

Efficiency of Pyramiding and Broadcasting Methods for Information Distribution over Social Network Facebook

Aleksejs Busarovs*

In this work was scrutinized efficiency of two information distribution and search methods over Facebook social network. Social network was chosen due constantly growing interest to this phenomenon and lack of understanding it operation principals. Facebook was used as global leader within all social networks. For this work was used modified pyramiding method, since original wasn't developed for application in social networks, since at that time they didn't existed. Pyramiding in this work was aimed to marginal members of the social network, who were detected with graphical analysis of social network. The choice in favor of marginal members was made, since they posses higher level of creativity and can distribute information to wide audience to whom information holders don't have direct access. Broadcasting was applied in traditional way, limited to the scale of Facebook. Results showed big potential for pyramiding, aimed to marginal members, broadcasting on contrary wasn't effective, but further and deeper research is needed to support this notion.

Field of Research: Management.

1. Introduction and Theoretical Background

The purpose of this work is to show how effective are broadcasting and modified pyramiding methods, applied in social network Facebook. Broadcasting is information distribution method, when information is transmitted to wide audience of Internet users. Broadcasting is pivotal part of crowdsourcing. Crowdsourcing is a distributed problem-solving and production model; when, problems are broadcast to an unknown group of solvers in the form of an open call for help to find solution (Brabham 2008). Crowdsourcing approach is appealing to companies, because it major advantage is R&D cost reduction (Howe 2008). Recent studies of crowdsourcing show, that application of this model delivers in 29.5% cases successful solutions to the problems, that haven't been solved by internal R&D (Lakhani et al. 2007).

The success of crowdsourcing is explained by the fact that knowledge that reside outside the borders of the company is much greater than knowledge that belongs to the company. The Internet allows company to harness this great knowledge on low cost. The challenge is to attract substantial number of Internet users, who is ready to provide solution for company's problem. Previous research distinguish two ways how to attract contributors of solutions, they are broadcasting and pyramiding. The goal of broadcasting is attract big number of contributors, with notion that small fraction should have valid solution, pyramiding on a contrary try to distinguish contributors with big potential, based on recommendations from the experts. This paper uses both methods, in order to develop more holistic approach to problem solving over the Internet.

*Aleksejs Busarovs, Riga International School of Economics and Business Administration, Dzelzavas 35-29, Riga, Latvia. Email : alex@innomaniacs.eu

Busarovs

The pyramiding method was developed by professor von Hippel from MIT, its idea is in gradual search for highly qualified experts in particular field, who are able to solve the problem. This search is organized in form of direct contacts to specialists with proposition to solve the problem and suggest other professional, who might have knowledge and skills to solve the problem. Often search leads to people who possess knowledge outside the area of initial problem, that promotes more radical ideas (Gassmann & Zeschky 2008). Traditionally pyramiding is executed by means of telephone interview, that make this process rather time consuming (von Hippel, Franke & Prugl 2009). Modified pyramiding, used in this work, is altered to be used on-line, through text messages within social network Facebook.

The choice was made in favor of social network Facebook due its size and popularity on a global scale. At present moment this is the biggest social network in the world. It is available in 70 languages and has more than 900 millions active users, they are still growing in quantity (Carlson 2012). Modern social networks are phenomena that became possible with new features of web 2.0. Researchers are interested in them, since they are constantly evolving, and there is no clear guidelines of their operation, development, and rules for information distribution. For business social networks are additional channels for products promotion, under lower costs, comparing with traditional media. This information channel has its risks, since information is moving both directions, thus social media can become anti campaign against company, as it happened with Chevrolet Tahoe advertising, when initiative to use crowdsourcing for home made commercials creation and distribution, became an uncontrollable wave of sarcastic videos about Tahoe, distributed through internet (Bosman 2006).

2. Previous Research on Facebook

At present moment most of the Facebook research is dedicated to the academic libraries issues (Scale 2008; Graham, Faix, & Hartman 2009; Xia 2009; Maxymuk 2009; Steiner 2009; Epperson & Leffler 2009; Ismail 2010; Bierman & Valentino 2011; Ramos & Abrigo 2012). Active use of web 2.0 features is associated with younger generation, this notion is supported by office workers research, which shows that stronger addiction to Facebook have people from 23 to 30 years old (Lin et al. 2012). There is also difference in patterns how different generations are using Facebook, people of older age require more time for simple tasks, due to less familiarity with interface, but younger users spend less time in one sessions, but make it more often (Brandtzæg, Lüders & Skjetne 2010). Facebook is of big interest for business, one of application modes is brand support, thus research about reasons to become fans of companies' profiles was conducted (Hyllegard et al. 2011). Product promotion is inevitably important, social networks, including Facebook appeared to be appealing as additional channel of information distribution and communication with potential partners (Perrigot, Basset & Cliquet 2011). At present stage of Facebook evolution, there is lack of empirical research about ethical issues of publications and use of personal information, but as first step were set frame for further research on this topic (Light & McGrath 2010).

One of the Facebook peculiarity is so called groups, which are slightly differ from organization profiles, and often associated with non government organizations or initiative groups, research of this Facebook groups, showed that for success of such

Busarovs

groups is vitally important organizers' active actions, supporting constant discussion, which is directed to the wider audience than initial target group (Xia 2009).

Literature review on Facebook reviled contradictions concerning search of people, or information about this people. According to Scale's research, Facebook is not appropriate tool for such search, especially if the target of the search is significantly distant, in terms of direct social connections (Scale 2008). On the other hand, so-called method of snowball appeared to be effective, in searching rare information within Facebook (Baltar & Brunet 2011). This paper address this contradiction, using pyramiding and broadcasting methods, in order to find out which of them is more efficient for information distribution. Previous research on broadcasting was concerned about information distribution over Internet in general, the present paper try to understand whether same rules are applied for Facebook. Initial Pyramiding method was meant for telephone interview, this paper shows its potential in the domain of social network.

Besides collection and promotion of information, one should keep in mind, that main purpose of Facebook is to facilitate communication between its members, which many users see as form of entertaining, under condition of mutual trust with other users (Shu & Chuang 2011). Taking into account rapid development of the Facebook, its popularity and recurring interface change, seems very surprising such not numerous amount of research of this social network. This can be explained that social network research is in its infant stage, comparing to research of traditional web pages.

3. Innovations and Pyramiding

Substantial interest for researchers are radical innovations, for their ability to change market structure and bring company to leaders position, and ensure substantial growth in revenues and profit. From the previous research is known, that users are often source of radical innovation, examples are sport gear, software and surgical instruments industries (von Hippel 2005). Frequently innovation associated with problem solving process, radical solutions are radical only for industries where they haven't been applied yet. Similar problems can exist in other areas of knowledge, or industries, but due to differences in industries structure they can be already solved, example is brake system ABS, which initially was developed for airplanes, had high price, but was still affordable for the air industry. For automotive industry it was radical solution, and it was imported from air industry, but not developed internally, that reduced initial costs for system development. Company, which is interested in radical innovation from users, should search them in distant fields of knowledge, to contribute for breakthrough solution. Empirical research shows that more radical solutions came from more distant fields of knowledge then the field where problem resides (Gassmann & Zeschky 2008), thus the searching method should be developed with goal to attract people from other fields, advisable as far as possible. This can be achieved by embedding these principles on system level to broadcasting and pyramiding.

In this work, author chooses dragonfly effect, as method to make broadcasting and pyramiding correspond the needs of the search for people with knowledge from distant area. Dragonfly effect is system of methods for distribution of socially significant information to wide audience through social media. The dragonfly effect was

Busarovs

developed, based on thorough research of large projects and the way how information about that projects was distributed, one of the examples is elections of American president Barak Obama in 2008, when social networks inspired many young Americans to vote for him (Aaker & Smith 2010). At the present moment there is not enough information about the efficiency of this approach in case of business needs. This work is using some of dragonfly effects methods to program the broadcasting and pyramiding search on system level.

4. Approach

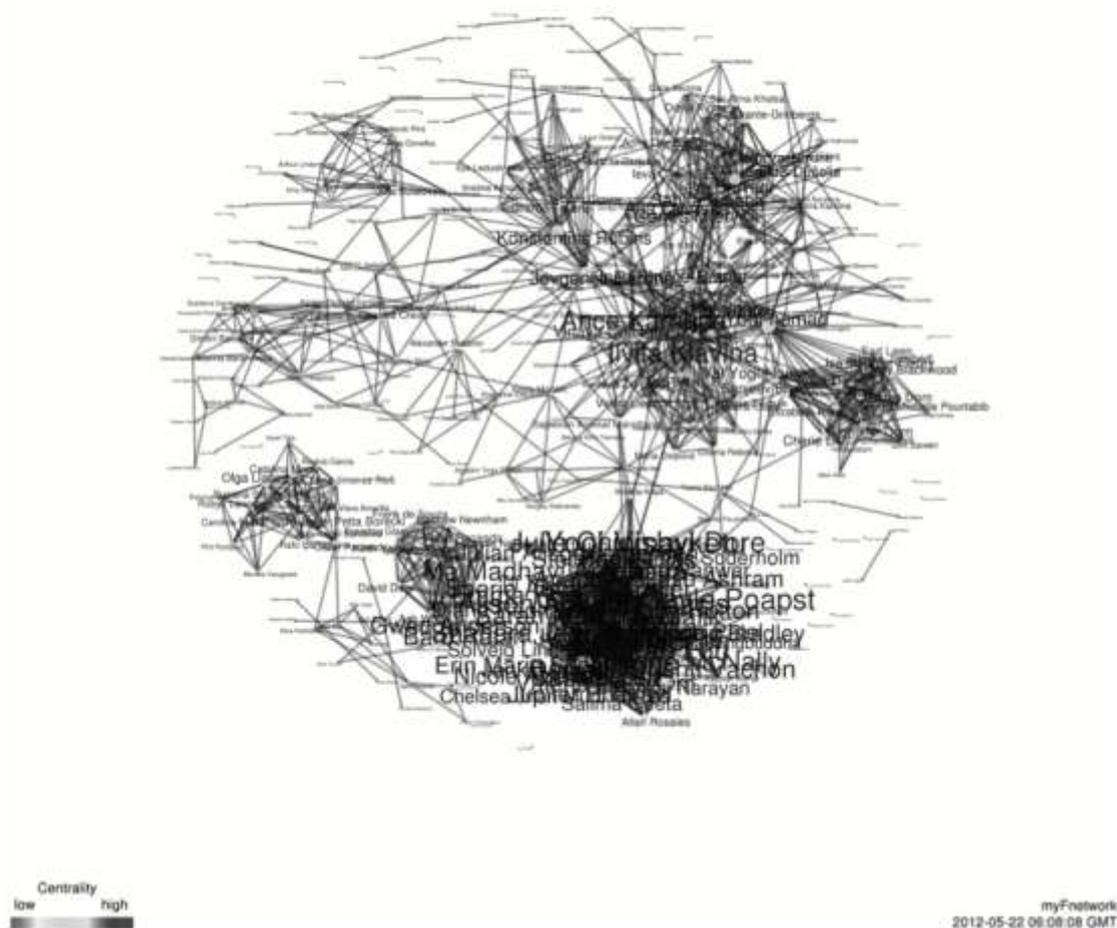
The foundation of this research is experiment, for which was developed graphical poster, inviting people to take part in online survey. The poster asked for help, and had additional description with exhaustive information about the initiator of the search and call for two actions, to take part in research and share information about research with “friends” on the Facebook, who might be interested in this research. The choice was made in favor of poster, because majority of people more easily perceive visual information, rather than plain text. Description under the poster had link to the <http://kwiksurveys.com/> where Facebook users were able to answer questions of the survey about participation in online idea contests.

The poster was published on author’s Facebook profile, which has 355 friends. The practice shows that just published information reach less number of people comparing with information, which attract attention in form of comments, “likes” and reposting. This is explained by algorithm of Facebook interface; not all post are shown from “friends” by default, only most popular. Popularity ranking is determined by attention that post receives from users. This peculiarity is especially important for people, who have many “friends”, every day face big stream of information.

Since the goal of this paper is determine efficiency of pyramiding and broadcasting, the sample was chosen in order to maximize both, quantity and quality of information distribution, first goal to reach wider audience and second to provide response from them. The graphic analysis of the social network was conducted, with aim to determine marginal members, persons who don’t have direct contacts with other members of this network, and have week relation to the core of network. Recent studies showed, that people who are located on the border of social network have higher level of creativity, since combine knowledge from different groups (Kratzer & Lettl 2008). The other benefit of reposting information through marginal members is information distribution to the wider audience to whom initiator of the search don’t have direct access. On figure 1 is presented graphical depiction of interconnections between members of social network, used in this work, marginal members don’t have any connection lines, linked to them, they are 33 in total. Every marginal member got personal message through Facebook with petition to republish this poster.

Busarovs

Figure 1: Graphic analysis of social network.



5. Limitations of this Work and Future Research

One of the challenges in researching Facebook is its constant development and changes of interface, most of the time these changes are incremental, and most of the time users don't notice them, but seldom major changes are taken place, as in case of shift from profile's wall structure to the timeline structure (Neal 2011). Due to the Facebook's constant evolution, its research's results have short validity time, it stays actual as long as observed structure is operating, after web page structure change the results of research have limited application. This limitation can't be overcome by deeper research, due to its short lifespan, in order to keep results updated research should have recurring nature and follow every new update from Facebook. Additional difficulty researching any social network is its unstable nature; stages in the life course will influence the social network of actors (Kalmijn 2003).

In addition to the information distribution over Facebook, offered survey asked about intentions to take part in idea contest, which in its essence is creative crowdsourcing, according to Schenk & Guitard classification (Schenk & Guitard 2009). But previous

Busarovs

research shows that intentions and real actions have weak relations (von Hippel 2005). More precise results would be from research based on empathic design principles, but this would be too expensive, since crowdsourcing involves unidentified group of people in the Internet (Howe 2008), the crowd that is more than two billion people, and continue to grow (ITU 2012). Considering fact, that crowdsourcing has no clear limitation for applications in particular industry, its research should be combined with real examples, in order to determine which are the key factors for participation in different industries. The data, received during these experiments, should be presented in the form of case study. According to Alan Branthwaite and Simon Patterson research for social networks assessment deep qualitative research is more appropriate, rather than just monitoring of this networks (Branthwaite & Patterson 2011).

6. Results

Despite notion, that information within Facebook can be distributed similar to the snowball, in case of search for rare information, the speed and degree of distribution for general information appeared to be more modest. As the results of applying both methods (broadcasting and modified pyramiding), 17 users made actions to promote initial information further through their networks.

Table 1:
Responses to question “How did you mark post with information about this survey?”

Action	Response
Like it	4
Share it	8
Comment on it	1
Send as message	1
Post it on my time line (wall)	3
Didn't mark it at all	27

Table 1 shows in details how information was distributed further. For efficient information distribution over Facebook network most desirable actions are “Share”, “Send as message” and “Post on the time line”, the results of this actions are more visible and appear more frequent in the stream of information for distant users, to whom the source of information have no direct connection. “Like” and “Comment” don't guarantee visibility for distant users, especially if they have many “friends”, since algorithm of Facebook reduces amount of shown information, that hinder information distribution. User can see all information from “friends” only if it was changed manually in profile settings.

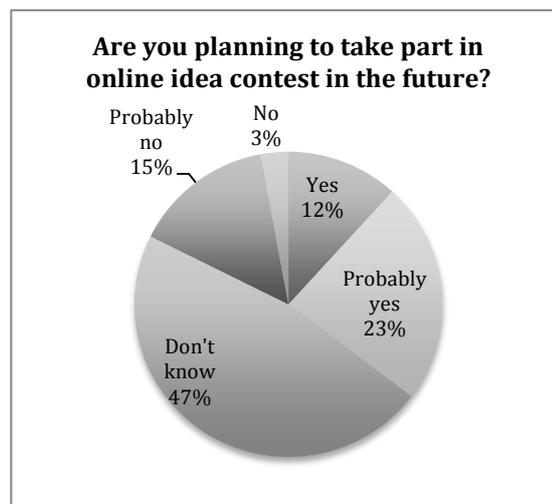
The strongest response for call for help was from modified pyramiding method, out 33 marginal “friends” 7 distributed information further with personal comments for their “friends”, asking to take part in the survey. This is high response rate, and it support notion that pyramiding, aimed at marginal members of social network is effective way to search for information. Broadcasting, or passive posting of information on the Facebook, showed much worst result than pyramiding, there were only 2 “share” responses, out 355, that are the results of broadcasting, both of them can be explained by emotional attachment to the initiator of the survey. That shows that

Busarovs

broadcasting is ineffective when applied to wide, undefined Facebook users. There is need in additional research of broadcasting effectiveness when it is applied to narrowed groups of people, who shares common feature and interests, like fan pages of professional associations, or groups pages, according to Facebook typology. Another 3 poster sharing came from people with whom initiator has no direct social contacts. Such reaction can't be called snowball effect and confirm Scale's research that Facebook is not efficient way to distribute information (Scale 2008).

The surveys replies showed following results, the respondents were age range from 23 to 60, on average 32 years old. Presumably number of responses would be higher if group would be younger, but how valuable would be these answers for crowdsourcing search, since people younger than 25 didn't gain enough professional experience, which is needed to solve problems in other industries. Very significant discrimination by gender, 70% is women and 30% men. Such strong bias probably is due small sample, only 43. This fact have to be addressed in future research, because according to Jeppesen and Lakhani research women have higher potential in successful solution creation (Jeppesen & Lakhani 2010), that in combination with modified pyramiding method could become powerful tool for problem solving and innovation creation.

Figure 2: Intention to take part in future crowdsourcing projects



Survey showed that significant part, 35% of participants already have experience in such crowdsourcing activities as idea contests. Respondents were asked about their motivation to take part in idea contest, the most popular response was desire to help. One of the respondents mentioned opportunity to learn something new, he put it this way: "the opportunity to learn and get feedback on my work". This reason is often mentioned in literature on free participation in crowdsourcing (Lakhani & Wolf 2005). The answers for the question about not taking part in idea contest were lack of knowledge about such contests, for example one of the respondents claimed, that he was late to submit his idea. Taking in to account these answers is clear that crowdsourcing is lacking popularity, and organizers of such contests should promote them more thoroughly, promotion campaign should be well timed in order to allow participants submit their propositions. As it is seen from the Figure 2, the future participation in crowdsourcing is ambiguous. This can be explained in the way, that decision to take part in crowdsourcing is made spontaneously, based on combination

Busarovs

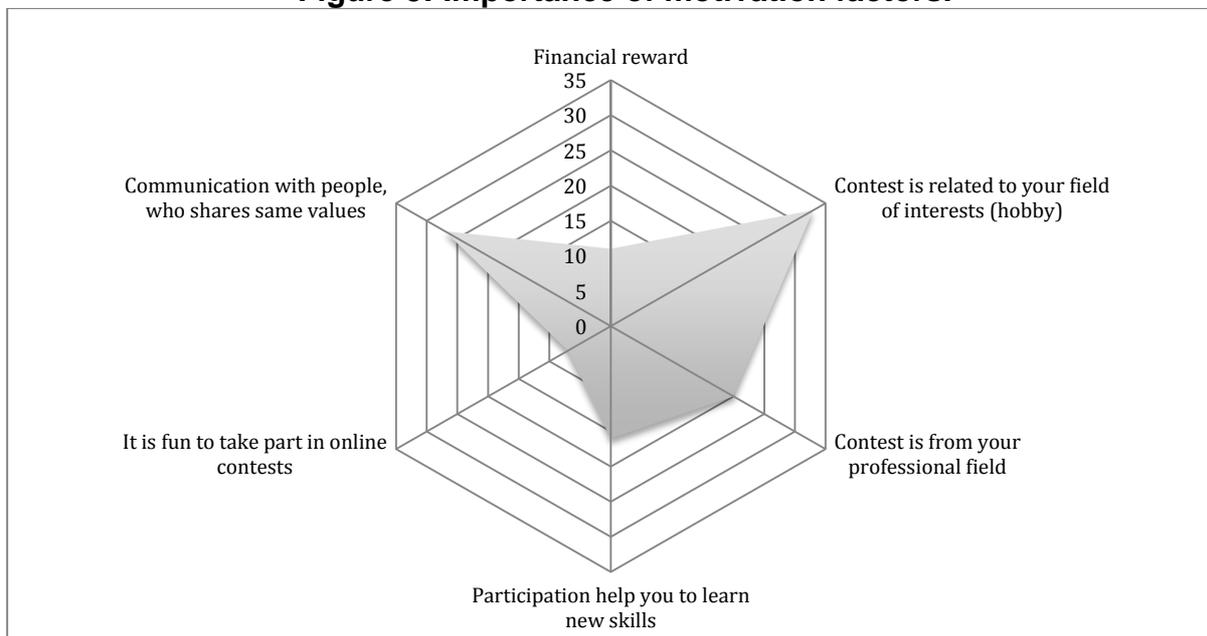
of many factors, such as available time, information about contest, insight, which is difficult to provoke artificially (Gentner & Markman 1997). Survey also asked question about motivation factors to take part in idea contests, the results are shown in table 2.

Table 2: Motivation to take part in idea contests.

	Very important	Somehow important	Not sure	Not important	Not at all important
Financial reward	25.00%	25.00%	21.88%	15.63%	12.50%
Contest is related to your field of interests (hobby)	37.50%	37.50%	15.63%	9.38%	0%
Contest is from your professional field	25.00%	34.38%	21.88%	15.63%	3.13%
Participation help you to learn new skills	21.88%	28.13%	31.25%	15.63%	3.13%
It is fun to take part in online contests	12.50%	21.88%	46.88%	12.50%	6.25%
Communication with people, who shares same values	21.88%	46.88%	25.00%	6.25%	0%

Summarized all replies, each answer got value from +2 for “very important” to -2 for “not at all important”, and neutral answers were assets as 0. All answers were combined for each category; the results are presented on figure 3. As seen from this chart main reason why people take part in crowdsourcing activity is coincidence of person’s hobby with the area of knowledge where crowdsourcing project is coming from. The other most significant factor is possibility to communicate with people of same interests and values. Both findings correspond with previous research on motivation to participate in crowdsourcing activities (Hars & Ou 2002; Lakhani & Wolf 2005; Ge, Dong & Huang 2006).

Figure 3: Importance of motivation factors.



7. Conclusions

The major limitation of current work is small sample of respondents. This situation is common for online surveys, thus future research have to cover much wider audience. Taking in to account this limitation, received results can't be seen as universal, and shouldn't be extrapolated to all cases of information distribution on Facebook,

Busarovs

especially commercials. This work determines borders of limitations and set directions for future research, which will overcome these limitations and deliver more precise data.

In order to maximize opportunity from web 2.0, promotion activities shouldn't be limited only to one social network, even as big as Facebook. Information should be distributed through various channels, ingresses in social media, such as YouTube, LinkedIn, Slideshare etc. Published content should be aligned with form of the web site, like video for YouTube and presentation slides for Slideshare. The same is true for social networks, information on the LinkedIn should be oriented on the professionals, MySpace is suitable for more creative people, and Facebook for general audience.

Crowdsourcing, and idea contests in particular, require deliberate plan for its promotion. This plan should include call for help, because Internet users are eager to help with their ideas how to solve problem. Taking in to account fact, that one of the motivation factors to take part in crowdsourcing is sharing interests with the area of knowledge where problem is coming from, primary information should be distributed through groups of interests, clubs, associations etc. Secondary the wider audience should be targeted, since the reason of not taking part in idea contests is lack of information about such contests. In order to leverage the intelligence from the crowd, the structure of crowdsourcing platform should allow exchange ideas and knowledge between participants. According to Surowiecki, under right circumstances group of people can be smarter than the smartest member of the same group (Surowiecki 2004), thus on the system level the web site should be oriented to maximize synergy.

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Busarovs

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Busarovs

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