Advances in Intelligent Systems and Computing 1194

Leonard Barolli
Aneta Poniszewska-Maranda
Tomoya Enokido *Editors*

Complex, Intelligent and Software Intensive Systems

Proceedings of the 14th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2020)

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Editors

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Welcome Message of CISIS-2020 International Conference Organizers

Welcome to the 14th International Conference on Complex, Intelligent and Software Intensive Systems (CISIS-2020), which will be held from July 1st to July 3rd, 2020, at Lodz University of Technology, Poland, in conjunction with the 14th International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS-2020).

The aim of the conference is to deliver a platform of scientific interaction between the three interwoven challenging areas of research and development of future ICT-enabled applications: software-intensive systems, complex systems and intelligent Systems.

Software-intensive systems are systems, which heavily interact with other systems, sensors, actuators, devices, other software systems and users. More and more domains are involved with software-intensive systems, e.g., automotive, telecommunication systems, embedded systems in general, industrial automation systems and business applications. Moreover, the outcome of web services delivers a new platform for enabling software intensive systems. The conference is thus focused on tools, practically relevant and theoretical foundations for engineering software-intensive systems.

Complex systems research is focused on the overall understanding of systems rather than its components. Complex systems are very much characterized by the changing environments in which they act by their multiple internal and external interactions. They evolve and adapt through internal and external dynamic interactions.

The development of intelligent systems and agents, which is each time more characterized by the use of ontologies and their logical foundations, builds a fruitful impulse for both software-intensive systems and complex systems. Recent research in the field of intelligent systems, robotics, neuroscience, artificial intelligence and cognitive sciences is very important factor for the future development and innovation of software-intensive and complex systems.

The CISIS-2020 is aiming at delivering a forum for in-depth scientific discussions among the three communities. The papers included in the proceedings cover all aspects of theory, design and application of complex systems, intelligent systems and software-intensive systems.

We are very proud and honored to have two distinguished keynote talks by Prof. Beniamino Di Martino, University of Campania "Luigi Vanvitelli," Italy, and Prof. Chiba Institute of Technology, Japan, who will present their recent work and will give new insights and ideas to the conference participants.

The organization of an International Conference requires the support and help of many people. A lot of people have helped and worked hard to produce a successful CISIS-2020 technical program and conference proceedings. First, we would like to thank all the authors for submitting their papers, the Program Committee Members, and the reviewers who carried out the most difficult work by carefully evaluating the submitted papers. We are grateful to Honorary Co-chairs Prof. Makoto Takizawa, Hosei University, Japan, and Prof. Sławomir Wiak, Lodz University of Technology, Poland, for their guidance and advices.

Finally, we would like to thank Web Administrator Co-chairs and Local Arrangement Co-chairs for their excellent and timely work.

We hope you will enjoy the conference and have a great time in Lodz, Poland.

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CISIS-2020 Keynote Talks

Semantics, Patterns and Compiler Techniques for Portable App Development in Multiple Cloud and Big Data Platforms

Beniamino Di Martino

University of Campania "Luigi Vanvitelli," Aversa, Italy

Abstract. Cloud vendor lock-in and interoperability gaps arise (among many reasons) when semantics of resources and services, and of application programming interfaces is not shared. The same issue arises with Big Data platforms: different programming, deployment and execution models, many different machine learning libraries and related APIs. Standards and techniques borrowed from SOA and semantic web services areas might help in gaining shared, machine readable description of Cloud and Big Data offerings (resources, services at platform and application level, libraries and their API groundings), thus allowing automatic discovery, matchmaking, and thus selection, brokering, interoperability end composition of Cloud services among multiple Clouds, and seamless programming of analytics on multiple Big Data platforms. This talk will illustrate in particular the outcomes of the EU funded projects mOSAIC (http://www.mosaic-cloud.eu) and TOREADOR (http://www.toreador-project.eu).

Distributed Systems of the Day for Efficient Digital Data Exchange and Sharing: A System Transition from Peer-to-Peer to Cloud-Fog-Edge Computing

Shinji Sugawara

Chiba Institute of Technology, Chiba, Japan

Abstract. With the recent increase of bandwidth for communication networks, the major improvement of computing processors and the spread of cloud computing, the exchanges or sharing of various types and huge amount of data or digital contents has become very active among a great many users on a large-scale network represented by the Internet. For this, various distributed systems have been used so far and major system architecture has been continuously changing according to the functions and purposes required at each time period. In this talk, we describe the historical changes and classifications of distributed systems used for searching, exchanging, storing and sharing data deployed on networks and their respective advantages. We introduce examples of actually implemented systems. Furthermore, we discuss the possibility of future development of distributed systems for data sharing.

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Abstract

This research aimed to analyze the effect of corporate social responsibility (CSR) on firm value and how the normative pressure moderates this relationship. The companies studied included 105 companies listed on the Indonesia Stock Exchange (IDX) in 2016–2018. Researchers determined these samples using purposive sampling. The results of the study showed that CSR has positive impact on firm value. Meanwhile, normative pressure significantly impacts the relationship between CSR and firm value. The implication of this research is the importance of companies paying attention to CSR in increasing firm value and the importance of pressure from independent board in strengthening the effect of CSR on firm value.

Keywords

Corporate social responsibility - Normative pressure - Firm values

A Value Creation Process for Sustainability of Knowledge Based-Society

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Abstract. This study aims to develop a value creation model for knowledge-based society. Knowledge-based society is a society that has knowledge in various fields to produce a sustainable modern society. Knowledge-based society requires a knowledge community that has a unique community of knowledge workers. Some research provide the best way to form a knowledge-based society, however, only few research offer the concept of creating value for society members. Therefore, we need a model to create value that can sustain the community in a knowledgeable society. The specific target to be achieved in this research is to understand the application of value creation concept, so that it gives impact on knowledge-based society. Future research is discussed to validate the proposed model.

Keywords: Value creation · Knowledge-based society · Trust · Collective engagement

1 Introduction

The current era of society 5.0 is characterized by access to information through sophisticated technology and being part of the community in living life. Society 5.0 is based on the Industry 4.0 paradigm where technology becomes very important to create a society that has sustainable, passionate and worth defending knowledge [1]. The formation of knowledge can determine the capacity to empower and activate human capabilities. Community life is dominated by change so knowledge becomes very important to shape community-based knowledge.

Knowledge-based society refers to the type of society needed to compete and succeed in changing the economic and political dynamics of the modern world. It refers to a good and educated society so that the knowledge is useful to encourage innovation, entrepreneurship and the economic dynamics of the community [2]. This is inseparable from the ease of information technology and the ease of communication for sharing knowledge between one another. One effort to form a knowledge-based society can be achieved through knowledge sharing in a community where there are members of various

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professions to increase knowledge between one another. Knowledge in a society is a new way of organizing work and managing the world that demands the development of sustainable competence [3]. In a community, the formation and equality of values between members become the main thing to create a common goal. Value formation describes a way of behaving, interacting, sharing experiences based on social construction in a community [4].

Value co-creation in an economic context refers to the creation of customer use value where joint creation is a function of interaction [5]. Value co-creation is an interactive, creative and social process between stakeholders initiated by organizations at various stages of the value creation process [6]. In the context of community-based knowledge, communities standing within the community can help realize a process of creating value to gain knowledge. Value formation is a process that provides opportunities for ongoing interactions, which the organization is willing to share.

Most of the research on shared value creation is carried out with business to consumers, or consumers to a business perspective [3]. There are no studies that discuss the process of value formation in a community that aims to increase knowledge among members in it. This research is conceptual research that will discuss how the process of forming the value of community members with various professions who are members of a community to obtain new knowledge to create a life that is empowered and sustainable.

2 Literature Review

2.1 Knowledge Based Society (KBS)

The creation and development of a knowledge-based society are considered to be one of the most important priorities of modern society and its priority is the development of lifestyles, as well as social, economic, political, scientific and technological progress. The creation and development of knowledge-based societies knowledge are valued as the most important assumption and the main way to solve most social, economic, technological, even security and defense problems throughout the world as well as in various countries or regions in the world [6–10]. The creation of a knowledge-based society reflects the essential qualities of change in all areas of social, economic, political life, science and technology progress, and interaction with nature. This greatly affects the process of globalization and the situation in the modern world [11].

Knowledge-based society has the characteristics of people who are considered relevant for all fields of life - social, economic, political, cultural, scientific and technological and their progress, and the process of improving their lives in accordance with the standards, norms and values of a knowledge-based society. Values become very important for the formation of a community in society to create a compact society and finally they co-exist in their respective lives. The process of creating a KBS is an important priority of a change and current social development. Such communities can changes in the quality of a better lifestyle, able to produce economic knowledge that is beneficial to their respective lives and produce creativity, innovation and ideas in the process of knowledge adaptation [11].

In the social context of society, value creation can be formed from a social identity which provides benefits in improving self-concept in a group or community environment.

Social identity theory holds that part of one's self-concept depends on the importance and relevance placed on group membership that belongs to individuals [12]. This theory suggests that individuals' drive for positive identity and appreciation influences the social comparison they make [13]. Someone who has a high social identity is able to defend their group, protect the status and interests of that group. People will also lead to positive perceptions about groups as well as promote overall positive attitudes about groups. If people have a high level of social identity in a community, it will create a smooth channel of knowledge so that the community provides a lot of education to its members.

2.2 Value Co-creation

Value co-creation is a collaborative activity shared by parties involved in direct interaction, which aims to contribute to the value that appears for one or both parties [14]. Values are formed by social forces, are reproduced in social structures, and can be asymmetrical for the people involved. Value creation in an economic context is more inclined to the creation and delivery of richer experiences to stakeholders as part of a shared process with tangible results. The result of this goal is the achievement of innovation to improve one's performance. In business services, value is often used as an indicator of overall economic intensity knowledge. If this value is raised in a community consisting of various members with a variety of different professions can form a broad and sustainable knowledge. The added value consists of creating, accumulating, and disseminating knowledge to develop a high profile so that it is useful for solving problems that occur in society.

In the business context, existing co-creation theories aim to create value through customer participation in business activities. Value creation in the community environment means that all members of the community must have involvement and participation in various community activities. The experience of community members can enhance value creation and can have an impact on moral formation. The implementation of value creation is knowledge sharing that runs both ways between members so that members of the community are rich in knowledge in facing the changing world today.

Knoblich et al. [15] introduce the concept of how users together create value. There are three basic questions: 1) Who is responsible for creating shared value? 2) What is value, how is it communicated and transferred to the market? and 3) what is the role of the community in the process of creating shared value? In the context of organization and community, people gather in a meeting in one goal to increase their knowledge physically and mentally without any element of profit. The advantage of them joining a community is that they adopt knowledge and share with each other so that their lives will be better. They create a value together to unite and provide benefits to each other so that their knowledge becomes very broad towards a modern, sustainable society.

Organizations actually manage existing relationship portfolios greatly influenced by trust and dedication where shared knowledge provides value and can be created jointly by both parties. The process of value creation is a collaborative process between members so as to create a certain goal. This process can occur when people in a community can interact well. The minimum requirements for co-creation are the intention to create together and the awareness that joint creation is taking place. Furthermore, it can be said that both (all) parties must show intention and awareness. People who join a community

must have the awareness that value creation is very important for the creation of community sustainability. The values that exist in the community are able to form a parallel interaction so that the exchange of knowledge increases. All parties in a community must have the same goal for joint creation in harmony. Value creation can occur when members have the same beliefs, the same goals and identities resulting in community involvement.

Collaborative involvement between members becomes very important to create value. Collaborative involvement is a form of involvement that together creates involvement in social interaction capable of achieving change. Self involvement can be achieved when all people have the same goals, feel comfortable with their community environment and the culture and institutional structure that supports effective stewardship. The activities carried out by the organization have a very high effect on creating value. The activity also provides an opportunity for members to support each other and share experiences. Activities like this can certainly increase their knowledge capacity in a broader context outside their work. The creation and utilization of values in a community has a very large contribution for the creation of a community that provides sustainable benefits in the community.

Value creation can also occur by adopting co-creation as a process of active and creative social partnership between communities. Value co-creation is an activity or process between members and the community so that they can contribute to one another. Members will get the benefits of knowledge and the community will continue to exist because their members collaborate with each other to maintain and revive the community. Furthermore, the result of co-creation is satisfaction, trust and loyalty which can sustain the community in a sustainable manner.

Value creation can be achieved through experience, involvement and collaboration between members and organizations [16]. People with different occupational backgrounds will complement the required knowledge. People who have the same thoughts, goals and culture will form a value that can foster sharing and implementation of knowledge. This fosters a knowledge-based society. The shared values creates new sources of information as knowledge that can be adopted by all community members. To create value, an ongoing dialogue is needed between community members, where both parties are active and involved in the learning process, so they create shared value for both parties. If this interaction allows consumers to create a unique experience together, the organization or community tends to enjoy new competitive advantages, which explains why its value must be made together. That is, value creation is the desired goal of the organization, to help the organization understand the needs of its members. If value can be created, then this effort will support rapid learning because experience among members is an efficient way to create value.

3 Proposed Conceptual Model

Based on the literature review, our proposed conceptual model can be described in Fig. 1. Value creation in knowledge based society can be achieved through a cycle that consists of five concepts which are: trust between members, inter-organizational knowledge sharing, a balance between collaboration and competition (collapetition), and collective engagement.

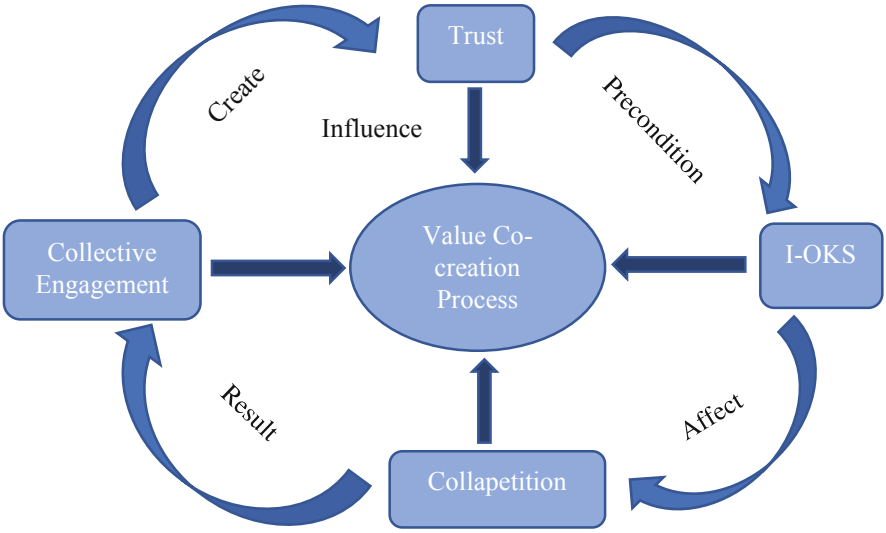

Fig. 1. The value co-creation for knowledge based society: conceptual model

Trust Between Members
Trust is a fundamental factor that can drive success or failure both in physical and virtual business [17]. Trust can be an adhesive between community members. However, trust has an evolutionary phase both in physical and virtual environment [18]. This pattern of trust cycle involves building, maintaining and destroying. Communities based on knowledge can certainly maintain their trust because they have a positive attitude, including providing each other valuable information for the achievement of a sustainable, knowledgeable society. Trust can be raised through active communication and consistent interaction between members, having empathy for proactive behavior so that they can share valuable resources to achieve mutually beneficial goals. This trust can create a value in the community to improve knowledge quality.

Inter-Organizational Knowledge Sharing (I-OKS)
I-OKS is an effort to achieve value creation in knowledge based society. It shows the dynamic nature of sharing knowledge between society members because each member adopts various strategies, such as collaboration, competition, compromise, accommodation and avoidance [19]. Sharing knowledge between community members can create communities that have broad knowledge and can help community sustainability. Society can coordinate knowledge sharing for the benefit of their organizations so as to complement more internally oriented competencies aimed at the transfer, integration and creation of knowledge. Companies involved in sharing knowledge between companies need to develop the ability and routine to understand and handle complex knowledge sharing across their boundaries. Sharing knowledge between members can be achieved such as by collaborative research and development, sharing research information and

understanding coordination between members. If members within a community are willing to share their best knowledge, it will create value so that it supports the community' sustainability.

Collapetition
Collapetition is a combination of collaboration and competition. Collaboration as participation in a meeting and sharing information to identify common solutions for complex tasks [20]. Collapetition means a balance between collaboration and competition in a community, its members work together to make better progress in the community. When collaboration is formed, there is always deliberation, discussion, dialogue, and sometimes passionate communication until understanding, vision, and goals are achieved in mutual understanding. In the other side, competition fosters antisocial attitudes such as the desire to win, position problems, unwillingness to maximize mutual benefits, lying, and hostility. The concept of collapetition balances collaborative behavior and healthy competition such as working together to create value to achieve community goals.

Collective Engagement
Collective engagement is a construction of positive employee attitudes that can collectively express themselves psychologically, cognitively, and emotionally in their work roles [21]. Collective engagement can encourage group member interaction by sharing the behavior of positive elements such as affective attributes, motivation, and that performance attributes can be increased such as collective efficacy and potential for high groups. Collective engagement includes team spirit, is concerned about each other's needs and challenges and feels that they are a complete team. Involvement can identify each individual' goals with community goals, which in the later stages will override their desire to achieve more valuable community goal. Therefore, community' value is enhanced by collective involvement through improved innovation performance. In addition, each member can build involvement based on the intellectuals shared. Community members who have an involvement will increase information and knowledge shared, which can then create an added value. A proactive attitude and responsive and collaborating members are expected to make the community survive and maintain a competitive member.

4 Conclusion and Future Research

Knowledge-based society is a society that has good knowledge in economic, social, technological and political terms that shows modernization and a sustainable society. Creating a knowledge-based society, value creation is the main thing to foster communities to exchange the knowledge. Value creation can be achieved if community members have the intention to improve their quality of life through positive activities that can enhance their knowledge. A five concepts of value creation cycle are: the existence of trust as a prercondition for the formation of inter-organizational knowledge sharing that can have the effect of forming collapetition so as to produce collective engagement. Collective engagement between community members also strongly supports the process of value formation in a community. This engagement includes feeling comfortable

involved in various activities that can support the process of knowledge creation. These values then form a community with members who share knowledge with each other to form a knowledge-based society.

Future research will be aimed to validate the measurement of proposed concepts and test the conceptual models on empirical data using quantitative methods.

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