



A Case Study on Hackathon # Develops and a Hackathons Contribution to Innovation

Deise Carolina de Souza Silva^(✉), Clarissa Stefani Teixeira^{ID},
and Jatyr Ranzolin Junior

Federal University of Santa Catarina – UFSC, Florianópolis, SC, Brazil
deisekarolinass@gmail.com

Abstract. In recent years there has been a significant increase in hackathons in the Brazilian public sector, especially between the period from 2012 to 2016, where more than 51 hackathons have been identified. The present study sought to analyze the potential of these events for innovation within the public sector and carried out a research with the managers of the case Hackathon #DesenvolveSC, which was the first hackathon of the Government of Santa Catarina - Brazil. Thus, five government officials were interviewed in order to identify their perceptions regarding the practices of hackathon and changes occurred in the public organization. Santa Catarina began to perceive the need to promote events that provoked the interaction of the state with the citizen and the triple helix, and that through collaborative environments, exchange of experiences, sharing of resources and creation of ideas, encourages solutions to be to fill gaps in the public sector. This process of interaction and collaboration where there is an exchange of information between the internal environment that is the public sector and the external environment is where open innovation occurs. Hackathon is not just a marathon of technological artifact competition, but it is also an open innovation tool perceived by the servers. In addition, the main results indicate the interaction potential that events such as hackathon provide in the ecosystem, not only in connection and support with other state folders, but also with universities and private companies that accompany the marathon in its execution.

Keywords: Hackathon · Hackathon in the public sector · Open innovation and hackathon

1 Introduction

In today's information-rich environment, companies can no longer rely entirely on their own ideas to advance their business, nor can they restrict their innovations to a single path to the market. The traditional model of innovation - which has been largely internally focused, closed off from outside ideas and technologies - is becoming obsolete. Emerging in its place is a new paradigm, "open innovation", which strategically harnesses internal and external sources of ideas and leads them to the marketplace in multiple ways [1].

Citizen sourcing strategies, such as hackathons, have been increasing in the Brazilian public sector. Hackathons have a clear focus on inviting citizens to participate in problem

solving and building solutions that can benefit society. Hackathons are a strategy for open innovation. However, its format still presents weaknesses in relation to the costs involved in its organization and the sustainability of the solutions created [2].

In Brazil, hackathons events within the public sector have been growing in recent years. States have sought to find solutions to the problems surrounding them using hackathons as a tool. In the period from 2012 to 2016 51 hackathons were identified in the Brazilian public sector, most of which were carried out at municipal level, orchestrated through prefectures³. However, some initiatives at the state level were located and, in this context, the present article sought to analyze the potential of actions in stimulating innovation through a collaborative environment between government, citizen, university and company under the focus of the Hackathon case #DesenvolveSC.

2 Hackathon and Its Characteristics

The hackathon concept came about when independent developers created a cryptographic development event held in Calgary on June 4, 1999. A small number of developers came together to avoid legal issues arising from the United States cryptographic software export regulations. The word hackathon is combined with the words hack and marathon, where the hack is used in the exploratory sense and investigation of programming (not as a reference to cybercrime) and “marathon” and means a long run to create something useful in a single event [4].

The initiatives present similar characteristics as to the format of the event, opening lectures are held and the teams that will participate in the marathon are formed. Teams are evaluated at the end of the event and rewarded with financial and/or non-financial rewards (travel, “mini-internships”, courses, mentoring and incubation programs, etc.). However, in Brazil these values are still differentiated in each case².

One of the reasons for the popularity of hackathons is its symbiotic or collaborative nature where everyone involved benefits. These benefits are associated not only with the participants, but also with the organizers and sponsors. Many hackathons are geared toward college students and the event provides an opportunity to learn aspects of software development that are difficult to teach as part of their regular classes. Thus, in some hackathons, students have free access to software and hardware considered to be expensive or for products that have not yet been released [5].

2.1 Hackathons in the Open Innovation Context

Open innovation according to Almiral et al. [6] will succeed when the needs of the entire ecosystem and supporters are organized in order to promote competition and collaboration. In the meantime, Ferreira [2] states that the promotion of hackathons is used in the context of open innovation, analyzing the impact perceived by the end customer of the product or service. For the same authors, practices tend to be positive and the procedure helps to remove barriers and accelerate ideas.

The relaxed organizational structure of hackathons events encourages participants to innovate and create an environment that can sustain innovation (that is, it can manage the failure needed for innovation to emerge). In addition, the relative ease of hosting

such events allowed many events to be realized, therefore, for a variety of experience and skills to be applied within the reach of different cultures. Likewise, the ease with which they can be maintained and the diversity of events that have emerged make them challenging. It is estimated that there is an average hackathon per week in London, with participants from different agencies and departments [4].

In the public sector, according to [3], governments seek support from citizens to provide assistance in solving problems. Such a practice is called by some authors of citizen sourcing, which functions as a resource to collaborate and find answers to the difficulties encountered in the public sector in an efficient manner. From this, one of the initiatives to contemplate this scenario of cooperation between government and citizen has been occurring in the public spheres through hackathons.

Contests that involve greater citizen involvement in solving a problem, such as hackathon, may be important to enable a greater level of open innovation in the public sector. In this way, it can be said that the public agent plays an important role in promoting open innovation initiatives, and it is necessary to discuss their perceptions about how citizens' initiatives can promote open innovation in the public sector. However, the hackathon, as a citizens' initiative for open innovation, is still a little studied by the academy considering the current interest of the government in the initiative, mainly in Brazil [2].

3 Methodology

The methodology applied to conceptualize hackathon was carried out through a bibliographic review [7] with the keyword "hackathon" in international databases and was also used Google Scholar and Portal Capes to search the scientific information about hackathons performed in national territory. A bibliographic survey on hackathon in the Brazilian public sector and the relationship of hackathon with open innovation was also carried out.

In order to carry out the study of the case study, the two editions Hackathon #DesenvolveSC of the Government of the State of Santa Catarina - Brazil, carried out through the Center for Information Technology and Automation of the State of Santa Catarina (CIASC), which is a company founded more than 40 years ago. In the year 2016, CIASC launched the first edition of Hackathon #DesenvolveSC, with 120 participants and in 2017 launched the second edition of Hackathon #DesenvolveSC with the involvement of more than 150 participants. The events cited present a methodology from the Federal University of Santa Catarina that conducts open innovation events for governing bodies in the State of Santa Catarina [8]. For the data collection, a questionnaire was applied with the internal committee of the CIASC, responsible for the promotion of the Hackathon #DesenvolveSC. The questions that led to the pursuit of knowledge about employee perceptions were: 1) Do you consider Hackathon #DesenvolveSC to be an open innovation method? 2) Describe the benefits of Hackathon #DesenvolveSC for the CIASC, and if there has been any significant change to the company; 3) Describe what in your view did not bring a positive result and what needs to be reviewed or improved in the Hackathon method #DesenvolveSC. Thus, five questionnaires were applied with the strategic leaders who participated in the constitution of the two editions of Hackathon

#DesenvolveSC. The questionnaire was sent via email and prepared using the Google Forms tool. The answers were analyzed qualitatively and interpretatively and used for the elaboration of this article.

4 Hackathon #DesenvolveSC: The First Hackathon of the Government of the State of Santa Catarina

Hackathon #DesenvolveSC was the first hackathon carried out in the state of Santa Catarina, through the Information and Automation Center of the State of Santa Catarina (CIASC), a public company responsible for the execution of the company's policies, management and technology services, information and electronic governance of the organs and entities of the State Public Administration, direct and indirect [8].

According to information contained in the official site of the event, official government source, the first Hackathon #DesenvolveSC, was held in September 2016, with more than 41 (forty one) participants, 10 (ten) multidisciplinary teams formed, with the participation of 23 mentors (business, developer and usability), five speakers, one of them international. The competition aimed to strengthen the relationship between the public sector and the citizen through projects in the areas of economic development, sustainability and innovation. The three best works received the award in the amount of R \$ 5 thousand each. The hackathon was carried out by the CIASC in partnership with the Federal University of Santa Catarina (UFSC), with support from the State Secretariat for Sustainable Economic Development (SDS) and the Santa Catarina Foundation for Research and Innovation (FAPESC) [9].

The second edition of Hackathon #DesevolveSC took place in August 2017 and counted on 150 participants, among students, mentors and speakers and aimed to promote the development of technological solutions mobile, web and internet of things (IoT), with a focus on public safety. The 2nd Hackathon #DesenvolveSC was held in partnership with the State Department of Public Security (SSP) and Federal University of Santa Catarina (UFSC) [8]. Information on 2016 and 2017 events can be seen in Table 1.

According to information contained in the official website of the event Hackathon #DesenvolveSC, it was possible to observe that both editions sought to promote an environment of innovation and collaboration between government, university and professional market practices, stimulating the creation of technological solutions for the use of the state and of the citizen. In both events, there was connection of the triple propeller where members of government, universities and companies could act as mentors of the solutions proposed during the event [10].

The results obtained in the questionnaire applied with CIASC employees, directly involved in the organization of the event, are shown in this Table 2:

In the analysis extracted from the form, 95% of the respondents answered that they consider hackathon an open innovation method. Authors [6] consider that hackathon practices are carried out in government settings, such as in Amsterdam, Barcelona, Boston, Helsinki, New York and Philadelphia. These practices are understood as being of open innovation since they present the real problems faced by public institutions. In the case of the state of Santa Catarina, two institutions were involved in opening up the problems faced at the governmental level, being the State Secretariat for Sustainable Economic Development and the State Secretariat of Public Security.

Table 1. Hackathons numbers made in the years 2016 and 2017.

Year	2016	2017
Entity receiving the event	Center of Informatics and Automation of the State of Santa Catarina	Center of Informatics and Automation of the State of Santa Catarina
Problem solver	Secretariat of State for Sustainable Economic Development	Secretary of State for Public Security
Problems	Environment Economic development Innovation in citizen’s relationship with government	Public security
Number of participants	41	47
Number of teams	10	10
Number of mentors	23	35
Number of speakers	05	07

Source: Prepared by the authors.

Table 2. Results of the applied questionnaire

1) Do you consider Hackathon #DesenvolveSC method of open innovation?	2) Describe the benefits of Hackathon #DesenvolveSC for the CIASC, and if there have been any significant changes to the company	3) Describe what in your view did not bring a positive result and what needs to be reviewed or improved in the Hackathon method #DesenvolveSC
YES = 95% NOT - 5%	Respondents answered that the benefit was not the creation of a new product, because there was no sustainability to continue the development of the prototypes. For the employees the reports are for the gain associated with the interaction of the triple propeller and the awakening to a new culture of innovation within the company	Respondents answered that the public company was unable to absorb the ideas generated in the event and turn into business and that the profile of the participants of the event was not an audience with an entrepreneurial vision, did not envisage a business opportunity and therefore had no interest in developing the solution and post-event method must be forecasted so that hackathon is not only an encouragement of ideas, but the transformation of good ideas into solutions

Source: Prepared by the authors.

[2] also considers that one of the goals of the hackathon marathon is the very achievement of innovation in organizations. In the case of the practices of Santa Catarina it is possible to identify that the greatest changes were not in the ambit of the Secretariat that opened the problems, but in the receiving entity. This is mainly due to the interactions carried out before and during the event with the team of mentors and the team that holds the methodology at the university.

However, other benefits are still found. A study such as [2] considers that hackathon practices were associated with: i) an increase in the number of new businesses in the region; ii) greater appropriation and openness of data of the public organization; and iii) changes in the perception of the organization's employee innovation culture. In terms of the hackathon analysis of Santa Catarina, employees of the CIASC (organization hosting the event) perceive that the action at the state level did not bring a resolution of the problems, due to the difficulty of continuing and developing post-event solutions. In this context, [2] already indicates the difficulties encountered in terms of sustainability in the development and execution of solutions. According to the same author, the government has difficulties absorbing the initiatives developed in hackathons, mainly related to the necessary contracting procedures after the development of the solutions, emphasized by the interviewees as "bureaucracy".

Both editions of the hackathon were carried out in partnerships with secretaries of state who are clients of the CIASC and had as objective to validate the technological solutions with their clients, during the marathon and to sign post-event partnerships for the conclusion of the solutions. Due to all the impediments and barriers, both political, management and bureaucratic, the solutions were not absorbed and made feasible. However, in the case of the 2016 event, they were made available to society [9].

However, employees indicate that hackathon has initiated a process of innovation within the company itself. [11] consider that the most valued results are associated with the community spirit generated from the event, but that lasts after the event. The same authors consider as benefits the educational proposals with the actors involved in the practice of the activity. These issues are true given the employee engagement and the second event - which took place in 2017.

For public employees, the benefit was not the creation of a new product, because there was no sustainability to continue the development of the prototypes. For employees the reports are for the gain associated with the interaction of the triple helix and the awakening to a new culture within the company. Authors such as [11] indicate that marathons provide those involved the perception of new forms of intervention and professional activities, directed to the construction of creative answers to socially relevant problems. Moreover, in the study by [2] the main purpose of the Brazilian public sector in promoting hackathons from the perspective of public officials is to generate innovations, promote social participation, greater transparency, environmental strengthening and innovation network, actors' approach to innovation (private sector, public sector and educational institutions, research and development) and acceleration of internal organizational changes.

One of the problems pointed out by the servers is associated with the non-incorporation of the solutions by the company. Moreover, according to perceptions the solutions were not turned into business. Studies already report the difficulties of governing bodies in stopping the solutions in open innovation processes [2]. According to the same author, the perennial or sustainability of the solutions developed by the participants is a critical aspect highlighted by the interviewees. However, in the event of the Santa Catarina event, what is observed is that by the proposal of the announcement of the event, the solutions corresponding to the version fully implemented in the winning proposal should be licensed to the CIASC, and should not be used for commercial purposes.

Another point considered for the non-continuity of the proposed solutions was the profile of the participants of the event who were not an audience with an entrepreneurial vision, did not envisage a business opportunity and therefore had no interest in developing the solution. The study by [2] indicated that some organizations try to reduce these risks and weaknesses of the format of hackathons by working with partners, mainly in incubation stages of the winning solutions of the contest. However, it should be noted that the main public of the event was a university which may also interfere with future visions.

5 Final Considerations

Hackathon, as identified in the research, is a method of open innovation [2], as it is possible to bring together different actors, such as academia, business, university and participants from different places, with different cultures and abilities, who share experiences, ideas, materials and deliver a value-added product for the state and the citizen.

The CIASC held two editions of Hackathon #DesenvolveSC, between the period of 2016 and 2017, being the pioneer in the Government of the State of Santa Catarina. The results were positive regarding the promotion of innovation within the company and the process of acculturation of the servers, who began to prioritize innovation and were instigated to create tools to support open innovation.

In addition, the interaction with other organs (secretaries) that together proposed the event was observed. The results of the two hackathons were beneficial to the process of innovation within the company and interaction with the players of the innovation ecosystem. Not only did the connection between the government, considering different portfolios occurred, but also with actors such as universities and private companies who participated as mentors.

One of the relevant points is associated with the post-event context that needs to be defined in order to achieve the expected results, that is, the delivery and development of a value-added technological solution to the state and the citizen. However, new studies are being conducted in order to identify that the format of events such as hackathon can somehow meet this demand or whether other forms of innovation are necessary.

The hackathon for the Brazilian public sector still needs to be improved in relation to sustainability in the development of ideas, a great challenge today proposed for public administration, due to bureaucracy and management in hiring procedures and partnership models with private entities.

Ethics declaration

Conflict of interests. The authors declare no conflict of interest.

Compliance with norms involving human beings as subjects. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its subsequent amendments or comparable ethical standards. Informed consent was obtained from all individual participants involved in the study for the application of the questionnaire and the article does not have a description of the names, it is anonymous.

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