

Hackathons as ephemeral adhocracies for Intellectual Capital (re)generation: An emerging framework

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Abstract— Hackathons are events that bring together people with diverse backgrounds and expertise in a single location over a limited time to develop disruptive ideas and artifacts. The skyrocketing success of Hackathons across various domains and sectors is due to the opportunities they offer to leverage the creative and Intellectual capacity of the crowd, and to develop new relationships, skills, knowledge, solutions, and processes. However, Hackathons’ potential in relation to Intellectual Capital (IC) has been overlooked by the literature so far, and few studies focus on their outcomes and evaluation. This study addresses this issue by conceptualizing Hackathons as ephemeral adhocracies whose value proposition includes the (re)generation of IC at the system level. Based on this conceptualization, we leverage the authors’ participant observation through active involvement in 57 Hackathons globally with various roles (i.e., participant, mentor, facilitator, jury, and organizer) between 2014-2020. Through iterative qualitative analysis carried out on the literature and empirical material, we identify 32 distinctive critical attributes through which Hackathons may differ from one another. We leverage the literature and the empirical material to highlight how each of these 32 attributes may influence the three key dimensions of IC (i.e., Human, Relational, and Structural). Our analysis offers a framework that can be useful for practitioners when approaching Hackathons and serve as a foundation for design and evaluation instruments, while opening the way for future research on Hackathons as emerging organizational forms specifically devoted to IC (re)generation.

Keywords— Hackathon, Intellectual Capital, Adhocracy

I. INTRODUCTION

Hackathons are emerging as relevant tools in the growing movement of open or distributed innovation [1], aiming to dismantle knowledge boundaries in order to address scientific, technological, business and societal problems [2]. Hackathons can be viewed as an emerging hub of all three components of IC: Human Capital (HC) (which consists of employees’ skills [3], [4], knowledge, and experience [5], [6]); Structural Capital (SC) (firms’ codified knowledge, databases and culture [7],

[8]); and Relational Capital (RC) (which consists of the knowledge resources embedded in the networks of internal and external relationships [9], [10]). However, the potential of Hackathons as generators of IC has been overlooked by the literature so far, and few studies focus on the outcomes of Hackathons [11] and their evaluation [12].

We argue that the IC approach is particularly well-positioned to contribute to a sounder understanding of Hackathons in open innovation contexts [13]. On the other hand, the IC literature usually adopts organizations as the key level of analysis for IC generation, management, and measurement [14]. Therefore, the investigation of Hackathons under the IC lens poses a theoretical challenge: how might Hackathons, with their temporary and boundaryless nature, be conceptualized as IC sources from the organizational standpoint? To the best of our knowledge, the scientific literature has not answered this question yet. As a consequence, the world of practice still lacks an essential set of tools for designing and soundly measuring the performance of Hackathons. This study addresses this issue by conceptualizing Hackathons as ephemeral adhocracies whose value proposition includes the (re)generation of IC at the system level [15]. This study lies at the crossroads, and contributes to, three research streams, namely (i) the emerging stream on Hackathons, (ii) the literature on IC generation in innovation ecosystems [16], and (iii) the literature on open innovation [1], [17].

II. LITERATURE REVIEW

A. Hackathon

The term ‘hacking’ has been used in developer contexts since the 1960s, but the word ‘Hackathon’ emerged only in the late 1990s to indicate live, intense, full- immersion contests or events aimed at developing new IT concepts and/or artifacts. More recently, Hackathons are being launched by a broad range of organizations [18] to spur and enable innovation. Hackathons’ organization has expanded to various sectors starting from large companies [19] and SMEs [20], to student events [21] and civic engagement [22].

Hackathons, therefore, can be defined as events that are conducted in a single (physical or virtual) location in a short period of time and attract people with different backgrounds

and expertise [23] allowing intensive bursts of creativity [18] to develop solutions and disruptive ideas [24] and provide means to boost innovation [25].

B. Intellectual Capital in Adhocracies

To date, only a handful of researchers have carried out empirical analyses on the organizational conditions that lead to the development of IC [26], [27]. Nonetheless, some studies [14] have shown the importance of well-structured constructs such as organizational culture and its relationship to IC creation, such as employee satisfaction or their commitment and innovation.

There is evidence that adhocracy promotes higher levels of knowledge sharing [28].

III. METHODOLOGY

In order to study Hackathons as ephemeral adhocracies, we leverage thick empirical material: i.e., participant observation

of the authors, who were involved in 57 Hackathons globally in various roles (participant, mentor, facilitator, jury) between 2014-2020 in order to identify key attributes characterizing hackathons. Then we leverage the literature and the empirical material to highlight how these factors may influence the three key dimensions of IC [29]–[31].

IV. FINDINGS

From the literature analysis performed on the selected sample of papers, 24 attributes were identified as key attributes characterizing Hackathons, and 8 more were identified in the empirical material.

In Table 1 we report the 32 resulting attributes and highlight how these factors may foster Intellectual Capital.

TABLE 2 – KEY ATTRIBUTES OF HACKATHONS EMERGING FROM THE LITERATURE ANALYSIS

| Attributes | Type of Attributes | Intellectual Capital Generation (*) | |
|------------------------------------|--|--|-------------|
| | | Element | Type |
| Challenge Design | 1. Coding-Technology; 2. Entrepreneurial/ Business Creation; 3. Social | Skills, Competences (1-3) | H |
| Degree of Elaboration | 1. Idea; 2. Conceptual Solution - Prototype; 3. Functional Solution – Prototype; 4. Finished Product - Service | Skills, Competences (2-4) Higher complexity of the Output (3-4) | H R |
| Duration | 1. Short (<24 hours); 2. Medium (24-72 hours); 3. Long (>72 hours) | Skills, Experiences (2-3) Organizational Culture, Processes (1-3) | H S |
| Entry Fee | 1. No; 2. Yes | Skills, Know-How (2) Hackathon's Reputation (2) | H R |
| Event Type | 1. Restricted Participation; 2. Open Participation | Lateral Thinking, Skills (2) Processes (1) | H S |
| Incentives (to Participation) | 1. Competition / Collaboration; 2. Certificate; 3. Job Opportunities | Experiences (1;3) Reputation (2-3) | H R |
| Judges Expertise | $\frac{\sum \text{Expert Judges}}{\sum \text{Judges}} (0 - 100\%)$ | Network, Reputation (**) | R |
| Learning Experience | 1. Self-Learning; 2. Guided Learning through Tools; 3. Guided Learning on Hackathon Theme; 4. Both (2-3) | Skills, Competences, Know-How (2-4) | H |
| Material | 1. No; 2. Yes, Prior to the event; 3. Yes, at the event | Skills, Competences, Know-how (2-3) | H |
| Mentors Coordinator | 1. No; 2. Yes | Processes (2) | S |
| Mentors Participation | $\frac{\sum \text{Mentors}}{\sum \text{Teams}} \% (0 - 100\%)$ | Skills, Competences (**) Network, Collaboration (**) | H R |
| Mentors Skill Diversity | $\frac{\sum \text{Expertise of Mentors}}{\sum \text{Mentors}} \% (0 - 100\%)$ | Know-How, Expertise, Skills (**) Hackathon Reputation (**) | H R |
| Origin of Initial Ideas | 1. Hackathon Partners; 2. Participants; 3. Both | Organizational Culture, Processes (1;3) Know-How, Expertise (1-3) | S H |
| Phase of Innovation Process | 1. Idea Generation; 2. Idea Development; 3. Idea Diffusion | Relationships (2-3) | R |
| Presence of Partners/Sponsors | 1. No; 2. Yes, only Partner; 3. Yes, Partners and Sponsors | Skills, Know-How (2-3) Hackathon Reputation, Relationships (2-3) | H R |
| Registered Patents after the Event | $\frac{\sum \text{Registered Patent after Hackathon}}{\sum \text{Teams}} \% (0 - 100\%)$ | Patents (**) Reputation (**) | S R |
| Resources (Provided) | 1. No; 2. Immaterial (e.g Tools, Platforms); 3. Material; Both | Competences Developed (2-3) Processes, Database (2-3) Hackathon Reputation (2-3) | H S R |
| Rules / Format | 1. No; 2. Yes, Strict Rules; 3. Yes | Skills, Adaptability (2-3) Hackathon Reputation (2-3) | H R |

| | | | |
|----------------------------------|---|---|---|
| Solution Space | 1. Open; 2. Structured; 3. Semi-Structured | Skills, Flexibility, Creativity, Initiative (1-3) | H |
| Starting Point (Idea) | 1. Before the Event; 2. Hybrid; 3. At the Hackathon | Databases, Processes (1-3) | S |
| Startups Created After the Event | $\frac{\sum \text{Startup Created}}{\sum \text{Teams}} \% (0 - 100\%)$ | Lateral Thinking, Skill (2-3) | H |
| Target Audience | 1. Students / Employees; 2. Semi – Professional; 3. Experts; 4. General | Skills, Know-How (**) | H |
| Teams Formation | 1. Prior to the Event; 2. During the Event (Self-Organized); 3. During the Event (Guided) | Infrastructure, Processes (**) | S |
| Teams Age Diversity | $\frac{\sum \text{Generation of Participants in the team}}{\sum \text{Participants in the team}} \% (0 - 100\%)$ | Relationship (**) | R |
| Teams Culture Diversity | $\frac{\sum \text{Nationalities of Participants in the team}}{\sum \text{Participants in the team}} \% (0 - 100\%)$ | Competences, Expertise (1-4) | H |
| Teams Gender Diversity | % of Women in the Team (0 – 100%) | Skills (2-3) | H |
| Teams Skills Diversity | $\frac{\sum \text{Skills of Participants in the team}}{\sum \text{Participants in the team}} \% (0 - 100\%)$ | Skills, Inclusion (**) | H |
| Type of Event | 1. Hackathon as a Stand-Alone Event; 2. Hackathon Parallel to Another Event | Organizational Culture (**) | S |
| Type of Proposed Activities | 1. Recreational Activities; 2. Networking Activities; 3. Educational Activities; 4. Blend | Skills, Inclusion (**) | H |
| Value Proposition | 1. Focus on Human Interaction; 2. Focus on Challenge Output; 3. Focus on Learning Experience; 4. Blend | Relationship (**) | R |
| Venue | 1. Online; 2. On-site; 3. Hybrid | Skills, Competences, Know-How (**) | H |
| Winners' Reward | 1. Non-Monetary; 2. Monetary | Relationship, Reputation (**) | R |
| | | Experience (2) | H |
| | | Networking, Hackathon Reputation (2) | R |
| | | Skills (2-4) | H |
| | | Relationship (2;4) | R |
| | | Experience, Skills, Know-How (1-4) | H |
| | | Skill (2-3) | H |
| | | Relationship (2-3) | R |
| | | Hackathon Reputation (2) | R |

Source: authors' own elaboration.

(*) The first column shows the enabling elements that allow the creation of Intellectual Capital. In the second column there are the types of IC generated (Human Capital = H; Structural Capital = S; Relational Capital = R).

(**) In this case the element generates more Intellectual Capital as the increasing of the index value.

V. CONCLUSION

Hackathons emerge as an interesting tool for IC (re)generation and provide people from aspirant, young and mature organizations with an ephemeral but extremely dense and strongly specialized organizational locale, thus allowing participants to externalize the process of creating an effective adhocratic environment [32].

This analysis allows us to propose a framework of the key factors that Hackathon designers and evaluators may consider to maximize Hackathons' capability to (re)generate IC.

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