustworthy index. However, they only validate this model in partner selection for the virtual enterprises. A replication of this model for selecting member in virtual team team in questioned. Trustworthiness index is measured by factors of ability, factor of incentive and factor of persistence for secure collaboration amongst organization in creating virtual enterprises. However, there is lack discussion on members' selection mechanism for cross organizational team in which members come from open professional network. Virtual professional network as an open market for team member candidates can be seen as an open source candidates. As in virtual team, member candidates come from any worlds, any cultural backgrounds and any capabilities, company must carefully choose them to become members of their team team work. In online environments, one can find many experts who advertise themselves or as representatives for their professional virtual organizations. With this situation, it is a hope that an organization can gain benefit by hire some virtual experts from virtual professional network to help organization finish a short time and specific task. We argue that the method to select team member for virtual temporary teams would be different comparing with selecting members for traditional team. In traditional team, members may come from the same company or organization. Therefore, they are easier for getting know each other as they have similar value identity of organization.

Moreover, for team manager as a task giver, how to form collocated team work inclusive member selection is not regarding many factors comparing with virtual team forming. Consequently, in this research, we propose trust based approach for selection mechanism in global virtual teaming. Furthermore, this approach may also serve the practical purpose as a method to help a company select team members from virtual professional networks. It purposes to help establishment of share identity, trust, and knowledge sharing between team members. Share identity, trust and knowledge sharing believed can strengthen social coherence as well as economic competitiveness of virtual team .

### *C. Degree of Task Interest*

In virtual collaboration team, task requirements and recognition has made member tied together in high motivation to finish its task team [13]. However, in the old style of virtual collaboration team, task is assigned by management and members are forced to engage with other members to finish this task. Therefore, they sometimes failed to establish social capital such as trust that very needed in virtual collaboration. In order to overcome this situation, we argue that the new form of virtual collaboration should refer to 'virtual communities of interest'. In the most form, these virtual members are not only engage in work related, but also interest centered and tied.

The phenomenon of internet-based social movements as the kind of the drove of such support in virtual community is based on the degree of task interest. Virtual community is described as a collective of individuals or business partners who interact based on a shared interest. Their interaction is mostly facilitated by communication technology and guided by some frame of norms [14]. People who become member of these virtual communities are freely and voluntarily to join based on the task interest that they feel. Task interest is widely studied in the motivation and emotion literatures [15]. It defines as an 'individual interest', a 'relatively enduring preference for certain topics, subject areas, or activities' [16]. Hence, degree of task interest can be seen include both feelings as well as perceptions of value or relevance of task ordered. Individuals who have higher degree of task interest are more likely to have high cognitive functioning, persistence and affective involvement. Mc Allister [17] argues that it will make individuals have a high attention on the task. Individuals with high attention on the task perceived that task team is easier to finish than if they hold low attention on the task.

Therefore, in order to support an effort to search virtual collaboration members' candidates, we expect higher degree of task interest to be related to the effectiveness of team performance. As task is requested and advertised in virtual environments, the movement of members' candidates is most likely based on their task interest. A measurement such as an interest toward the task requirements, challenging of its task and feeling about easiness of task can be use to analyze the degree of task interest. Horvath et al [13] have developed this scale in their research to measure degree of task interest of student in some courses material. Students who have higher

degree of task interest showed higher performance than student who perceived low interest toward the courses material and class situations.

Moreover, we argue that virtual experts are people with high indication of effective learners as they advertise in virtual environments on behalf of themselves or as representative of their companies. Recent literatures suggest that effective learners are self-regulating agent. Self-regulated learners actively analyze tasks that presented to them, self select strategies to achieve their objectives and be able to monitor their progress in relation to task criteria [18]. We refer this as individual proactively skills. Proactivity skills in the context of virtual teams may include a capability to identify required behaviors, seeking and carrying out relevant information, having an initiative to contact and communicate with other members, being capable to manage time with regard to different space of teammates, and focus in the task without direct managerial intervention [19]. These skills are closely related to self regulation. We defined self regulation for virtual team members as a self individual process that enables an individual to guide his/her self behavior according to goal-directed activities over time and cross changing circumstances. Therefore, self regulation that comes from high degree of self interest upon a task is a desirable knowledge, skill and abilities for virtual team members. It would be very beneficial if members of virtual team are person with high effective learners. High degree of task interest would lead to self-regulated persons. This is a challenge for team manager on how to select team members based on their degree of task interest. It is widely argue that virtual team members should finish task in finite time. Members with high self regulation will more be able to accomplish task demands. The conceptual framework of partner selection for digital collaboration in Fig. 2 below.

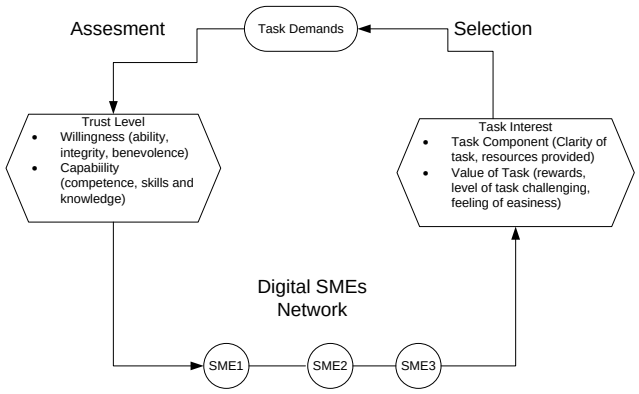


Fig. 2. Trust level and task interest based approach for virtual team team members selection

### *D. Member Selection of Virtual Collaboration*

In the existing literature, there are many discussions about selection design for cross-functional and cross-departmental teams. Individual performance and collaborative performance amongst members is often used as a basis for the selection of team members [3, 4]. Moreover, Wi et.al [4] argue that the selection of partners in a virtual organization will influence mutual trust, knowledge sharing and performance. In their study, they propose a method of partner selection for creating a team-oriented virtual organization. Knowledge and collaboration are used as criteria to find a mutual partner to complete a research team task as ordered. Knowledge requirements of a partner candidate is measured by the level know-what, know-how and know-who. Social network analysis by measuring centrality, density and closeness centrality is used to measure the degree of collaboration capability of partner.

Managing and improving partner selection will improve compatibility among organizations in virtual enterprises [5]. Their research develops a model for partner selection for an agile virtual enterprise. An analytical network process that considers both intra- and inter-organizational capabilities is used as a basis for selection of partners. Agility performance metrics such as time, cost, robustness and scope of task should be met by the candidate in order to qualify as a partner. Moreover, potential partners also need to be assessed in regard to their compatibility with other partners. This compatibility is measured by trust and speed of formation. However, they do not explain how to evaluate trust and speed of formation of each partner candidate.

Furthermore, Hertell *et al* [11] develop and validate a web-based selection tool for members of distributed teams. This research expands a conceptual competency that distinguishes KSAs (Knowledge, skill and abilities) regarding task-work, teamwork and tele-cooperation as factors to consider when selecting and placing members in virtual teams. The first two factors (task-work and teamwork) are derived from conventional team member performance while the last factor, tele-cooperation is considered as the nature of a virtual team. This model disregards trust as a selection criterion for virtual team forming. However, the level of knowledge, skill and ability to execute tasks are components of cognitive-based trust. Therefore, trustworthiness is suggested as a basis for virtual distributed team member selection. Regarding the role of trust in the establishment of virtual networking team, Zhang and Zhu [12] discuss significant variables that relate to the high work performance of virtual teams. The four basis team processes which are virtuality and communication, personnel selection, trust and motivation are the key inputs in the development and formation of virtual teams. Hence, this research suggests that trust should be used in personnel selection of virtual team members.

One research that presents a trust-based approach to selecting virtual team members was undertaken by [12]. They propose a model that explores the dynamic properties of a trustworthy index. However, they validate this model only in partner selection for the virtual enterprises. A replication of this model for selecting members for a virtual team team is questionable. A trustworthiness index is measured by these factors: ability, incentive and persistence for secure collaboration within an organization in creating virtual enterprises. There is need for discussion of a mechanism for member selection for cross-organizational teams where members are sourced from an open professional network. A virtual professional network as an open market for team member candidates can be seen as an open source of candidates. Because in a virtual team, member candidates come from diverse worlds, cultural backgrounds and capabilities, a company must be careful when choosing members for its team team work. In online environments, one can find many experts who advertise themselves or are representatives for their professional virtual organizations. Given this situation, it is hoped that an organization can benefit by hiring virtual experts from a virtual professional

network to undertake and complete a specific, short-term task. We argue that the method of selecting team member for virtual temporary teams would be different compared with selecting members for a traditional team whose members may come from the same company or organization. Therefore, it is easier for them to understand each other personally as they are already know and engaged in the organization's culture and values.

Moreover, for team manager as a task giver, how to form collocated team work inclusive member selection is not regarding many factors comparing with virtual team forming. Consequently, in this research, we propose a trust-based approach as a selection mechanism in global virtual teams. Furthermore, this approach may also provide the practical management model as a method to help a company select team members from virtual professional networks. It purposes to help establish a shared identity, value, culture, trust, and knowledge sharing among team members. Share identity, trust and knowledge sharing as social capital in organization are believed to strengthen the economic competitiveness of a virtual team.

### *E. The Importance of Trust in Virtual Collaboration*

Trust is said to be one agent's expectation of the other agent's competence, goodwill and behavior [19]. However, this definition ignores the temporal and context-specific nature of trust. Chang *et.al* [20] proposed a definition of trust which takes into account its temporal dimension. They define trust as 'the belief the trusting agent has in the trusted agent's willingness and capability to deliver a mutually agreed service in a given context and in a given time slot, as expected by the trusting agent'. In a virtual collaboration team, members are working within a given context, which is the task team and the expected duration of the work relationship is stated from the outset. Therefore, each member will have an expectation of the trust level of other members based on a specific task and within a given time. Furthermore, Chang et. al [20] state 'in a virtual environments, a trust relationship is established between two parties who normally have never met or may never meet and where communication takes place through a virtual interaction medium'. Hence, trust is vital for the valuable operation and accomplishment of the virtual team because it substitute two critical and significant factors that exist in most traditional forms of team but are absent in virtual form, hierarchical control and legal framework of regulation [21].

Virtual collaboration team is characterized by an environment where face-to-face communication is simply not possible due to the cost of travel. Members interact through the use of technology-mediated communication. Trust is maintained and sustained by the ability of members to communicate with each other. Effective communication, together with adequate ICT resources and effective communication behaviors between humans, is one way to create and maintain trust in a virtual relationship. Some authors such as [22], [23], point out that the execution of communication in virtual environments correlates with social and technological aspects. The Social Dimension refers to the personal interest of humans that will sustain communication between members of virtual team. The Service Dimension involves continuity and conduction of communication within the frame of behavior actions and in the knowledge and information sharing in order to accomplish task and goals.

Moreover, virtual collaboration teams are converting the individual skills, knowledge and capability into mutually dependent work in a short period of time while using communication technologies to coordinate their work. Members of a virtual team may have had no previous history of collaborating together and slight hope of working and collaborating together again in the future. As a result, a collaboration team must occupied quickly to finish a common goal; members must act swiftly and need to perform according to the norms continuously and keep in consistent to maintain expectations of trust [24]. Hence, some authors explore the communication behaviors to develop and maintain trust throughout the life cycle of a virtual team. A study by [23] divided the communication behaviors and member actions that facilitate trust early and later in the group's life. Social communication such as communication of enthusiasm to build trust is needed early in the life of the group. While later, positive leadership, predictable communications, substantial and timely response to crises are form of communication behavior that maintain the trust level. Additionally, [25] propose steps that should be taken by managers and team leaders at each stage of the virtual team's life cycle to help members develop and sustain trust through to the successful completion of the team. They divide the virtual team's life cycle into five stages: establishment of the team, inception, organization, transition and accomplishing the service. In the first stage, choosing members, training and a clear reward structure is needed to build dispositional trust. Hence, forming team by selecting members is an initial important step to guarantee the establishment of trust and the successful completion of the collaboration task.

Members of a virtual collaboration team might come from different organizations or companies across the world. This type of team is temporary and team-based. Many discussions in the existing literature regard virtual team as members or co-workers of an organization who are working separately and are geographically dispersed. They are working together to finish their organizational task. There is still a team leader in that type of team. However, for the pure virtual team that we propose, there is no formal leader or team manager. Members form a team and work virtually based on their interest in the task that has been ordered by a certain company as task requester. The company's challenge is how to create this type of team team, especially on how to select team members from many virtual organizations or virtual professional networks. Therefore, the existing problem is how to design approaches which make it possible to create and continuously improve the performance of virtual teamwork through a method for selecting members who trust each other, are highly motivated, and can accomplish the set of tasks.

One of the many benefits by creating a pure virtual team team is the opportunity for an organization to access talent across the world. Some studies show that a virtual team has many advantages over the traditional team [26], [27]. Temporary virtual teams make it possible to enhance companies' worldwide markets. It gives access to new markets of people from any geographical location with the best knowledge, talent and skills. Furthermore, temporary virtual teams bring diverse perspectives to a task. Research

indicates that diversity is advantageous since it may create positive conflict. New ideas and perspectives arising as a result of positive conflicts between members often lead to increased innovation.

One of these efforts is the phase of team forming. In the development of a team, team forming occurs in the first stage. In order to derive maximum benefit from creating and having an effective global virtual team team, a thoughtful and deliberate approach to member selection based on certain criteria is required. It is also to lowering cost of time and budget [1]. Lurey and Raisinghani [2] proved that selection procedure influence the effectiveness of virtual team inclusive its performance and satisfaction level amongst members. The selection procedure as an internal group dynamics is a significant factor in the design process of a virtual team. If the selection process is done correctly and precisely, however, the creation of global virtual team teams can deliver even greater benefits than can traditional teams.

### *F. Social Movements and Degree of Task Interest*

Virtual collaboration team is usually formed to finish for the specific form of task. They are formed with focus on specific team to disseminate and collaborate for preparing task team deliverables and break up until the next reassignment for other task [28]. With this situation, task requirements and recognition has made member tied together in high motivation to finish its task team [8]. However, in the old style of virtual collaboration team, the task is assigned by management, and team members are forced to engage with other members in order to finish this task. Therefore, they sometimes failed to establish social capital such as trust that is essential in a virtual team. In order to overcome this situation, we argue that the new form of virtual team team should refer to 'virtual communities of interest'. In the most form, these virtual members are not only engaged in work related, but also interest centered and tied.

The phenomenon of internet-based social movements as the kind of the drove of such support in virtual community is based on the degree of task interest. Social movements are logical and rational response of people toward new opportunity to satisfy individual self interest [27]. Virtual community is described as a collective of agents or business partners who interact based on a shared interest with certain degree. Their relations and communication are mostly relied on the advance of communication technology and directed by some frame of norms [28]. People who joins in these virtual communities are freely and voluntarily able to engage based on their degree of task interest. Task interest is widely studied in the motivation and emotion literatures [13]. It is defined as a 'self or personal interest', a 'comparatively continuing inclination for certain topics, subject areas, or activities' [13]. Hence, the degree of task interest can be seen include both feelings as well as perceptions of value or relevance of the task set. Individuals who have a higher degree of task interest are more likely to have higher cognitive functioning, persistence and affective involvement. Horvath *et.al* [13] argues that it will enable individuals to focus better on the task. Individuals with higher attention on a task will perceive the task team as being easier to finish than will those with lower attention on the task.

Therefore, in order to support an effort to find suitable members for virtual team teams we expect a higher degree of task interest to be related to the effectiveness of team performance. As a task is requested and advertised in virtual environments, the movement of members' candidates is most likely based on their task interest. A measurement of the interest in the task requirements, level of challenge of the task and the perception of the ease of the task can be used to analyze the degree of task interest. [15] have developed a scale in their research to measure the degree of task interest of students in some course material. Students who have a higher degree of task interest performed better than did those students with perceived low interest in the course material and class environment.

Moreover, we argue that virtual experts are people with a high indication of being effective learners as they advertise in virtual environments on behalf of themselves or as representatives of their companies. Recent literatures suggest that effective learners are self-regulating agents. Self-regulated learners actively analyze tasks that are presented to them, independently select strategies to achieve their objectives and are able to monitor their progress in relation to task criteria [13]. These are referred to as individual proactivity skills. Proactivity skills in the context of virtual teams may include a capability to identify required behaviors, seeking and implementing relevant information, taking the initiative in contacting and communicating with other members, being capable of managing time with regard to the different pace of team mates, and focusing on the task without direct managerial intervention [14]. These skills are closely related to self-regulation. We defined self-regulation for virtual team members as a personal individual process that enables an individual to guide his/her own behavior according to goal-directed activities over time and across changing circumstances. The relationship of these factors is described in Figure 3 below.

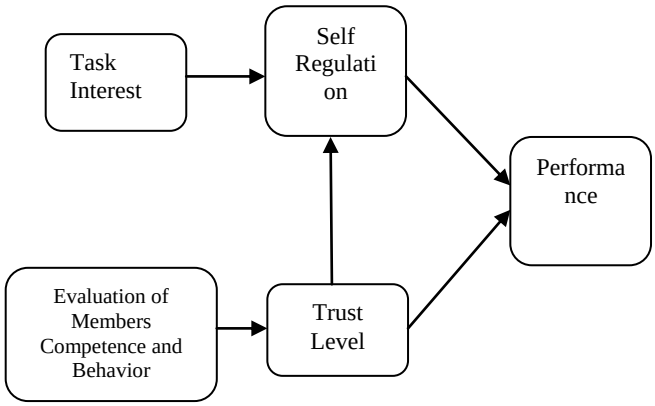


Fig. 3. Antecedents of virtual communities performance

Bigley *et.al* [29] proposed a framework that describes relationship between personal evaluation about others and self-regulation. Self evaluation is defined as an evaluation of positive or negative behavior of others. If individual perceived positive evaluation toward others, they will implement approach self-regulation. However, if somebody hold a negative evaluation toward others, they will execute avoidance self regulation. Based on this research, we argue that evaluating other people's behavior is similar with evaluation of trust level. When we hold positive evaluation, it

means we have a positive level of trust. In the other hand, if we perceived a negative evaluation towards others, we hold a negative level of trust. Moreover, [29] divided trust to trust vulnerability ($T_v$) and trust confidence ($T_c$). They argued that $Trust_v$ and $Trust_c$ are likely carrying distinct self regulatory effect. Trust vulnerability negatively and uniquely associated with avoidance behavior. It means trusting agent who perceived trusted agent is high Trustv will perceive that this trusted agent are willingly vulnerable to help their partner in relationship. Therefore, they will reduce the avoidance behavior to this trusted agent. On the other hand, $Trust_c$ is positively and uniquely associated with approach behavior. Trusting agent who assigns high $Trust_c$ to trusted agent will has a view that trusted agent is a resources to accomplishment at work [29]. Hence, this trusting agent will executes approach self regulation toward trusted agent as a hope that trusted agent will be helpful to finish task.

As discussed above, high degree of task interest would lead to self-regulated persons. Persons who have a high interest toward task will explore their efforts and capable to self manage their resources. Self regulation that comes from high degree of self interest upon a task is a desirable knowledge, skill and abilities for virtual team members. It would be very beneficial if members of virtual team were highly effective learners. The challenge for a team manager is how to select team members based on their degree of task interest. It is widely argue that virtual team members should finish task in finite time. Members with high self-regulation will more be able to accomplish task demands. Therefore, we argue that task interest and trust level will co-jointly form a self-regulation tactic which is important to perform effectively in virtual collaboration team .

## III. The Proposed Framework

This section presents a conceptual model of virtual team member selection. A detail about candidates' properties, strategies to find other members who are most trustworthy, and has a high task interest is proposed. The conceptual framework is presented in figure 4 below.

Firstly, a task giver company through a team manager or broker company describing and offering a set of tasks or detail of collaboration work in virtual environments. Such media like company's web, wiki or online advertisement can be used to announce this team and seek professional experts who are willing and able to finish task that requested. The asking professional experts or members candidates incur their task willingness for every task request. The movement of candidate to become a member of open virtual collaboration network is assumed based on their task interest. They will asses some task component such as the clarity of task and resource that provided by task requester to finish this task. Further, they also incur to calculate the value of task. Value of task such as reward provided, the level of task challenging and their feeling about easiness of task become some key criterion whether the task is interesting or not. Secondly, a collective of professional experts who interest with this task team will apply to become team members. In some cases, team managers can ask member candidates to form their initial team alternative. It means they can apply as a collective of agents with form of team candidate. To achieve this, in open virtual collaboration, a candidate must find, with a few attempts as possible, another candidate that has mutual trust. An initial level of trust between candidates may relate with their task interest with an assigned task. Some studies argued that a high degree of task interest lead to high performance [30].

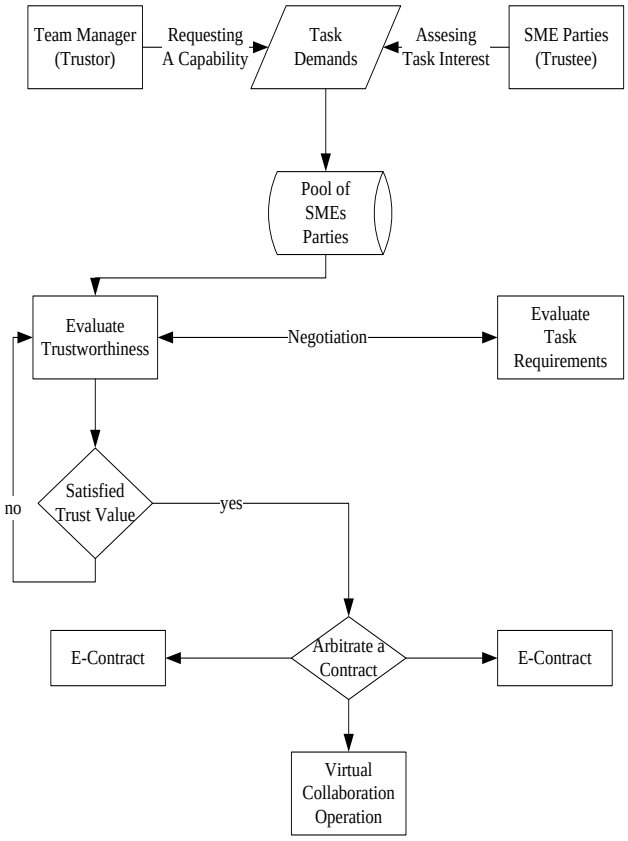


Fig. 4. An active member selection in virtual environments

Therefore, in generating the ordered list of team member candidates that vulnerable to help, each candidate may consider past interactions and the current task. This list of candidates, arranged based on perceived likelihood to task interest, can be viewed as an ordered ranking of which members candidates are most trustworthy. Trust can be defined as "the subjective probability by which an individual expects that another individual will perform a given action on which its welfare depends" [25]. Using this definition, the act of asking other experts can be seen as a trust decision. In open community, a candidate incurs a cost when asking another candidate for help, and this cost is only worth expending if the asking candidate believes that the other party will respond positively. Should the trustee refuse to work on this task, because they are incapable or unwilling, the trustier suffers a loss and must ask the next candidate in the ordered list. The trust decision mechanism, and hence the order in which candidates are asked, is instrumental in determining task interest. Further, the performance of global virtual collaboration team depends on how well they are able to learn effective trust policies to finish task. Finally, candidates may apply as team alternatives by which members trust each other with high degree of self task interest.

On the other hand, team manager will assess his initial

level of trust toward these candidates. It is based on the willingness and capability of these team members to finish task that ordered. In virtual environments, willingness and capability is a part of cognitive trust. Cognitive trust or competence trust focuses on assessment perceived of others' competence and ability to finish a task. Some questions such as can trusted party finish a task? Will the task performance be on high quality? Will the task be finished on time? comprise cognitive based trust. The more robustly trusting party believes the answers to these types of questions are affirmative, the higher levels of his cognitive trust to trusted party [31]. As the type of trust in virtual collaboration team needs to build quickly, team manager needs to consider this level of trust in initially, especially in member's selection. There are two ways to assess an initial level of trust, direct source and indirect source. In initially, trust is gain or build through reputation and then through repeated experience. McKnight [32] argue that history transaction, reputation, bids and organizational structures are attributes that associated with the trustee trustworthiness. History of transaction as direct source of trust can be seen as previous experience of team managers in working with some candidates. Reputation as an aggregate opinion provided by other parties can be seen as indirect source of trust. A team manager may ask the reputation of candidates or team alternative to independent third party about their capability in working virtually. Such capabilities like strategies in coping conflict, working collaboratively with cross culture background

We propose two additional bases for selecting members of virtual team which is the level trust between candidates and team manager, and degree of task interest among members toward the value of task team. The degree of task interest criterion is a baseline where a candidate decides randomly to join in a networking collaboration team regarding their level or degree of task interest. Candidates will model other candidates' goal oriented behavior for each task type based on previous interactions with those candidates. For a given task, the task requester or task giver uses this model to predict the likelihood of the other members helping to finish that specific task. The second criterion is trust basis; team manager orders other candidates by the frequency of accepted task requests by these candidates in the past and its past performance in finish the same task.

## IV. 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 20$^{th}$ 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.

Moreover, managing the performance of a virtual collaboration team is not a straightforward task. The absence of a formal leader and regular face-to-face meetings between members makes the type of task and its deliverability fundamentally different from that of a traditional team. This paper has discussed the potential benefits, barriers and skill/competence needed to create a virtual collaboration team. Based on those discussions, a mechanisms framework for member selection of virtual collaboration teams has been proposed and presented. The framework model presented in this article is at the conceptual level, so further research needs to be carried out in order to formalize, test and implement the model. Moreover, future works also need to propose and validate the measurement of self-regulation of candidate members in virtual environments. In special cases, the measurement of the degree of task interest can be adopted from the existing research about task fulfillment in a co-located context.

This paper focuses on enabling virtual collaboration team members to learn to form trusting, cooperative relationships with other members in virtual environments by designing a framework for use when selecting team members. It addressed the problem of quickly identifying candidates based on specific task attributes. Asking for help can be time-consuming and costly, so team members must approach possible partners based on the likelihood of their being able and willing to help with a given task. It is a new idea to consider the initial trust between candidates for member selection of a virtual team. It will also help to build and maintain trust level that is essential for virtual, short-term work. Further research need to the deployment of the proposed conceptual framework for team member selection for validation purposes in a real world environment.

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