RISK AND OPPORTUNITIES FOR DEVELOPING COLLECTIVE INTELLIGENCE IN NETWORKED SOCIETY

Aelita Skaržauskienė

Mykolas Romeris University, Lithuania

aelita@mruni.eu

Žaneta Paunksnienė

Mykolas Romeris University, Lithuania

zaneta.paunksniene@mruni.eu

Gintarė Paražinskaitė

Mykolas Romeris University, Lithuania

giparaz@mruni.eu

Agnė Tvaronavičienė

Mykolas Romeris University, Lithuania

a.tvaronaviciene@mruni.eu

Abstract

Purpose – the purpose of this paper is to provide an overview on Collective Intelligence phenomena development influenced by application of social technologies in networked society. We gain to identify the main social, managerial obstacles and opportunities, challenges and risks influencing the emergence of virtual networked structures by considering these networks as being sensors for emergence of collective intelligence.

Design/methodology/approach – the synergy of social technologies and Collective Intelligence development is the subject of scientific discussion in many articles, but the need for systemic empirical research still exists. The paper takes the form of critical theoretical examination

of the relevant literature and divergent thinking. It begins by exploring social technologies prevalence and establishing its potential in modern society. Next, it explores Collective Intelligence phenomena with concluding discussion on potential risks and opportunities by applying social technologies for Collective Intelligence development.

Findings – the research will identify and analyse what are the conditions that lead society and communities to become more collectively intelligent. Social technologies are becoming the preferred mode of communication of new generation, new technologies prevail in government and business communication, generating collective ideas is one of the methods in technologically related communities to create collective knowledge, solve problems and initiate innovations. In spite some risk related to control and diversity as well as legal issues, use of Collective Intelligence could potentially benefit society in a wide variety of domains.

Practical implications – better understanding of theoretical assumptions could influence more reasonable application of social technologies in practise.

Originality/Value – this paper presents useful conceptual and holistic understanding of risk and opportunities by developing Collective Intelligence on the basis of social technologies.

Keywords: collective intelligence, social technologies, networked society

Research type: conceptual paper

Introduction

Castells (2005) argues, "nowadays wealth, power, and knowledge generation are largely dependent on the ability to organize society to reap the benefits of the new technological system, rooted in computing and digital communication". As author defines "networked society is a social structure operated by information and communication technologies based in digital computer networks that generate, process, and distribute information on the basis of the knowledge accumulated in the nodes[27] of the networks or formal structures, systems of interconnected nodes" (Castells, 2005). Today, more than 80 percent of the world's online population (which is about 2.1 billion people) is interacting via social networks on a regular basis (McKinsey, 2012) and according to Google Executive Chairman Eric Schmidt's (2013) "everybody in the world will be on

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[27] Nodes are the points where the curve intersects itself (Castells, 2005). Node in social networking is defined as network element capable of a connection and could consist of a web page, a text segment, an image, or anything that can be represented in digital form (Griggs, Wild, 2013).

the Internet within seven years". Networked society noticeable transforms in terms of sociability. According to Castells (2005) trends observed that face-to-face interaction is not fading away or there is no increasing isolation of people in front of their computers. In most instances Internet users are more social, have more friends and contacts, and are more socially and politically active than non-users. Similarly, new forms of wireless communication (e.g. mobile phone) substantially increase sociability, particularly for the younger people. The networked society is a hyper social society. Communication in the Internet by means of Web 2.0[28] and social media tools emerge new form of collaboration, group knowledge, on-line Collective Intelligence (Salminen, 2012), social networking (Gunawardena et al., 2005). Thus pointing this hyper communication in the effective and productive direction leads to new form of knowledge, humanity intelligence growth, smart and inclusive society, which is one of the conditions for democracy promotion, economical development and competitiveness strengthening. Hence, the purpose of this paper is to provide an overview on Collective Intelligence phenomena development influenced by application of social technologies in networked society.

Salminen (2012) states that for Collective Intelligence development by application of social technologies huge expectations are set. Scientific society argues that in general human group manifest higher capabilities of information-processing and problem solving than an individual (Heylighen, 2002; Luo et al., 2009). Intelligence in groups manifest when each group member evaluates the overall situation and acts accordingly to achieve the overall goal (Leimester, 2010). Although some research materials on conceptualizing Collective Intelligence are already published (e.g. Luo et al. 2009; Malone et al. 2010) there is no single theory capable to explain how the Collective Intelligence works, there is diversity in concept definitions (e.g. "global brain", "team intelligence", "collective mind", "organizational learning", etc.) and there different abstraction levels in the discussion about the phenomenon (Salminen, 2012). Due to lack of a common framework it is difficult to assess what is already known. However each attempt to systemize knowledge and conceptualize phenomenon leads to promising future of the Collective Intelligence purposeful application and effective employment in society life.

Main issue for the study of Collective Intelligence is to clarify the essence of discourse. All the types of human groups can be regarded as a source of Collective Intelligence. However they can critically differ from each other in their size, structure, way of communication, etc. Luo et al. (2012) discuss between different levels of Collective Intelligence: team level, business level, global

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[28] "Web 2.0 is an amorphous term used to define a computing paradigm that uses the Web as the application platform and facilitates collaboration and information sharing between users" (Gregg, 2010).

level and community level, which scientist position in between above mentioned levels. Community, according to authors, "refers to any human group in which the members have some common characteristics, share same interests or views" (Luo et al., 2012) as well as gain the same goal or have similar purposes. Though this kind of communities existed long the way, nowadays online communities are playing increasingly important role in networked society. This article aims to provide discussion on synergy of social technologies and Collective Intelligence. It begins by exploring social technologies prevalence and establishing its potential in modern society. Next, it explores Collective Intelligence phenomena with concluding discussion on potential risks and opportunities by applying social technologies for Collective Intelligence development.

Criteria for Collective Intelligence identification

In this part of the article we aim to discuss criteria for Collective Intelligence definition In recent years, there has been a surge of research activity about Collective Intelligence, especially in the context of new digital collaborations and communication channels, and vast of various definitions have been proposed for phenomenon characterization. Generally concept 'intelligence" refers to the ability to learn, understand, act purposeful and to adopt and effectively deal with environment by using own knowledge (Leimester, 2010). Collective-level intelligence emerges from in-group knowledge exchange activities such as collaborative learning and problem solving processes, which takes the form of opinion and expertise exchange (Luo et al., 2012). Scholars define Collective Intelligence in various ways – "the distributed knowledge and expertise of individuals located inside and outside the formal boundaries of the enterprise, group, community" (Lesser et al., 2012), "the capacity for information processing, efficiency with which group is able to solve problems, quality and timing of group decision-making" (Goyal, Akhilesh, 2007), "a matter of building scenarios around a problem-solving situation" (Boder, 2006). Applying structural approach, Collective Intelligence (Figure 1) can be conceptualized as knowledge network created by web-mediated (social technologies) interaction amongst individuals with personal knowledge (Luo et al., 2012).

Massachusetts Institute of Technology, one of the most reputed academic institutions of USA has established a center called the "MIT Center for Collective Intelligence" for understanding and taking advantage of the phenomenon of Collective intelligence. Working team from this institute proposed conceptual framework of Collective Intelligence system where main structure

elements are Staffing (Who is performing the task?), Incentives (Why are they doing it?), Goal (What is being accomplished?) and Structure/Process (How is it being done?) (Malone et al, 2010). Staffing refers to characterization of the group that is involved in Collective Intelligence emergence; mainly about it's structure and relationship between structure elements. They distinguish to types of groups: crowd, where anyone in the large group can take activities, without being assigned by someone in a position of authority; and the hierarchy, group of individuals where someone in authority assigns for other participants to perform the task. Closely related to Staffing element is Incentive. This element also characterizes group or individual in the group motivation. Authors (Malone et al, 2010) argue that money, love and glory lead people to participate in Collective Intelligence system. Other two elements – Goal and Structure/Process are related to process/activity characterization. Malone et al (2010) distinguish two main goals for which Collective Intelligence are aiming: create, when system generates something new, and decide, where participants evaluate and select alternatives. At the same time these activities differ according to dependencies between their contributions. While creating this, participant can be involved in collecting separate ideas or collaborative contributions to create something. In the decision making important aspect is whether group member evaluate and select alternatives individually or they make group decision by voting, consensus or averaging.
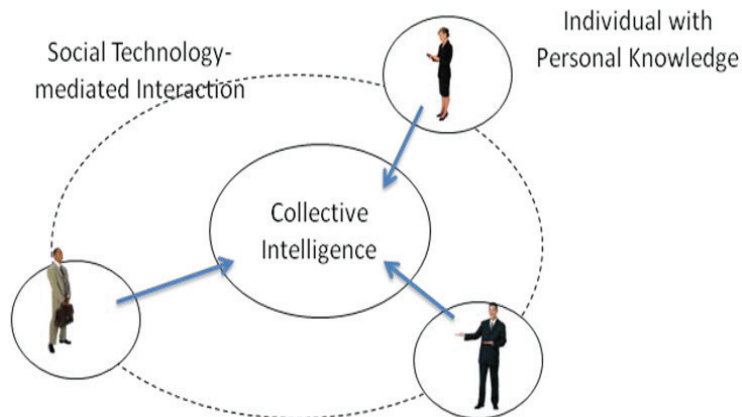

Figure 1. Structure of Collective Intelligence emergence

Different way of analyzing and identifying Collective Intelligence in group, organization or community presented in Goyal, Akhilesh (2007) study. Authors proposed model of work team's innovativeness, where factors that enhance overall group ability to act effectively are presented.

Overall group ability reveals itself in social capital, emotional and cognitive intelligence of the group. According to Goyal, Akhilesh (2007) group size, leader's behavior, group cohesion, group history, control mechanism, heterogeneity of the members, group norms, shared vision, commitment to team goal, organizational culture, specific task at hand, individual members' capabilities impact overall ability of the group. As the authors haven't distinguished which factor impact social capital[29], emotional and cognitive intelligence, we suppose that all of them are related to each category of the group abilities (social capital, emotional and cognitive intelligence). And at the same time these factors can be treated as criteria for Collective Intelligence identification. One of them as group size, leader's behavior (in hierarchy-specific groups), group cohesion, group history, individual members' capabilities, heterogeneity of the members, shared vision, are related to individual and group characteristics. At the same time control mechanism, group norms, commitment to team goal, organizational culture, specific task at hand, refer to process/activity characterization.

Analyzing various authors proposed frameworks, we conclude that all characteristics can be divided into two groups: individuals or group characteristics and process/ activity characteristics (Table 1).

According to Boder (2006) Collective Intelligence emergence is composed of three building blocks: competencies development, goal development, and mechanics development. Each block draws from pre-existing knowledge and is developed in order to achieve Collective Intelligence. The first one is the developments of the competencies that draw from the domain-specific knowledge of the company. The guideline here is to achieve complementary competencies. The second one is the development of a common representation of the goals that draw from strategic market knowledge. The guideline is to integrate the various conceptions people have about how to reach a goal into a coherent direction. The third building block is the development and alignment of processes into mechanics of interactions between entities involved in Collective Intelligence development that draws from the company's culture and its formal and informal norms. "The guideline here is trust and respect. Analyzing proposed model inferences could be made that competencies are related to the group or individual characteristics as it refers to pre-existing domain-specific knowledge of the group and it's member and goals and mechanics correspond to process/activity characterization, as they both represent what goals and how they

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[29] "Social capital – individual's ability to interact, their potential to interact with those around them, as relative, friends, co-workers, and also with those who are distant and may be accessed remotely. Social capital means ability of individuals to produce their own networks, their personal communities" (de Costa, 2006)

are being achieved", as Malone et al. (2010) Goals and Structure/Process elements of Collective Intelligence system.

Table 1. Criteria for Collective Intelligence identification (developed by authors)

	Criteria for Collective Intelligence identification				
	Boder (2006)	*Malone et al. (2010)*		*Goyal, Akhilesh (2007)*	
Group and individuals characteristics	Competencies drawn from preexisting organizations's domain specific knowledge	Who?	Hierarhy	Group Size, Group Cohesion, Group History, Group Norms	Leaders' behavior
			Crowd		
		Why?	Money	Shared Vision, Individual Member' Capabilities, Heterogenity of Members	
			Love		
			Glory		
Process/activity characteristics	Goals drawn from strategic market knowledge	Decide - How?	Group decision (Voting/Consensus/Averaging/Prediction Markets)	Control Mechanism, Commitment to the Goal, Specific Task	
			Individual decision (Markets/Social Networks)		
	Mechanics impacted by cultural norms	Create - How?	Collection (Contest)		
			Collaboration		

Opportunities for Collective Intelligence development

As already mentioned, Collective Intelligence is the general ability of a group to perform a wide variety of tasks and activities. This behavior, which Preece and Shneiderman (2009) called

Technology-Mediated Social Participation, "shows the ability of masses to achieve common goals through participation and collaboration on Web – goals that no single individual or organization could achieve alone" (Woolley et al., 2010; Leimester, 2010). The main challenge is to understand how and where to employ countless amount of knowledge or experience of the whole networked society, or just one organizational network, or virtually communicating community. Through theoretical analysis, we could define activities and fields where Collective Intelligence can be successfully developed.

Activity that usually associated with Collective Intelligence is a **new idea generation**. Lesser et al. (2012) states that discovering and sharing new ideas enables create value using the experiences and insights of numbers of people around the world, identify new opportunities to differentiate organization or serve new markets, solicit new ideas for products, service offerings, cost savings, business / public process or model innovations. Following some different approaches of idea creation by means of collective group communication are presented:

• Community members can provide their ideas or products of creativity in form of *collection creation* (e.g. Flickr), when items contributed by members of the crowd are created independently of each other (Malone et al., 2010).

• In idea generation activities approach of *contest and challenge* can be used. This is an approach where members of crowd compete to provide a winning solution. Sometimes it can be financially awarded.

• Another way of generating ideas is *virtual ideation and dialogue*, processes by which individuals come together in a virtual environment discuss and share insights on specific topics. Communities of practice are example of employment of this approach. Communities bring together individuals with a common interest, craft or profession to develop and share knowledge, best practices. These kind of collaborative platforms enable social networking; fostering open dialogues and facilitates virtual communication between community members (Lesser et al., 2012).

• *Collaborative creation* of something (Malone et al., 2010) or c*ollaborative design markets* approach (Lesser et al., 2012) when creative individuals giving the voice in some entity design (creation) process, deal with idea generation activity and helps to create new products. Proper example of this kind of collaborative Collective Intelligence applications are any open source software (e.g. Linux) or open innovation projects (e.g. Procter&Gamble), where there are strong interdependencies among the modules or proposals submitted by different contributors.

Another activity where Collective Intelligence can be developed in order to use it is **decision-making** or **deciding**. For years, chiefly in the business organizations, specially arranged teams or focus groups executed these tasks. Now by adopting virtual network is possible to use wide group of individuals to execute these processes. Decision support requires high amount of information processing and the evaluation of potential solutions (Bonabeau, 2009; Leismester, 2010), so the decision support tasks can be divided into generating alternative solutions (this activity closely related to idea generation) and evaluating them. Malone et al. (2010) distinguish two types of decision-making: (1) *group decisions* and (2) *individual decisions* (Table 2). Ways of decision making (group or individual) determine what environment, technologies and processes, are involved. In new and innovative ways, tap into outside skills and experience to deliver on business imperatives.

Table 2. Collective Intelligence developing tools for decision-making (developed by authors)

Type of decision	Tool for decision-making
Group decisions	• Voting • Consensus • Averaging or Rating
Individual decisions	• Purchasing or Demanding • Social networking • Communities of practice

Group decisions. One of the approaches to make group decision is voting. Usually website users or anybody from the community participating in the voting, give their vote for their preferred alternative and the one determined by majority vote is treated as wining solution. Malone et al. (2010) separates two sub-variations of voting used in some virtual communities implicit voting[30] e.g. iStockPhoto and weighted voting[31] e.g. Google search.

Other way of decision-making in technology-mediated groups is consensus (e.g. Wikipedia). It means that all group members agree on the final decision. In this case solution cannot be accepted if anybody disagrees or vote against it. The kind of consensus is used in the human-based

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[30] Actions like buying or viewing items are counted as implicit "voting" (Malone et al., 2010).
[31] Ranking e.g. search results on the basis of how many other sites link to the sites in the list (Malone et al., 2010).

character recognition system reCAPTCHA[32]. The system proposes for users to enter correctly scanned word, which is unrecognizable by optical character recognition software. Only when word is typed the same by all required amount of users the word is treated as correctly spelled (more on the topic von Ahn et al., 2008).

Malone et al. (2010) as the manner to make decisions discuses averaging or rating. By averaging authors mean cases where decisions involve picking a number. Averaging is commonly used in the systems where quality is evaluated by some point scales (e.g. Amazon, Booking.com). The average quality rating of all rated user is shown next to the alternative as the final decision. More on interesting examples of averaging approach employment check NASA Clickworkers, Marcetocracy.

Individual decisions. While decision do not need to be identical for all and there is no requirement/task to evaluate entity in the one adopted rating system *individual decisions* are applicable. One of the ways to use individual decisions in collective preference detection is purchasing or demanding (e.g. eBay) control. In this case all individual decisions to purchase form kind of demand, which affect availability and price level.

Earlier in the idea generation part discussed approaches that use individual decision in the virtual environment are social networking (e.g. blogosphere) and communities of practice. They can be equally adopted in the decision-making activity. Relationship and linking based on trust, similarity in tastes and viewpoint, other common characteristics form structure of the social network or interlinked web with related content (e.g. Epinions.com), which can recommend, consult, provide alternatives and propose solutions.

Lesser et al. (2012) discuss about **decision-making** by means of *disaggregating and distributing workload activities*. These activities can be performed individually or by groups. In order to improve decision making by augmenting skills and distributing workload approaches can be used:

- Parallel task processing, when complex problems are deconstructed into smaller or simpler tasks);

- Distributed questions and answers, where members answer each other questions in order to solve the problem;

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[32] CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) are wide spread security measure in the World Wide Web that prevents automated programs from abusing inline services. They do so by asking humans to perform a task that computers cannot yet perform, such as deciphering distorted characters (von Ahn et al., 2008)

- And online simulated serious games enabling participants to apply their real-life knowledge and problem solving skills to provide solutions to complex problems.

Beyond developing existing ideas and solving nowadays problems, Collective Intelligence can be applied **to predict the outcomes of future events** (e.g. Microsoft project completion date prediction) (Malone et al., 2010). It facilitates making better, more informed predictions about the future, generation of potential solutions, predict outcomes of today's increasingly complex business challenges, and improve forecasting effectiveness (Bonabeau, 2009; Lesser et al., 2012). For improving forecasting effectiveness traditional forecasting approaches such as *prediction markets* can be employed (Malone et al., 2010; Lesser et al., 2012). In prediction markets participant with virtual currency or tokens invest or divest in the likelihood of future events or outcomes. Numbers of virtual market "prices" or tokens are interpreted as forecast probabilities. There also can be applied contest approach when participants are rewarded based on the accuracy of their predictions when compare to others and how they match actual outcomes.

One of the best examples of Collective Intelligence development in **aggregating knowledge** activity, insight and expertise of a diverse group, it is *wikis*, which "offer potential to capture knowledge from large groups of people, making tacit, hidden content explicit and widely available. They also efficiently connect those with information to those seeking it" (O'Leary, 2008). According to O'Leary (2008) wikis satisfy four key knowledge management needs by capturing knowledge from those who have it, converting knowledge into an explicitly available format, connecting those who want knowledge with those who have it and linking knowledge to knowledge. In wikis important aspects that facilitate instrument efficiency are: mass collaboration, transparency and pull versus push mechanism.

Fields of Collective Intelligence application

From above performed literature analysis we conclude that agreement exists that tools using/activities developing Collective Intelligence perform better results in organizations, communities, social and scientific projects processes. Further we present more explicit analysis of the fields where these tools/activities can be applied.

Research and development projects. Approach of Collective Intelligence emergence can be adopted as a mean for solving long-standing scientific problems, as in the case of molecular biology problem solution proposed within three weeks as a result of interaction Washington

University scientists and 57000 individuals (Savage, 2012). As Gloor et al. (2008) calls it re-designing of research and development organization knowledge flow and operating and recruiting new members from surrounding learning communities. In the R&D and innovation projects quality of solutions and consistency of the output should be ensured. Access is to talent, diversity of participants and participant engagement over time preconditions project quality and consistency of the output (Bonabeau, 2009).

Project management. In general employing Collective Intelligence developing tools in project management can improve the quality of project output results (Gloor et al., 2008):

- Communications failures among project members can be reduced, as it converts on-way communication into two-ways communication;
- Virtual communication and collaboration discovers core contributors;
- Team work together more efficiently, unlocking the creative potential of team members;
- Knowledge visualizations assist in finding good ideas in the project and the whole organization context.

In *mergers and acquisitions projects* getting knowledge from different involved in the process companies to form new high-performing teams can be challenge (Gloor et al., 2008). Employing collective and collaborative approach of communication between new members of the group not only helps to improve companies re-design process but also ads / increase value for enterprise. Creating new solutions as collaborative teams, consisting from members with different background and contributing with knowledge, help to aggregate and incorporate in to new knowledge system and to develop new Collective Intelligence of re-designed community.

Sales and marketing management. As Gloor et al. (2008) argues approaches employed for Collective Intelligence emergence can improve efficiency and productivity of sales and marketing. In the market research social network analysis gives indicators of productive as well as unproductive members of the sales and marketing force. There is some research done showing that high performing sales force members communicate more with external people than average or low performers, at the same time they use more communication technologies for their work (Gloor et al., 2008; Bulkley, van Alstyne, 2004). On the other side data shows that there is no correlation between performance and overall volume of communication, which imply that other more complex metrics as e.g. contribution level should be measured, for indicating workers performance. Applying Collective Intelligence developing tools in the market research and customer service enable to reach wide population and to receive lots of different information:

customers stories, complains, recommendations, preferences, experiences, etc. In the market research case it is important to maintain ability to discover or elicit true responses, which can be obtained by sample size control (whether it is representative of market) and participants' engagement (Bonabeau, 2009). Customer service improvement can be developed in users' community environment. The percentage of problems solved, tone of conversations and early discovery of problems can detect effectiveness of activity. Key indicators of communication quality can be responsiveness to unsolved problems and participants' engagement (Bonobeau, 2009).

Knowledge management. As Boder (2006) states Collective Intelligence is a keystone in organizational knowledge generation. Main actions involved in Collective Intelligence creation in order to maintain high performing organization knowledge system are: make individuals' competence explicit, clear articulation of objectives, smooth mechanics of interaction, complementing various competencies, ensure reciprocal expectations and, trust and respect enhancing interactions and organization norms should be developed.

 E-democracy. It is believed that via E-democracy tools can be raised citizens' participation in government decision-making (Carrizales, 2008). Collective intelligence can influence process via democracy tools by strengthening e-participation (as e-forum, webcasting or podcasting, e-mail innovations) or can have an effect even on the final decision (e-consultations and e-surveys, e-petitions). For already a decade is a question to be solved under the discipline of e-engagement (OECD, 2003)

More fields where Collective Intelligence approach is useful to employ could be revealed by more extensive literature review and practical case analysis. Fields like s**ystem testing or crises response** or other more specific areas can use Collective Intelligence development results in order to increase process efficiency. For example, Collective Intelligence application in system testing could aim to assess number, quality and scope of unexpected issues that are uncovered during the testing. But as the scope of the article is limited and the aim is to reveal general opportunities for development of Collective Intelligence we follow with the possible risks discussion.

Discussion about possible risks related to Collective Intelligence

The aim of this part of the article is to provide the theoretical insights to potential risks and legal aspects (threats and problems) for Collective Intelligence. Analyzing the issue of Collective Intelligence development, almost all aspects (especially legal), which are connected with the safe

usage of Internet, can be discussed. Also the application and employment virtual environment and social technologies carries some indirect risks, as group member over-diversity or contrary over-expertise as well as lack of engagement and abuse.

One of the issue, that Bonobeau (2009) names as "common" to all forms of Collective Intelligence is a **loss of control**. First of all it relates to control over outcomes. In some cases undesirable and unwanted outcomes that can be harmful for organization, community or other group, can have place in result of Collective Intelligence. This can emerge because of the flaw of authorities, leading the project, thinking or improper application of Collective Intelligence, as well as being not prepared to deal with the decision or result. This kind of issues often goes together with problem of unassigned liability, which is responsible for poor collective decisions. Loss of control problem gets more serious when group decides to attract outsiders in collaborative decision-making (Bonobeau, 2009). There can be danger in opinion leadership shift to undesired side, then followed by the snowball effect. Also risk of *information* about an ongoing project or organization by itself *disclosure* is real when outsiders are involved. Another concern related to activities in virtual environment as well as collaborative communication is the *possibility of abuse*; such as excessive employee time spent ''chatting'' about not work-related topics on internal or external social networks or using social media to attack fellow employees or management. Enterprises have taken different approaches to handling this risk, from forbidding not work-related conversations or censoring critical opinions to welcoming the critiques and engaging in public conversation with the critics. These kinds of restrictions sometimes become obstacles for effective Collective Intelligence or virtual collaboration development. Some risk and uncertainty in Collective Inteligence development is related with the *balance of diversity and expertise of member*. Diversity-based approach can lead to distorted decisions, as there is risk of getting involved individuals with lack of necessary knowledge and capabilities as well as ability to understand the problem. At the same time too expertise groups get into danger of becoming too stagnate, conservative and narrow. Another issue related to individuals' participating in the collaborative communication characteristic is their *engagement and motivation*. As Bonobeau (2009) proposes, organizations of the activity must provide a continuous flow of the new, enthusiastic participants to keep engagement high, or they need to provide incentives to sustain people's motivation over time.

The **issues of privacy** consists of several problematic aspects when it is related to generating of collective intelligence via virtual communities is. Communication in social networks is not isolated with possibilities to share personal information with closed circle of persons, thus on the

same time the possibility for such data to become accessible for million people all over the world stays (Štitilis et al., 2012). The behavior of people is quite different in virtual life to compare with reality. Intentions for preservation of unreasonable personal data disclosure in real world falls down in virtual reality: people expose photos, events of personal life as well as professional life and such data is easily attainable for strangers' despite of various privacy technologies, provided from the managers of social networks. According to Goldie (2006) "by relying on anonymity, the virtual community members felt free to express themselves, and thus prevented the overreaching social control that expressive privacy protects against". Privacy in this aspect guarantees the better self-expression. In the process of generating of collective intelligence it is very important, because it gives the clear reflection about the needs of members of networked society. Joinson and Paine (2009) suggest to reveal the problem of privacy in Internet through two different dimensions of control: **environmental control** (connected with prohibition to access the personal information for unauthorized subjects) and **control over secondary use of information** (connected with possibility to use once published information secondly only with an individual's knowledge or consent). These two dimensions are possible subjects of further empirical researches in the field of the privacy issues.

Networked society is based mostly on the ground of trust, meaning that any data provided by the member is not fully verified. Such proposition intends to drive us towards another legal risk of virtual communities – **false identity issue**. This problem has two aspects. Firstly, the accurate identification of person is problematic. Secondly, the protection of personality, who does not want to be revealed or in other words - protection of virtual personality, is problematic. According to Kokswijk (2007) virtual identity is only temporal and innocent phenomenon, which disappears, when a computer is switched of. In most cases it doesn't make sense to control the correctness of personal data, thus in such fields of applicability of collective intellect as the participation in decision-making, the personality may be very important. The growing usage of virtual communication and development of it in public sector, creating the new functions of networked societies presumes the need of the further research in this field.

Depending on the certain networked society different requirements for identification of members is used. In some field where Collective Intelligence may be used, the identification of person may play a crucial role for securing the source of information. For example, in the municipalities' level it is important to involve community into decision-making. The networked societies is one of the keys, how to make such participation more effective, cheap and accessible for a wide circle of inhabitants. Thus the problem appears, how to secure, that in the generation of

decisions only people living in certain area would be involved? This managerial / legal aspect creates the threat that in certain circumstances the unfair behavior of networked society members can violate the interests of local community. Another threat, involving of children in social networks designed for adults. According to researchers (Small et al., 2012), "it is impossible to identify vulnerable populations, such as children". For example, "Twitter states that users must be over 13, but there is no way of verifying the age of a user based on the tweet content" (Small et al., 2012). It can be predicted, that identification may become crucial in cases connected with society-oriented results, gained through the activities of networked societies. Another problematic area is identity theft. Wide usage of Internet and e-commerce has taken identity theft into new level (Štitilis et al., 2011), thus legal regulation of this issue is not explicit and completed. All mentioned examples prove the need and expediency of deeper analyze on this issue.

As one of the main risks, which should be analyzed in further researches is the **intellectual property issues**. The violations of intellectual property rights in Internet because of its simplicity have already reached unbelievable level from the one side. From the other side it is obvious intention of intellectual property rights owners to maximize it and to take additional advantages from consumers (Kiškis, 2011). The networked societies, which generate the collective intellect with a purpose to use the result of it, can face such problems too. Sophisticated members of society may have some claims, concerning the ownership of proposed ideas and decisions or even results of collective interaction. Organization, etc. need "to determine whether and how it will assume ownership of the resulting intellectual property" (Bonobeau, 2009).

Several special points may be listed in the content of networked societies generating collective intellect. People in virtual communities are linked to be more self-confident and even risky in expressing their opinion in Internet as members of certain virtual community. For example, by scientific research was proved that people who are taking part in various virtual communities are inclined to take more risky financial decisions (Zhu et al., 2011). In legal aspect, the analogy with socially undesirable behavior can be made. People sharing their discriminatory views in Internet obviously violate the rights of people belonging to certain group and whole society in general. It is worth to emphasize that hate speech in Lithuania is mostly connected with instigators comment in information portals, social networks. The Human Rights Monitoring Institute has revealed that more than 90 proc. of all hate speech acts in Lithuania are committed in Internet (Bitiukova, 2011).

One more very important legal risk is a **censorship** of information provided in the Internet. According to Ziotrain and Palfrey (2008) control of the Internet content is a long-standing. The

freedom of expression has never been absolute. Thus this process is closely connected with legal issues: Internet control is implemented with a help of various legal instruments. The process of generating of collective intellect is also vulnerable by listed problem. In the process of generation of collective intelligence none of information should be missed. If the final result of Collective Intelligence is censored, such intellectual production cannot be presented as outcome of collective work in regard of contradiction of such censorship with general legal principles of rationality, good faith and justice. The members of networked society must be clearly introduced with the rules of participating and any possibilities to restrict their right to self-expression. In this case crucial is to find balance between whole society and certain networked community interests, supporting the attitude that initiative of governmental agencies in the field of Internet censorship with a goal to restrict the spreading of ideas, inappropriate for official policy of the state.

Conclusions

As the whole world become networked in virtual environment and the intensity of socialization and communication increased, pointing this hyper communication in the effective and productive direction leads to new form of knowledge, humanity intelligence growth, smart and inclusive society, which is one of the conditions for democracy promotion, economical development and competitiveness strengthening. In this context huge expectations are set for the Collective Intelligence development, through social technologies application. Scientific society argues that in general human group manifest higher capabilities of information-processing and problem solving than an individual (Heylighen, 2002; Luo et al., 2009). Although some researches on conceptualizing Collective Intelligence are already published there is no single theory capable to explain how the Collective Intelligence works. We conceptualize Collective Intelligence as knowledge network created by web-mediated (social technologies) interaction amongst individuals with personal knowledge. Analyzing various authors proposed frameworks, we conclude that all Collective Intelligence characteristics can be divided into to groups: individuals or group characteristics and process/ activity characteristics.

In order to effectively apply Collective Intelligence approach we distinguish range of activities and fields where Collective Intelligence can be successfully developed. Activities where Collective Intelligence could emerge cover new idea generation, decision making, forecasting or predict the outcomes of future events, aggregating knowledge etc. The field where those activities

could be applied is scientific research development, project management, sales and marketing management, e-democracy, and knowledge management.

Main risks associated with Collective Intelligence employment are loss of control over the project, issues of privacy, false identity issue, intellectual property issues, and censorship. Risks analyzed in this article could be named as the main threats, which networked societies are facing. The main legal problem is the finding of balance between privacy and requirement to identify as well as between the positive outcomes of copyright law and the effect of synergy, which is used in Collective Intelligence, between the need to control the content of communication in virtual medium in order to avoid the violation of human rights and the freedom of expression as one of key advantages of virtual life.

Acknowledgment

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