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How can hackathons accelerate corporate innovation?

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Abstract. In recent years, the way corporates innovate has changed significantly. Going from ‘behind closed doors’ innovation to open innovation where collaboration with outsiders is encouraged, companies are in the pursuit of more effective ways to accelerate their innovation outcomes. As a result, many companies are investing to create more entrepreneurial environments, which not only empower employees to proactively propose and test new ideas, but also reach beyond company walls to involve many others in the co-creation of new solutions. In this paper, we outline the most notable benefits of hackathons from the perspective of large organizations, and present the benefits and a methodology for organizing hackathons, ie. competition-based events where participants work in small teams over a short period of time to ideate, design, rapidly prototype and test their ideas with a user-centric approach to solve a determined challenge. This paper also provides a brief insight into the CEMEX Hackathon, which was organized following the aforementioned methodology.

Keywords: Co-creation, Hackathon, Open Innovation, Design Thinking, Lean

1 Introduction

Not long ago, industrial leaders believed that the greatest opportunity to leave the competition behind was to invest heavily in internal R&D. The idea was to have vast R&D resources, leading talent and strong, top-level support carry out all innovation activities behind closed doors, until new products - the seeds of the innovation process - were mature enough and ready to be launched to the market (Fig. 1: Closed Innovation). It was believed that only those companies would be able to keep up with the pace of change and innovation [24]. Fast forward 30 years or so, the situation in most industries is quite different. Companies around the world have moved, or are moving, from inward-focused, ‘closed’ innovation to open innovation as proposed in Fig. 1. Opening up the innovation process and making its walls permeable, decisively encourages the use and exchange of external ideas, technologies, knowledge, talent, resources and more [7]. In part, this can be achieved through the organization of co-creation events that are often referred to as hackathons, ideathons or innovation days. Once industry-

specific coding sprints, they recently overtook the world of entrepreneurs, startups and, lately, large corporations [1, 9, 12, 21]. The word hackathon is composed of two parts: *hack* and *marathon*. The term *hack* refers to the creative problem-solving, designing, prototyping and tackling of the challenge, while the word *marathon* indicates the intensity of the event. Briefly, a hackathon is an event with an element of competition, where participants work in teams over a short period of time to ideate, collaborate, design, rapidly prototype, test, iterate and pitch their solutions to a determined challenge. And since hackathons are time-limited events, they best fit the earliest stages of the lean innovation process, where the market is unknown or not well-defined yet, and many ideas are welcome to be tested using user-centric and Lean Startup concepts.

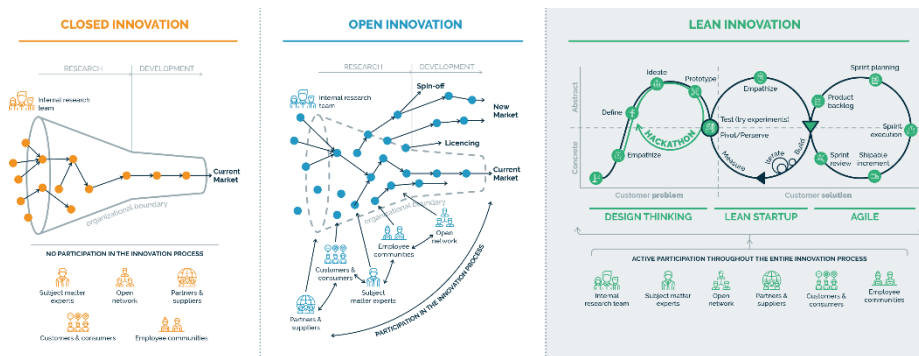


Fig. 1. Comparing the Closed Innovation, Open Innovation and Lean Innovation processes (adapted from [7, 18, 14])

Chesbrough [7] described open innovation as a concept where valuable ideas can come from both inside as well as outside the company, and can, similarly, be pushed to the market from inside as well as outside the company. Open innovation assigns the same priority to external ideas and routes to the market as to internal ones. The open innovation environment actively seeks for collaborations, reaching far outside the company's R&D in order to co-create with partners, suppliers and even customers [6].

The Lean Innovation Model [13], developed by the Lean Analytics Association (LAA), relies on over 5 years of research, where various innovation and product development models and industrial cases of successful implementations of lean innovation practices in leading companies were studied, analyzed and synthesized. One of the aims of the Lean Innovation Model is to provide a framework to help practitioners discover the various innovation practices, approaches and tools. One key practice to enable Open Innovation is the hackathon.

Hackathons leverage the creative and intellectual capacity of the crowd to generate a range of ideas that are crossing the company's borders in order to not only accelerate innovation and refresh the portfolio of ideas, but to bring employees from different departments closer together [12, 21]. Table 1 compares the benefits of organizing a hackathon proposed by different authors, including those identified during the organization and execution of the CEMEX Hackathon, which was organized according to the four building blocks of the Lean Innovation Model and the methodology in Fig. 2.

Table 1. Innovation benefits resulting from organizing a hackathon

#	BENEFITS	SUM	[25]	[23]	[17]	[4]	[1]	[12]	[21]	CX
BUILDING BLOCK 1: STRATEGY & PERFORMANCE										
1	Accelerates innovation	6	✓		✓	✓	✓		✓	✓
2	Corporate brand promotion	2	✓							✓
3	Earlier engagement with customers & potential users	3					✓	✓	✓	
4	Alignment with leaders to identify the challenge	1								✓
5	Clearly defines the underlying problems	5				✓	✓	✓	✓	✓
6	Vision, company's commitment and the hackathon challenge is co-developed by leaders	2						✓		✓
7	Establishes criteria to assess the teams & ideas	2	✓							✓
BUILDING BLOCK 2: SKILLED PEOPLE & COLLABORATION										
8	Talent engagement & recruitment	3		✓					✓	✓
9	Increases employee morale & relationship building	4					✓	✓	✓	✓
10	Facilitated events using Design Thinking require minimum or none prior experience from participants	1								✓
BUILDING BLOCK 3: EFFICIENT PROCESS & KNOWLEDGE-BASED ENVIRONMENT										
11	Provides a creative & stimulating environment	6	✓		✓	✓	✓		✓	✓
12	Enables rapid development & the testing of ideas	7	✓		✓	✓	✓	✓	✓	✓
13	Provides a time-intense innovation environment	2	✓							✓
14	IP development	3	✓						✓	✓
15	Uses a simple, yet impactful innovation process	3	✓				✓			✓
16	Frontloads the innovation process	3						✓	✓	✓
17	Fuels the company's innovation pipeline with already somewhat validated and prioritized ideas	2					✓			✓
18	User-centric lean innovation tools and techniques	1								✓
BUILDING BLOCK 4: CONTINUOUS IMPROVEMENT AND CHANGE										
19	Intensive co-creation & radical collaboration	3					✓		✓	✓
20	Enables organizational change	6	✓		✓	✓	✓		✓	✓

[1] Altringer, 2013; [4] Briscoe & Mulligan, 2014; [12] Di Fiore, 2013; [17] Li & Johnson, 2015; [21] Spaulding & Caimi, 2016; [23] Trainer et al., 2016; [25] Uffreduzzi, 2017; [CX] CEMEX Hackathon

By integrating several practices identified with the Lean Innovation Model as a framework and using findings from the literature as well as our experience in organizing hackathons [16], a step-by-step methodology for the preparation and execution of hackathons has been developed. We also provide a brief overview of the CEMEX Hackathon, which was organized following the methodology outlined in this paper.

2 Methodology for organizing corporate hackathons

As described in the introduction of this paper, hackathons are co-creation events purposefully designed to utilize diverse mindsets, tackle complex challenges and create new business opportunities. However, to provide such an environment, any hackathon

needs to be carefully planned, executed and wrapped up. From selecting the venue [11, 19] to appointing the facilitator, determining the program [2] and selecting the awards [3], every detail influences the creativity and innovation potential of the participants.

A literature review highlighted some of the core areas of organizing co-creation events, covering mainly generic hackathons and not corporate ones [8, 15, 20, 22]. Although most steps are transversal, the reasons, the planning and the alignment approach tend to differ. In addition, most of the literature still focuses on industry-specific events, largely on software development and digital technologies.

To ensure hackathons deliver benefits for the host-company as well as the participants attending, the LAA team defined a three-stage methodology that covers in detail: 1) the pre-hackathon planning, 2) the execution, and 3) the post-hackathon stage. The steps of the proposed methodology are represented in Fig. 2.

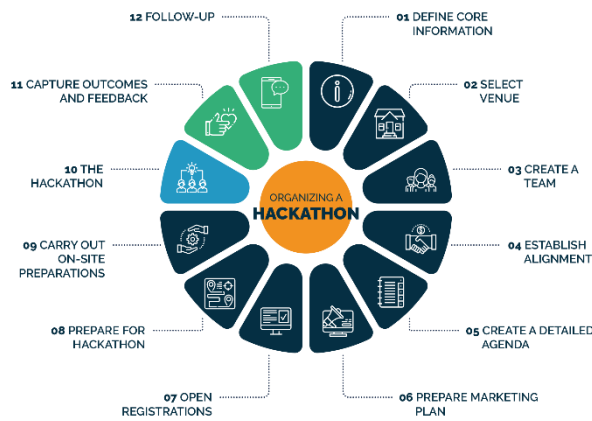


Fig. 2. Methodology for organizing co-creation workshops in a corporate setting [16]

2.1 Pre-hackathon stage (planning)

The planning stage is the first and most critical stage when organizing a hackathon. It consists of 9 steps (as observed in Fig. 2), starting from (1) defining the core information such as the aim and objectives, the expected outcomes, the theme or topic, the challenge, the date and duration, the target group (participants), the location and the budget. Having pinned these details down, a suitable (2) venue needs to be identified and a (3) team must be formed. While smaller hackathons need less time and people to organize, larger hackathons (100+ participants) require a dedicated or “core” team [8]. Hackathons do require an extended team, including facilitators, subject matter experts, presenters and workshop leaders, judges and technical and support teams. Each individual plays a specific role before and, especially, during the event. For example, facilitators will be involved in planning the program in the pre-hackathon stage and will be leading teams of participants through the design and problem-solving process during the execution stage. The core team will co-determine the evaluation criteria and protocol for the awards ceremony, identifying judges who, during the hackathon, will be carefully observing and evaluating how teams work and the ideas they develop. For

more specific challenges, subject matter experts are needed to advise teams during the hackathon, help them with specific questions or dilemmas, and provide insights, knowledge and experience, thus enabling teams to develop better prototypes [15]. To ensure such a diverse group of people works together smoothly and delivers value, (4) team alignment must be achieved (including alignment with the host company).

Hackathons also require a process to ensure the expected results are indeed obtained in such a short time. Coding and software development hackathons typically consider the Scrum process to ‘walk through’ a design cycle. On the other hand, business and corporate hackathons usually follow a design thinking methodology to guide the teams through the day(s). Design thinking works extremely well in the business hackathon setting, because it starts by deep-diving into the problem (challenge) through user interviews, observation and research. This provides strong foundations, rooted in real, human needs, to build ideas and prototypes on. Design Thinking is a human-centered approach used to creatively and holistically solve complex problems in an iterative and collaborative manner [5]. The design thinking process created by the Stanford Design School [10] is structured into five-phases: Empathize, Define, Ideate, Prototype, and Test. The following two steps of the hackathon organization methodology focus on (6) the promotion and marketing of the hackathon, and (7) handling the registrations. Whether the hackathon is being organized for an internal (in-company), external (open to the public) or mixed audience, getting the right participants will have an impact on the quality of the outcomes. Both activities need to be planned well ahead of the actual date of the event in order to ensure the news reach the largest audience [15].

During the final (8) preparation, the team will ensure that all presentations and speeches are ready, prototyping material is available, templates and visual guides are printed, and that the pre-work for participants is selected and distributed. A day or two before the actual event, (9) on-site preparations are required.

2.2 The hackathon stage (execution)

After the official welcome and the initial presentation of the hackathon challenge, teams start working on the Empathize phase, where participants conduct a preliminary research on the topic and engage with end-users and other stakeholders through interviews. Moving to the second phase, teams try to make sense of what they just learned through the interviews and research, by defining the problem they are going to address. While the hackathon provides the challenge, the underlying problem is identified through the analysis of data collected in the Empathize phase. With a clear problem statement, teams enter the third phase where they start brainstorming about potential ideas that could solve that problem and continue by ranking these ideas. The important notion at this stage is that ideation is not so much about the quality, but rather about the quantity of ideas. This is where teams should explore anything from conventional to entirely blue-sky options. What follows is a series of iterations, where teams start by developing a prototype for the selected idea, before testing it with the stakeholders.

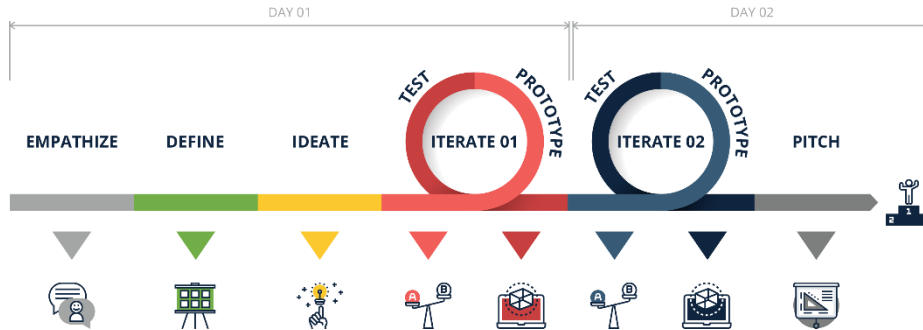


Fig. 3. Design thinking processes proposed for a two-day hackathon event [16]

2.3 Post-hackathon stage (reflection)

Hackathons are high-energy events, which is the reason why the post-hackathon work is often neglected. However, it is strongly recommended to also invest time in this last phase, where the organizing team organizes lessons learned sessions to analyze ideas, patterns and prototypes, and set in motion the wheels for establishing a project or projects based on the winning solutions.

3 Case study: The CEMEX Hackathon

The first CEMEX Hackathon organized by the Lean Analytics Association in collaboration with CEMEX was held in Cambridge, UK on Feb 9-10, 2018. It provided the perfect setting to motivate over 100 participants to develop ideas and co-create prototypes of solutions to solve the challenge of how to mobilize and engage employees in the innovation ecosystem at CEMEX.

Teams (composed of CEMEX employees and students) were assigned facilitators from 3 Universities (EPFL, Cambridge University and Cranfield University) and the LAA team to guide them through the two days of the design thinking process, while one CEMEX employee per team was selected to document and store the generated knowledge. Teams started the journey with interviews of employees and contextual research. Using the insights generated in the first step of the *Design Thinking* method, teams built the *persona* and developed an *empathy map* for that persona in order to determine the underlying problem they would focus on to solve the hackathon challenge. In the following step, teams used various brainstorming techniques as devised by facilitators, to come up with as many ideas as possible, before reviewing and ranking them. The most promising idea was prototyped in the fourth step, mainly through the use of paper prototyping, storytelling, roleplaying, wireframing and mockuping. The teams had the opportunity to work with three artists from the Starfish Taylor to better visualize their ideas. At the end of the day, each team was given 2 minutes to demonstrate their prototypes to the judges and other teams, who provided their feedback through a voting system. The teams kicked off the morning of the second day with a

discussion about the feedback received and a revision of their prototypes. All prototypes had to be completed by the end of the lunch, when teams were given time to prepare their final pitches and demonstrations. The hackathon closed after an international jury conveyed, unanimously selected the three winning teams, and announced the winners at the awards ceremony. The winning team received 3,000 GBP and the opportunity to develop their solution further in CEMEX.

During both days, all participants demonstrated a great level of interest and motivation for innovation and collaboration. Participants from over 15 countries, 9 CEMEX offices and 9 Universities, collectively generated approximately 1300 high-level ideas, used over 10,000 post-it notes, created 24 prototypes in total, and delivered 13 pitches. Michel Andre, UK Country President at CEMEX, one of the hackathon's key stakeholders, sponsor and judge of the hackathon said, "What a learning experience! Incredible engagement and passion demonstrated by all participants! Several great ideas being incorporated in our innovation model."

4 Conclusion

With a growing popularity amongst entrepreneurial individuals as well as larger organizations, hackathons provide a means to accelerate innovation. In this paper, we propose a methodology which provides a step-by-step guide covering the planning, execution and reflection activities which enable organizations to prepare an event that delivers value, helps change the innovation landscape and empowers participants and employees to act on the resulting ideas.

However, organizing a corporate hackathon entails challenges and needs an unwavering commitment from all the people involved. Hackathons are not a standard business practice yet and, therefore, require strong collaboration, continuous communication and transparency. The second main challenge worth pointing out is the framing of the challenge and its presentation to the target audience. Framing the challenge in the right way and maintaining continuous and transparent communication is critical to a successful organization of a corporate hackathon.

Building on the proposed methodology, we believe that future research should look into individual areas in depth to provide more specific and comprehensive advice, while continuing to measure the benefits and challenges of organizing corporate hackathons.

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