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ISOFF ICE Symposium 12 February Juuka FL

'Optimal conditions for group-dynamic challenges'

The results of mock-up research on group-dynamics during the January 2014 Juuka Finland 'Ice Dome' building by university students initiated by the Eindhoven Technical University.

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Keywords
Group-dynamics, process-development, motivators, action-prospects, Finland-Netherlands

Abstract
Society counts a growing number of group-dynamic challenges like civilian movements, resident initiative, self steering teams on the work floor and innovation team challenges. The basis driving force is governments that draw back, increasing competition in business and empowerment of people. Examples are the Juuka regional economic development and the Dutch sustainable city-developments as they depend on peoples' initiatives. For the prosperity of such initiatives a mock-up research is done on an Ice-building in Juuka, Finland (FL) project. The conclusions are: 'Making results' and 'leaders to follow' are more important motivators for the participants than fun-making and problem-solving. Front-runners inspire participants inside the initiative group. During the running time the ideal front-runner changes from locals and support people in general towards leading personalities being notable and leader type locals and participants. For such group-dynamic challenges the advice is: set clear notable targets and connect leader-type front-runners to the project, for extra motivation of the participants: built on 'social togetherness' (instead of social cohesion) for achieving results.

1. New trends into group-dynamic challenges

The development of small scale civilian community initiatives received more attention over the last years, in Europe and abroad (Healey, 2015). Examples are: help from neighbors, micro-credit family or inner-village businesses, repair cafés, neighbourhood maintenance enterprises, social housing corporations, renewable-energy cooperation's, crowd-funding, city developments and company networks concerning theme developments. Such initiatives mostly do touch one or more aspects of sustainable developments, as defined by the triangle of the People-Planet-Profit 'Model' (PPP) (Elkington, 2004).

Such developments are positioned in between governmental en government city related work (care, social housing, welfare) and local commercial businesses. Tony Blair (erstwhile PM GB) named the movement of these initiatives therefore the 'Third Way' (Giddens, 2000). Due to societal up scaling societal organizations and firms like family-driven businesses, started leaving neighbourhoods in the late 19th century. The effect was that work and living areas became separated and societal dynamics reduced slowly but radically. Recently such small businesses filled up this gap, in the form of community initiatives, more belonging to people of the same interest with mutual targets instead of being family driven (Brynjolfsson and McAfee, 2014). Governments in special municipalities do embrace such initiatives because of decreasing budgets on care and welfare and thus re-promote neighbourhood care-giving between citizens (Carley et al., 2013) .

Research made clear that unless the number of civilian community start-up initiatives recently increased, many of these initiatives do not come into results. The reason not only lies in the surrounding conditions of hesitating civil administrations and overpowered behavior of midfield and commercial

professionals: The dynamics of the group-process of the initiative itself often hamper a smooth development of such initiatives too (Sanders, 2014).

Similar movements are: civilian movement actions (like Occupy and Greenpeace) , self steering teams (quality and security teams and maintenance) on the work floor and innovation team challenges under pressure (NASA projects, ICT branch, the worlds from Google Nokia and the automotive industry).

One of the difficulties of research on civilian initiatives is the long running times, through which research becomes dependent on the memory of the people involved. Therefore the Juuka (FL) Ice-Dome 2014 building project being a community project of students of Eindhoven Technical university (Vasiliev et al., 2015) offered the unique occasion to follow closely the group process of a civilian initiative during a short running time in a mock-up setting. This to check or complete the picture of community initiative dynamics, specifically concerning stimulating action-prospects (Sanders, 2014) and how these develop and differ during the project's process. This should be useful for a better understanding of civilian initiatives as they are now, in Finland and the Netherlands.

2. The actual Finnish and Dutch sustainable challenges

Finland is a extensive sustainable country on a wide scope of issues facilitating local communities (FNC, 2008). On the scale of regions and municipalities CO2-neutrality, recycling and social communities living are brought together during the centuries of the past. Typical for the Finnish society is that 'Innovation' has settled in the people's communities too (as part of 'Domestic Producing'), making these joyful and prosperous (Vuori and Vuorinen, 2013). Therewith life in Finland touches the three cornerstones of the PPP sustainable model, being a social, energy conscious and prosperous society. Nevertheless the Finnish economy in 2015 is in troubled condition: competitiveness has deteriorated, output has fallen (not only manufacturing but also forestry GMP has fallen down), and the population is ageing rapidly and therefore national costs rise yearly (www.oecd.org/finland 2014). According to the OECD report, economic revival in Finland requires building on impressive human capital, strong institutions, with a focus on strengthening growth and increased integration of (global) value chains. Apparently the Finnish society has lost some of its typical community way of working in the production arena.

Differently organized is the Dutch society, where production developments traditionally find its way inside production-branches raised on regional and national scale. Examples are agriculture, the harbor businesses and logistic branches. Innovation, sustainability and other developments took and take place inside these branches. The drive for more intensive cooperation during the recent economic crises as in chain management for instance, showed to develop within these branches too (Vrijhoef, 2011). Hence, due to the new economic framework caused by this economic crisis Dutch society shows to be retrieving working on the community scale like in the past. The Dutch government thereby targets mobilization of civilian-initiatives by municipalities to compensate budget reductions on the national scale (Van Houwelingen et al., 2014). Even the national sustainable agenda for which the national organized approach shows lacking results (ECN, 2010) is more and more heading towards civilian-initiative coupling (Sanders, 2014).

Remarkably herein the Finnish and Dutch society both appeal community initiatives for better livability conditions, where both can learn from each other about community sustainability and production. A model is shown in figure 1, in which the different approaches of community initiatives in Finland (target is increase of sustainable entrepreneurship) and the Netherlands (target is reaching low-cost sustainable targets) is shown. Both approaches try to repair the equilibrium inside de PPP-Model for a prosperity (social, self-caring and sustainable) society.

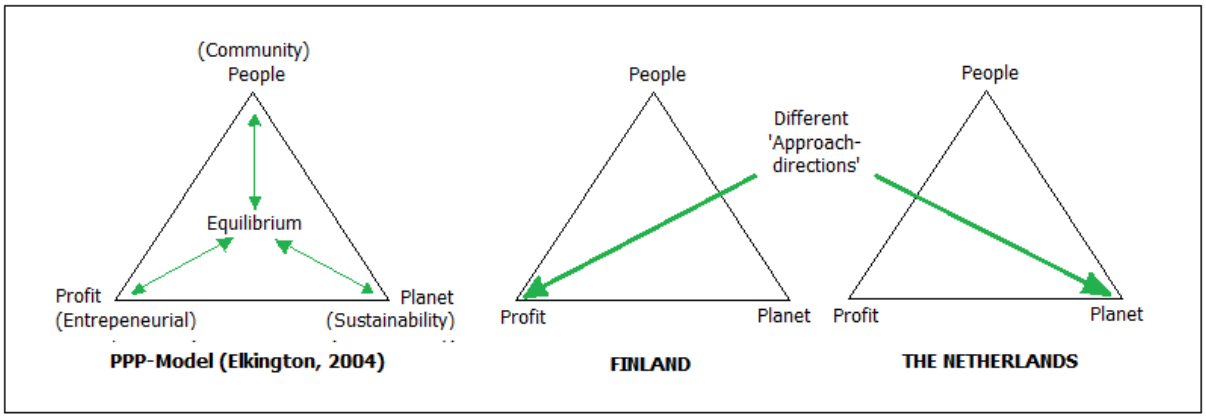

Figure 1, The different approaches of community-initiatives in Finland en the Netherlands.

The key issue in both situations is: How can community-driven initiatives in communities be established and prosperous? A part of the answer is in the literature on former case studies. Still less is known on the dynamics of the processes, their drivers and obstacles. Therefore the 2014 Ice-building initiative of the Dutch Technological University of Eindhoven at Juuka (FL), based on cooperation of people from both countries, is taken up to study these processes in a mock-up situation. Normally community-initiatives are hard to study for the complete lifeline because these take years under which circumstances also change because of the long running time. The Ice-building manifestation project though is a group initiative with a running time of only one month. That is why the project is chosen to be useful to study the dynamics of community-driven initiatives as addendum to the existing scientific literature on this issue. The results are presented below, with the actual literature on community-driven initiatives, the introduction of the 2014 Ice-building project at Juuka (FL) followed by the set-up, and the results of the model study done during the running time of the project, followed by conclusions and remarks.

3. The Juuka (FL) IceDome building research

In January 2014 the University of Technology Eindhoven built an Ice-Dome with a diameter of 30 meters at Juuka (FL), because of the needed temperature of minus 8 degrees Celsius or less for the ice, and due to the fact that the small municipality of Juuka saw possibilities for economic regional development by the manifestation of the project. The project consisted of building the largest Ice-Dome of the world in Pykrete, a mixture of sawdust and water. Pykrete has been shown to be 3 times stronger and 10 times more ductile compared to pure ice and has been proven to be ideal for building large span thin shell constructions. For construction this Pykrete is sprayed over a pre-constructed balloon with a white icy topping to finish this. Afterwards the balloon is removed and the structure stands on its own. For the project a group of 20 students and 10 other participants, like lecturers and supporting volunteers, traveled to Juuka in three overlapping shifts. Local residents organized activities to give them entertainment during the building process that seemed like hard work to them. The students worked in shifts of eight hours and especially the nights were tough to get through. Their spirit was stimulated by good food and some entertainment offered by their voluntary team and local people that spontaneously popped-up. Some impressions are given in figure 2.

Figure 2, impressions of the ice-building (pictures: Bart van Overbeeke en Fred Sanders)

The ice-building got confronted with some calamities concerning the construction. In the beginning the sawdust in the pykrete seemed too big for the pumps. The students tried some days to sieve the sawdust, but the results were unfortunately too poor and this took too much time. Luckily finer sawdust could be arranged soon after. Secondly the balloon lacked air pumping in the third week hence the top of the Dome partially collapsed, which by hard work could be reconstructed in time. During these weeks the workforce was offered several activities by the locals: shooting clay pigeons, ice fishing, sauna, and there was a running competition 'vrouwensjouwen' (women carrying) organized for the students. The project took eight weeks during which the work force changed in three shifts.

4. How targets and people facilitate motivation

To research the dynamics of the workforce's group process, every second day a questionnaire was filled in by (almost) all participants. This questionnaire asked (in numbers from 1 to 5) about the following personal motivations, connected to: personal condition (from energetic to tired), the origin of drift (from personal to non-personal like heading for group targets) and the source for having fun (from fun made in the working-force group to fun evoked by doing activities (including activities caused by calamities within the ice-building). Secondly the questionnaire asked to mention the one person that inspired that day, and thirdly to mention the personal 'drive' of the day the participant worked on. During the three weeks of the project this ended up in 10 days of sampling, with every day a number in between 15 and 24 people filling in the questionnaire. Despite that samples were small in number and that some participants did not fill in all the questionnaires, some results could be produced.

The results of the three questions on personal motivation were analyzed using SPSS. The people that inspired were tallied and summarized from all the research days. Also the targets that were of focus were clustered and analyzed. The results are the following:

- Working together in teams motivated the participants of the group-initiative, more than dealing with problems or doing activities 1). Working on problems costs energy 2).

  1. With SPSS analyses was found that during three out of ten of the questionnaire days spread over the building-period, working in teams was favorite (measure-moments 1, 5, 7 out of ten taken every other day: p<0,05). The other measure-moments signed no significance.
  2. Pearson cross-analyses shows significant within the two questions 'hoe is je gevoel heel persoonlijk vandaag'('how was your feeling today') and 'wat maakte het werken in de groep vandaag leuk' ('what made working in the group to fun today') that working-energy seems negative coupled to problem-solving (p=0.05, r=0.20, n=208).

- Working with the initiative motivates participants the most, the more when the final result comes in sight 3). Fun-making programs (parties and meeting locals) are second best motivators 4).

  3. Pearson cross-analyses showed significance for questions 'waardoor had je er vandaag persoonlijk zin in' ('what gave you motivation personally today') with all of the measure-moments, that the source of the motivation shifted from 'personal advantages' towards 'the goal of the project' during the project (p=0.005, r=0.21, n=202).
  4. The average results from the open question of the questionnaire confirms this: 61,7% of the mentioned targets that kept the participants busy were 'building' related. Second and third best were 'activities' and 'personal matters', as shown in figure 3.

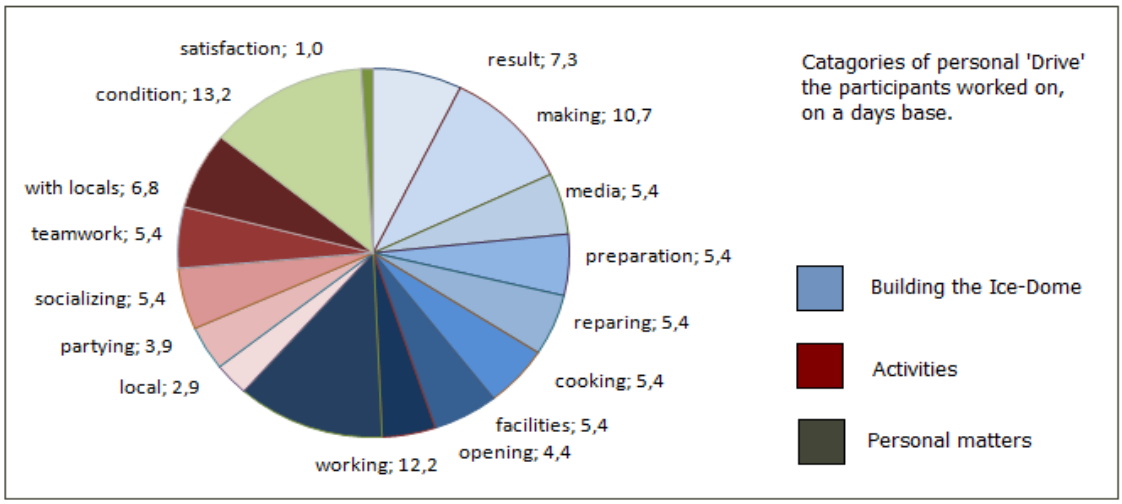

Figure 3, diagram of targets mentioned that kept participants busy (summarized all moments)

- Front-runners inspire participants inside the initiative-group. During the runtime the ideal front-runner changes from locals and support people in general towards leading personalities being notable and leader-type locals and participants 5).

  5. By combining motivation and time, the inspiring persons shifted from 'volunteer' towards 'supporting and leadership people' (p<0.005, r=0.27, n=209). The most mentioned persons were the TU Eindhoven organizing ass. Prof. (28 times out of 200) and 'Jari' the local huntsman (36 times out of 200).

6. Group dynamic reflections on the research set-up and results.

Group dynamics theory distinguishes group types: primary groups (small long-term groups with face-to-face interaction) and social groups (larger, less intimate groups, goal focused mostly) by which the origin of the existence and the regularity of coming together determines the group dynamic differences (Cooley, 1909). From this point of view the groups concerning this research are social groups: groups of moderate duration and permeability, characterized by moderate levels of interaction over an extended period of time, often in goal-focused situations (Forsyth, 2009). This counts for the described group-forming situations of the Finnish community initiative developments, the Dutch sustainability initiative in neighbourhoods and the mockup ice-building project as well, concerning a 'from the outside' observation. Therewith according to group-forming aspects the ice-building project can be seen as a correct mockup simulation.

Group participants have their own experiences concerning the rate of bonding, called 'Entitativity', concerning a 'from the insight' observation. Research brought-up 16 different groups differing from loose bonded 'up-lining of people' to intense bonded 'family structures' and 'teams in sport' (Lickel et al., 2000), see figure 4. Using this rating-line the mentioned Finnish and Dutch initiative groups as well as the student-groups working on the ice-building project should be defined as 'workforce-teams' with a rating of 6+ on the rating-scale 1-9, beyond average, as can be called 'social togetherness' being a lighter type of bonding then 'social cohesion' (Sanders, 2014). This check too confirms the mockup setup choice.

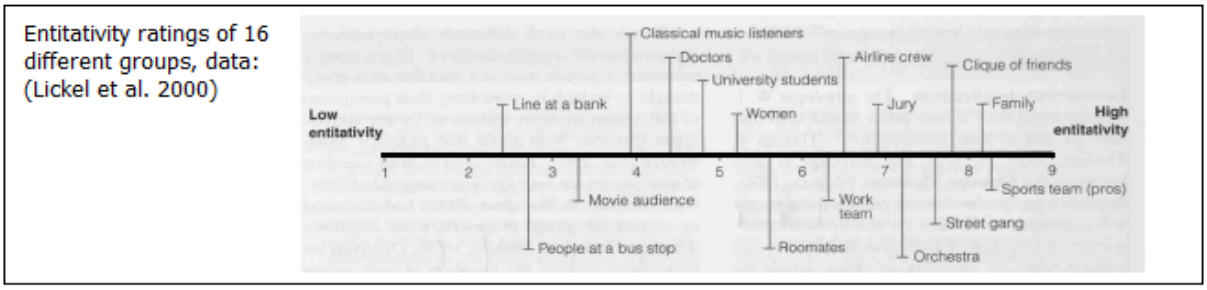

Figure 4, Entitativity rating-line with group-forming examples (Lickel et al., 2000).

Group initiative processes, like civil initiatives and the development of civilian organizations, show five stages of development in general: forming – storming – norming – performing – adjourning. During the stages 'norming' and 'forming' initiatives get noticeable. For the mockup research of de ice-building Juuka (FL) these are the stages during which the research for finding process coupled action prospects actually took place. 'Norming' concerns: Building up cohesiveness, agreement on procedures, standards and roles and improving communication. 'Performing' entails working of the group including tasks, competition, decision making and cooperation (Tuckman, 1965). The circumplex of basic activities adds on that for these 'behavior' and 'cooperation' are the determinant factors (McGrath, 1984), see Figure 5. which under scribes the logic to search for process coupled 'action prospects' of that kind, as the questionnaire for the following the Ice-building Juuka (FL) process does.

During the Ice-building project the group of students and volunteers changed over the running time; most of the participants stayed three weeks during the project of eight weeks in total. The composition of the group thereby was not homogeneous throughout the project. According to Jahoda, groups have a 'group mind', do act and continue acting as an entity unless participants step 'out and in' during its existence (Jahoda, 2007), because an entity of people becomes an entity (McNEIL and Sherif, 1976). Therewith can be postulated that the ice-building student-group followed during the questionnaire research can be seen as one developing group unless the exchanges of the participants during the running time.

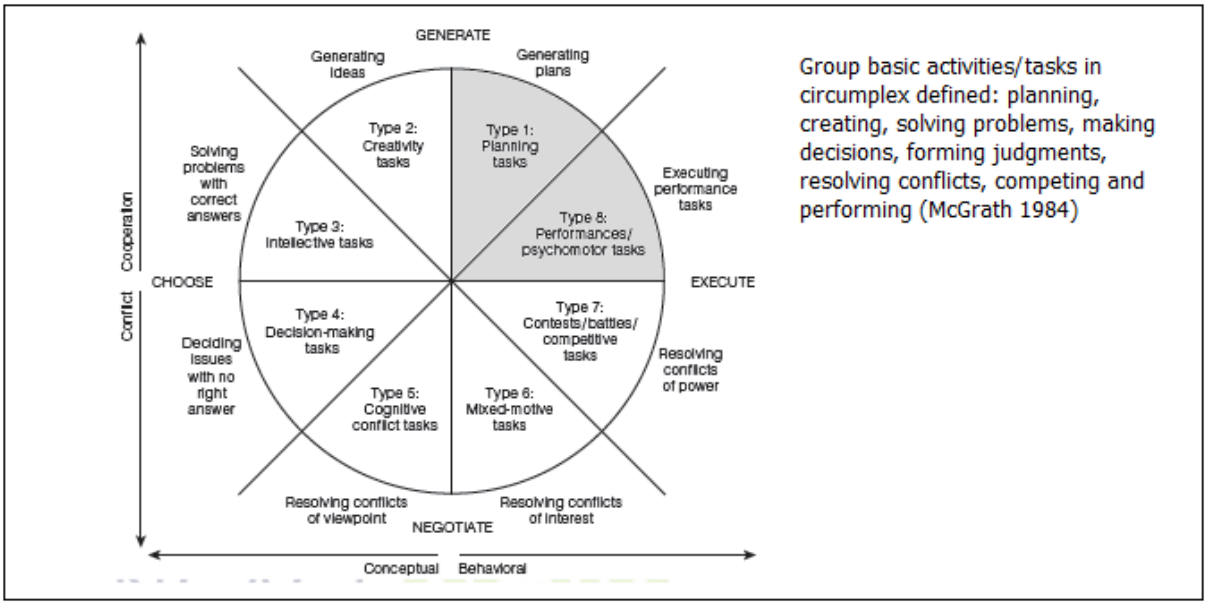

Figure 5, Circumplex of activities and tasks within a group dynamic development (McGrath, 1984).

7. Conclusions and remarks

The Ice-Building questionnaire research concerning stimulating action-prospects and how these develop and differ during community-initiatives processes, with the Ice-Dome building 2014 Juuka (FL) project as a mockup to be studied, delivered the conclusions that:

1. ‘Making results’ and ‘leaders to follow’ are more important motivators for the participants then fun-making and problem-solving are. Last mentioned are more motivators at the start of an initiative.
2. Front-runners inspire participants inside the initiative-group. During the runtime the ideal front-runner changes from locals and support people in general towards leading personalities being notable and leader-type locals and participants.

These results match with results of the recently finished Dutch dissertation on action-prospects on ‘sustainable development by group initiatives’ (Sanders, 2014): that ‘working together’ and conditions that ‘give empowerment’ are stimulating action-prospects for group-initiatives. This research concerns quality research on stimulating conditions for sustainable community developments of residents in cities and small communities. Important other outcomes of this dissertation research were that ‘being personal in order’ is an important basic condition for becoming social in groups, although to social groups (with bonded social cohesion) can block group participation. The Juuka Ice-building research did bring-up these points although not significantly. The new result of the Juuka research is: that the effect of motivating and front-runner action-prospects changes during the initiative process, from socializing moments towards project coupled items.

Based on this ice-building mockup research the advice for similar process and project developments like the Finnish regional economic developments and Dutch sustainability national projects therewith are: set clear notable targets and connect leader-type front-runners to the project, for extra motivation of the participants, and built on ‘social togetherness’ (instead of social cohesion) for results.

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