COMPETITION FOR INNOVATION IN THE FINANCIAL SOFTWARE INDUSTRY – A RESEARCH ON HACKATHONS

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Abstract
In today's interconnected and globalized economy, the concept of hackathon is a phenomenon in its boom days. Companies from many sectors of activity organize such events in order to drive innovation and gain access to cheap technology. The present paper is the result of a survey-based research aiming to describe the motivation of participants at such events, their view on how hackathons help them develop new skills and find new ideas, how a hackathon is organized in a financial software company and what does the concept of "hackathon" mean for the participants. Results showed, among other things, that the organization of a hackathon in a multinational corporation depends on the region where the event is held (participants feeling the effects differently depending on the office in which they work) and it is not easy to reach standardization in such an event.

Keywords: Hackathon, technology, innovation, financial software industry

JEL Classification : L86, O31, O32

Introduction

Appeared in the high-tech industry during the Internet bubble, the event called "hackathon" helps companies across an ever increasing palette of fields of activity to innovate and participate in the creation and/or development of new technologies. Hackathons have become a preferred way to tackle real-life problems and meet different needs of companies and people, from the most basic ones (like the need to interact with the others) to more complex needs (like launching a new prototype). A source of ideas, these events find their power in the collaboration which can be generated inside a team of members with different backgrounds; multinational corporations use them to help create stronger networks inside their structures. "Hackathons also have the potential to influence corporate culture and be used in external marketing efforts to position the company as a savvy digital workplace" (Gotta and Moyer, 2016).
Such events are associated with characteristics like "new", "fresh", "innovative", and "fun". However, it is not easy to organize a hackathon: it requires intensive preparation, a good

understanding of the local culture and a good timing. It is also difficult to determine people to dedicate their time to such an event because it is very often felt like a competition and people fear they do not have the needed skills to succeed. However, once passed this obstacle, the hackathon can prove useful to generate new ideas and start new projects. Today, the collaborative aspect is much more important than the competitive aspect.
Finance has long been seen as the area where technology investments are of great magnitude but digitalization is slow (systems are changed with difficulty). However, all this is starting to change and hackathons are a piece of the new order: financial institutions and financial software companies have realized what the benefits of such events are and have become one of the most important player in the organization of hackathons in the world.
The current paper describes the concept of hackathon in detail, focuses on its organization through literature review and survey-based research, gives some high-level statistics of hackathons in the world, and draws some conclusions on the aspects discussed.

1. Literature about hackathon

1.1. What is a hackathon?

A hackathon is in the vast majority of cases a full-day event (although it could last up to a week) in which developers and other people work together in software and/or hardware projects for different kind of purposes (purely professional, educational, social, and so on). A union between "hack" (to program something catchy, contagious) and "marathon" (working on the project intensively, nonstop), the concept of hackathon has grown in popularity in recent years (at a global level) even though it appeared more than a decade ago (the first "Hack Day" at Yahoo, for example, was held in 2006) (Wikipedia, 2017). The word "hackathon" is known to have emerged during the dot-com bubble and can now be characterized as a phenomenon in its boom days, after conquering the high-tech world in the years 2000s, together with the Internet. Any developer interested in a specific idea can now find pieces of code on the Internet from which to start his/her own project.
So who participates in a hackathon? It is true that developers do participate, but even though they represent an important segment of the participants, there could be other people involved in a hackathon: from functional analysts to project managers, from designers to testers, from simple supporters who provide the team with food and water to subject matter experts from different fields of activity. According to data collected from hackathon.com, 43% of participants are professionals, 21% are students, and almost 10% are entrepreneurs. It all depends on the type of hackathon and the conditions of the event: there are hackathons in which the eligibility criteria are very strict, and there are hackathons where there are no restrictions in what the participants are concerned.

1.2. What is the purpose of a hackathon?

The concept of hackathon has gained momentum when investors and companies all over the world realized that they can access cheap innovation and easy funding in order to create and/or participate in the development of new technologies. Such a simple event can have contributions in huge successes, like entire companies created from projects presented in the hackathon. Companies can innovate faster and cheaper, and we should look at hackathons through the positive energy that these events bring in the organization or community in which they are hosted. A hackathon is a collaborative event which drives forces and produces results (synergies appear between different departments).

The hackathon does not necessarily have to end with a complete solution to the problem exposed in the subject of the event or assumed by the project: it is all about participating, getting involved in the organization's or community's problems, learning something new along the way and embracing new ideas.
Hackathons can also be used as a marketing tool (to increase brand awareness) or as a human resources tool (develop competences and creativity, attract or identify talent within the organization); even though many companies use them to create new products and services, the benefits of hackathons are not limited to this (Laudet, 2017).

1.3. How is a hackathon organized?
The hackathon is a simple concept, but organizing such an event often requires serious efforts: probably the largest hackathon in the United States in terms of participants was MHacks, run by the University of Michigan (part of Major League Hacking, a national collegiate hackathon league), with over 2,000 people taking part in the event. From the point of view of logistics, the resources have to be considerable, but the most difficult thing in a hackathon is to attract participants and make them work for the idea. For example, many people do not know what a hackathon is and think that you need programming skills to participate in such an event. Others feel that they are not smart enough or innovative enough to take part in such an event; or it's just that they feel they do not have the skills needed to succeed, just like in any other competition (Tauberer, 2014).
Be it in a multinational company or in a local community, hackathons usually start by a presentation in which the subject (if one exists) or the concept is exposed to the interested parties. After the presentation, participants form teams and submit their ideas; the hackathon usually has a dedicated site and the registration is online.
The hackathon can take from a few hours to several days; the organizers usually provide drinks, food and sleeping bags. The team programming something can come to the event with parts of the code already prepared, especially for full day hackathons. The hackathon ends with a demonstration of the projects by each team participating in the event, in front of a jury. Prizes are often given to the winning teams and can vary from several hundred dollars to even one million dollars, like the hackathon organized in 2013 by Salesforce, the leading customer relationship solutions provider.
The presentations of the projects created in a hackathon are intensely promoted via social media, through blogs or photo/video releases, because the aim is to make the ideas popular and encourage other people to develop on them and even start businesses from them.
At the end of the hackathon there is more work for organizers: they have to take note of what went right and what went wrong and sometimes they make surveys among participants in order to receive feedback on how to improve future events.

1.4. Hacktahons in the world
Hackathons can find applicability in many fields of activity, from entertainment to fashion industry, from electronics to retail, from social sciences to life sciences, from administration to public transportation. The variety of sectors that adopt hackathons is in continuous expansion. Finance is one particular sector which makes serious progress in transforming its business through digitalization, and hackathons are growing in popularity.
Depending on the institution organizing the event, we can classify hackathons in: hackathons organized by central or local authorities, by multinational or local companies, by non-profit organizations, by education and health institutions, and so on. City councils

and even libraries organize hackathons, and so do European institutions. Hackathons can be classified also depending on the type of participants: students, women, people from a certain community, people with a certain social status. Only one quarter of the total hackathons organized in 2016 are internal ones (the rest being public).
Even though the United States and the United Kingdom are world leaders in organizing hackathons, this event is not the exclusivity of the English-speaking countries. More than 100 countries around the world are officially known to have hosted such events, with Germany and France leading the trend in continental Europe (Laudet, 2017).

2. Research about the hackathon in a multinational financial software company

2.1. Research hypotheses

Three main hypotheses on research variables have been formulated:
H1: Organization of a hackathon in a multinational corporation is affected by regional characteristics and resources

H1.1: The way hackathon participants feel the help received from hackathon organizers in understanding the purpose of the event is influenced by the region where the event is held.

H1.2: The emotional support received by the hackathon participants from the organizers of the event is influenced by the region in which the event is held.

H1.3: The opportunity of the time chosen for the hackathon is perceived differently by the participants depending on the region where the event is held.

H1.4: The resources provided by the organizers of the event to the hackathon participants vary depending on the region where the event is held.

H2: Participants in a hackathon see differently the inclusion of the event in their career development depending on their gender.
H3: Hackathon participants use this type of event in order to improve their skills and their career.

H3.1: There is a positive correlation between the way participants see the development of their skills through hackathons and their career development.

H3.2: There is a positive correlation between discovering new ideas through hackathons and developing skills.

2.2. Research method

The research method chosen for this paper is the survey, which is the most recommended method of research when people are the main source of information. The questionnaire is the technique employed here and it was applied to all the employees of a financial software company who participated in one of the two hackathons organized so far by the company.

2.3. Data collection method

The theoretical support for this research was given by the review of the literature existing on hackathons, mostly being available on the Internet. Other support materials consisted in internal documents of the company that organized the hackathons in the 2015 and 2016 editions (including e-mail messages and articles found on the intranet of the company). The actual data was collected through the use of an online questionnaire with five-choice Likert spectrum, the answers ranging from “strongly agree” to “strongly disagree”.

2.4. Results of the research

2.4.1. Descriptive statistics

The questionnaire was sent to a total number of 501 employees (in the financial software company chosen as subject for the paper) who have participated in an internal hackathon; the total number of actual responses was 185 (37% response rate). The results were interpreted using Q Professional software (V5.1.2.0).

In descriptive analysis, we used frequency distribution and frequency percentage tables. Out of the 185 respondents, 79% were men, leaving the women respondents to a total of only 21%. More than a half of the employees who responded to the survey were aged between 21 and 30 years and 67% are employed for less than five years.

Table no. 1: Frequency of employees by age and job tenure

Job tenure / Age	Less than a year	Between 1 and 5 years	Between 5 and 15 years	More than 15 years
Between 21 and 30 years	46%	72% ↑	24% ↓	0% ↓
Between 31 and 40 years	46%	23% ↓	60% ↑	40%
Over 40 years	8%	4% ↓	16%	60% ↑
Total	100%	100%	100%	100%
Total sample; Unweighted; base n = 185				

At the same time, the number of developers or technical consultants represented 80.5%, which means that only 19.5% were functional consultants or other type of consultants (fig. no. 1); this indicates a concentration of developers among the hackathon participants which seems specific to software providers. General data from hackathon.com indicate however that, in 2016, the majority (59%) of the participants at internal hackathons was actually represented by non-technical staff.

Figure no. 1: Hackathon participants by background

The above statistics indicates that there is currently a lack of benefits from collaborative participation at this financial software company's hackathons. However, considering the fact that the hackathon has been organized only on two editions and that only 38% of the respondents strongly affirmed that they knew what a hackathon was before receiving the invitation from the organizers, it is expected that these figures ameliorate as the event gains in popularity among the employees.

Table no. 2: Hackathon familiarity among technical and non-technical staff

Hackathon familiarity	Non-technical staff	Technical staff
Strongly Agree	25%	42%
Agree	56%	44%
Other responses	19%	14%
Total sample; base n = 185	100%	100%

While the figures for hackathon familiarity are close between technical and non-technical staff, a deeper look shows that the technical staff is more familiar with this concept. This is expected since the concept appeared in the high-tech industry more than a decade ago and involves programming in the vast majority of cases.

In what concerns the statistics about the departments in which the respondents work, around three quarters of the hackathon participants work in Development & Quality Assurance (QA), and only 8% are from Customer Support and Engineering teams (fig. no. 2). These results come to confirm the strong presence of the technical staff in this company's hackathon and somehow contradicts the general trend in the hackathon organization industry, which focuses on clients and therefore has an important Customer Support contingent.

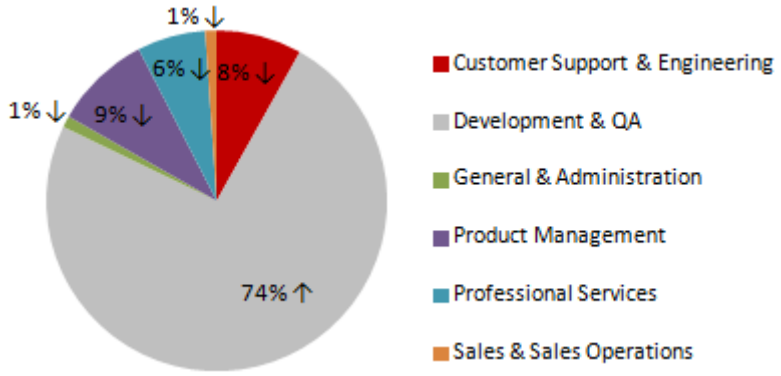

Figure no. 2: Hackathon participants by department

Only 1% of the respondents to this survey work in Sales & Sales Operations, 1% also in the General & Administration departments, and none of them come from the Software as a Service (SaaS) team. For a company which has a strategic pillar of customer centricity, these aspects need to be ameliorated in the future.

In what the motivation of the participants is concerned, employees from Europe and Asia agreed (88%) that they registered in hackathons because they are fun events, while those from United States disagree in a proportion of 33%. However, the main motivation of participating in a hackathon is the desire to create something new, to innovate: achieving this feat brings public recognition of someone skills and helps in opening new horizons in that person's career. Since this was a research on an internal hackathon and the prizes were not very high, only 45% of the participants considered the financial reward as a motivation to participate in a hackathon (with a low of 33% in the United Sates).

2.4.2. Pearson's Chi-square Test for Independence

In order to demonstrate the dependence between research variables, we used the Pearson's Chi-square Test (Agresti, 1990).

Testing the hypothesis H1.1 of this paper we have found out that the way respondents agreed that they received help from the organizers on discovering the event's purpose was influenced by the region in which the event was organized.

Table no. 3: Chi-square results

Hypothesis	Chi-Square	Degrees of freedom	Effective sample size	p-value	Level of significance
H1.1	18.8	8	185	0.02	0.05
H1.2	39.349	8	185	0.000004	0.05
H1.3.	15.82	8	185	0.045	0.05
H1.4.	52.931	8	185	<0.000001	0.05
H2	12.808	4	185	0.01	0.05

In the same way, hypothesis H1.2, H1.3 and H1.4 are accepted. Regarding hypothesis H2, the same test shows that the gender of participants influences the perception of the way a hackathon contributes to career development. 61% of the male participants believe that such an event can help their careers, while only 41% of the women believe the same thing.

2.4.3. Correlation Matrix

To test the hypothesis (H3) we have used a correlation matrix, which shows a positive correlation of 0.36 between the way respondents assess the development of their skills through hackathons and the effect that this development has on their career.

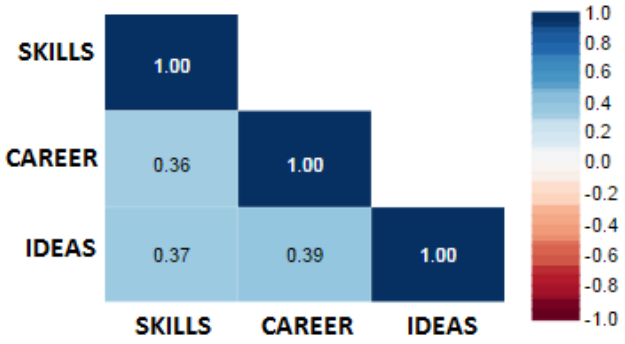

Figure no. 3: Correlation matrix between skills, career, and new ideas

A positive correlation (0.37) exists also between developing your own skills through hackathons and discovering new ideas. Both skills and ideas are important in order to develop a career, especially in the financial software industry.

Conclusions

The hackathon concept has appeared in the high-tech industry more than a decade ago, but it still remains a puzzle for many people. A small percentage of the non-technical respondents to this survey strongly affirmed that they knew what a hackathon was before participating in the event; and this is a statistics for the participants. 41% of the respondents think that you need programming skills to participate in a hackathon, which contradicts the definition of the concept and the fact that the global trend is to include people with a large variety of backgrounds. Three quarters of the respondents also think that hackathons are actually competitions. The financial software company chosen as a subject for this paper still has work to do in order to benefit from the collaborative aspects of hackathons. Many of the participants at the internal hackathon are developers and they do not seem to use the ideas of non-technical people. The global trend is to create a mix of people, enrich the corporate culture and enhance internal professional networks through hackathons.

From an organizational point of view, other improvements are required. While the hackathon might seem a simple and fun event, its organization is not easy. Especially for hackathons in multinational organizations where each branch has its own "competition", it is difficult to reach standardization and satisfy all employees. For the current research, the event chosen as an example is only at the second edition and might not have all the details established clearly: it is an idea to which more and more people adhere. Respondents from the United States felt in a proportion of 50% that they did not receive all the support needed from the organizers. 33% of the participants from France and 20% of those from the Philippines thought that the time chosen for the event interfered with their schedule. In total, only 28% of the employees responding to this survey and taking part in the company's hackathon considered that they had everything they needed in order to implement their idea.

The statistical tests showed that the region in which the event is held influences the results of the organization of the event. For this financial software company, a good solution would be to collaborate with a specialized company in organizing the hackathon, but it all depends on the resources allocated to this event.

In what the motivation of the participants in an internal hackathon is concerned, this aspect is not strictly related to money, as this research also suggests: it is more related to the positive energy and collaboration that it brings, to the possibility of creating something new that will immediately attract masses, to the public recognition that professionals search and to the opportunities they offer afterwards. We can make the parallel with the open-source movement, where professionals create and improve software programs without expecting an immediate gain; instead, they expect: peer recognition, career and learning incentives, improved performance at work, and having fun while creating something new (Vogelsang, 2010).

As future directions of the research on hackathons, more in-depth analysis can be realized by following the four main points revealed by the current paper: degree of knowledge and meaning of hackathons, motivation of participants, organization of hackathons, and personal development following such events. The purpose of the current paper is not to analyze the profile of a hackathon participant nor to quantify the effects of a hackathon on the development and career of the participants, so more could be realized down this road.

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