Social Technologies for Developing Collective Intelligence

Prof. Aelita Skarzauskiene
Collective intelligence (CI) is the general ability of a group to perform a wide variety of tasks.

Collective intelligence of the community:
- new knowledge, ideas, decisions
- suggested problem solving methods and solutions
- shaped up or structured opinions
- developed innovations, prototypes,
- generated added value, etc.
Difference between *swarm* intelligence and collective intelligence

- Intelligent systems – humans are capable to generate knowledge and think
- Synergy based on knowledge, not on genetic interaction
The Wisdom of Crowds Idea

Guess the weight of the ox?

The weight of the ox – 1198 pounds

The average of the guesses – 1197 pounds

Predictions in total – 787

Market place
Wisdom of crowd

Surowiecki (2004):

“under the right preconditions the groups are more intelligent than the smartest people in them”

What are these conditions?

DIVERSITY, DECENTRALISATION, INDEPENDENCE

SWARM EFFECT
Value for public administration

- Value for business management
  - Aggregating and creating knowledge
    - Building rivers of information
    - Gathering information
    - Crowdsourcing solutions
    - Generating new ideas
    - Predicting outcomes of future events

- Value for fostering innovations
  - Adapting Open innovation approach
    - Increasing involvement through gamification
    - Fostering creativity
    - Crowdsourcing ideas and resources
    - Making collective decisions

- Value for society
  - Mobilizing structures
    - Expanding volunteer network
    - Retaining support
    - Fundraising
  - Learning and training
    - Increasing e-learning
    - Matching talents to roles
    - Building recommendation system

Managing organizations

- Creating self-managing networked teams
- Disaggregating and distributing workload activities
- Testing systems
- Increasing efficiency and quality
- Producing Big Data
- Managing mergers and acquisitions projects
- Developing Marketing activities
  - Researching on market and services
  - Creating client relationships
  - Managing Online Reputation (ORM)
- Developing netizenship
  - Educating the public
  - Increasing e-participation
  - Desseminating information
  - Increasing transparency
  - Developing e-services

Responding to crises

- Obtaining information
- Identifying location
- Minimizing damage
- Mobilizing structures
  - Expanding volunteer network
  - Retaining support
  - Fundraising
- Learning and training
  - Increasing e-learning
  - Matching talents to roles
  - Building recommendation system
- Adapting Open innovation approach
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Value for fostering innovations

- Aggregating and creating knowledge
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- Value for business management

- Value for society

- Value for public administration
Today, more than 80% of the world`s online population is interacting via social networks on a regular basis, but 65% of the world population – 4,6 billion people – still lacks internet access

*Mckinsey research, 2017*
The MIT Center for Collective Intelligence explores how people and computers can be connected so that—collectively—they act more intelligently than any person, group, or computer has ever done before.
The Structural Model of CI System

(Luo et al, 2009)

- **technological network** or media network that supports information and knowledge transfer
- **human network of community members**
- **content network of knowledge** and information, which is hosted in humans and computer systems
WHAT is being accomplished?
GOAL

STAFFING
WHO is performing the task?
Hierarchy/ Crowd

INCENTIVES
WHY are they doing it?
Money/Love/Glory

WHAT?

WHO?

WHY?

HOW?

WHAT? is being accomplished?

INDEPENDENT  DEPENDENT

CREATE  COLLECTION  COLLABORATION

DETERMINE  INDIVIDUAL DECISION  GROUP DECISION

STRUCTURE/PROCESS

HOW it is being done?

CI Potential Index

is a relational conception that defines capacity of networked structure for aggregating and creating knowledge, creativity and decision-making, the ability of community for self-organization, transparency, adaptivity and generation of “wisdom of crowd” effect
Potential Index

Organisational and behavioural level

Capacity for creativity

Capacity for aggregating and creating knowledge

Capacity for decision making

Emergence Index

Potential for self-organisation

Intensity of emergence

Potential for adaptivity

Social maturity Index

Maturity of social impact on society

Maturity of social motivation

Maturity of social orientation

Technological level

Expansion related social technologies:
- virality
- locationality, temporality etc.

Risk related technologies:
- expansion control, privacy and security assurance, message control etc.

Value related technologies:
- value retention rate of the information, quality of media etc.
<table>
<thead>
<tr>
<th>Dimension</th>
<th>Indicators</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity for creativity</strong></td>
<td>DS Degree of diversity in source of ideas</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>DF Degree of diversity in engagement forms</td>
<td>36</td>
</tr>
<tr>
<td><strong>Capacity for aggregating and creating knowledge</strong></td>
<td>DI Degree of interdependence</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>CM Degree of adequate supply of “Critical mass”</td>
<td>43</td>
</tr>
<tr>
<td><strong>Capacity for decision making and problem solving</strong></td>
<td>DD Degree of decentralization and independence</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>PS Degree of efficiency of problem solving</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td><strong>CAI</strong> = 0.6 ( \frac{DS + DF + PS}{3} ) + 0.4 ( \frac{CM + DD + DI}{3} )</td>
<td><strong>37.25</strong></td>
</tr>
</tbody>
</table>
SUVESTŲ DUOMENŲ APDOROJIMAS

KI GALIOS INDEKSAS

\[ CAI = 0,6 \cdot \frac{DS + DF + PS}{3} + 0,4 \cdot \frac{CM + DD + DI}{3} \]

KI ATSIRADIMO INDEKSAS

\[ EI = 0,6 \cdot \frac{DQ + AL}{2} + 0,4 \cdot \frac{DC + AT + DM}{3} \]

SOCIALINIŲ TECHNOLOGIJŲ INDEKSAS

\[ STI = 0,4 \cdot MD + 0,6 \cdot \frac{EI \cdot PS + DM + DA + SC}{5} \]

KOEFICIENTO PASKAIČIAVIMAS IR PAAiŠKINIMAS

KI GALIOS INDEKSAS

65

KI GALIOS INDEKSAS

25

KI GALIOS INDEKSAS

61

KIPI

45

REZULTATŲ LYGINIMAS SU KITŲ ORGANIZACIJŲ REZULTATAIS
THINK TANK on Collective Intelligence

Publications

1. Following traces of collective intelligence in social networking: case of Lithuania
Authors: Šarkūnienė, Aistė; Mieliauskaitė-Šarkūnienė,edral, scholars, magazines.
Language: English
Download

2. The potential of collective intelligence for fostering innovation: social technologies perspective
Authors: Šarkūnienė, Aistė; Mieliauskaitė-Šarkūnienė,edral, scholars, magazines.
Published in: Proceedings of the 4th ISPIM Innovation symposium “Innovation in the Asian century”,
8-11 December 2013, Melbourne, Australia.
Language: English
Download

3. Role and opportunities for developing collective intelligence in network society,
Authors: Pirkškiene, Zinaida, Šarkūnienė, Aistė.
Published in: International Conference of Social Technologies ‘13, conference papers, Vilnius
Mylėtasis Borutes University, 16-18 October, 2013.
Language: English
Download

4. Potential of collective intelligence to tackle societal problems in network society,
Authors: Pirkškiene, Zinaida, Brutsa Šarkūnienė, Aistė.
Published in: International Conference of Social Technologies ‘13, conference papers, Vilnius
Mylėtasis Borutes University, 16-18 October, 2013.
Language: Lithuanian
Download
Graphical comparative analysis of 50 online communities according to Capacity Index, Emergence Index, Social Technology Index and Collective Intelligence Potential Index.

The research is funded by European Social Fund under the measure „Support to Research Activities of Scientists and Other Researcher“ (Global Grant) administrated by Lithuanian Research Council (Grant No. VP1-3.1-ŠMM-07-K-03-030).
<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity for creativity</td>
<td>32.95</td>
</tr>
<tr>
<td>Capacity for aggregating knowledge</td>
<td>40.91</td>
</tr>
<tr>
<td>Capacity for decision making and problem solving</td>
<td>22.73</td>
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<tr>
<td>Potential for self-organisation</td>
<td>53.41</td>
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<tr>
<td>Emergence of collective intelligence</td>
<td>38.26</td>
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<tr>
<td>Potential for adaptivity</td>
<td>68.18</td>
</tr>
<tr>
<td>Networking and collaboration technologies</td>
<td>54.54</td>
</tr>
<tr>
<td>Privacy and security enabling technologies</td>
<td>45.45</td>
</tr>
<tr>
<td>Collective decision making technologies</td>
<td>36.36</td>
</tr>
</tbody>
</table>
CIPI Evaluation results

• When measuring the *Degree of diversity in source of ideas* (value of 52) and *Engagement forms* (36), in the majority of monitored projects the demographic, gender and geographic diversity was evaluated as high. However, the national diversity was defined as relatively low. Almost all civic projects lack the advanced competition elements, game based approach, and the adoption for the different age groups.

• *Degree of decentralization and efficiency of problem solving* was identified as rather low. In the majority of the platforms only the registered users are able to propose an idea on already posted issues, and there are only few projects allowing an anonymous participation.

• The diversity in the ways to express opinions (such as voting, ranking, structuring, mass deliberation, etc.) is low in the majority of the observed communities as they lack the technological solutions for it.
CIPI Evaluation results

• The possibilities for the users to initiate a new topic, aggregate or create knowledge are very limited in many cases, because of the clear leadership of platforms` initiators or managers.

• The level of diversity in the addressed problems, insights and proposed ideas varies from low to medium. With the rare exceptions, the exchanges of information in the civic projects are dominant.

• The Lithuania`s Civic Tech demonstrate a high *Speed of reaction to social issues* (68) and a high *Level of social sensitivity* (52). However, the platforms lack sustainability, visibility and support from cooperating partners and stakeholders.
What are the socio-technological conditions that led the communities to become more intelligent?

• Have to be _clearly introduced_ and _easily mastered_.
• Have to be _designed to pursue specific goals_ and _clearly represent the goals in their design_.
• Have to encourage diversity of opinions by providing _privacy, anonymity_ and _personal data protection_.
• Have to allow _knowledge accumulation and exchange of information_ between the participants and outside world with the possibility to _reuse the collected data_.
• Have to offer solutions for _collective decision making_, _collective problem solving_, _virtual brainstorming_, _voting_, _ranking_, etc.
• Special attention has to be paid to _gamification technologies_ and _adaptation for different age/nationality/digital maturity groups_.
Which community is collectively intelligent?

• Continual **flow-in of new ideas and knowledge** - DIVERSITY

• Guarantee **anonymity** of participants - INDEPENDENCE

• **DECENTRALIZED** structure and governance

• **Synergy** based on **SWARM EFFECT** (critical mass of users)
Which community is collectively intelligent?

• Should contain a **memory system** that stores information and knowledge'

• Should have the capability of ‘**intelligent’ problem-solving**

• Should commonly **exhibit higher-level intelligent capability** than any community member
Threads for digital participation

- Privileged access to community resources, closing up within community
- Increased gap between participating and left-behind
- Discrimination for age, gender, sexual orientation or cultural background, disabilities
- Exclusion because of income, educational level, urban/geographical location, digital competencies level
- Maturity of created content
- Security, privacy, data protection and other legal issues

One of the main risks ... in citizen engagement is the danger of engaging only those people who are already engaged in an issue, thereby deepening the gap between those already participating and those left-behind...
The biggest **problems**

- Not structured opinions
- Not clear problem/advice/technology
- Maturity of created content (short-form content)
- „Fake news“, spam
- Technological determinism