

## Why collaborate? Factors influencing in crowdsourcing ecosystems

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### Abstract

*Many organisations embrace crowdsourcing to enhance innovation, problem-solving and value creation. While crowdsourcing in the past has been limited to just one organisation, crowdsourcing can be enhanced through collaborative practices that include sharing resources and value exchange in a 'crowdsourcing ecosystem'. However, the factors that influence the emergence of a crowdsourcing ecosystem are not yet well understood. To better understand these factors, our paper focuses on the emergence phase of crowdsourcing ecosystems. We conducted a case study of not-for-profit sector collaborative crowdsourcing projects to identify the internal and external influencing factors. We identify four major categories – preparedness, challenges, scope, and risks, along with 23 sub-categories. We believe our findings might be helpful for scholars and practitioners regarding the effective design of collaborative initiatives for crowdsourcing.*

**Keywords:** collaboration, crowdsourcing ecosystem, internal and external factors

### 1. Introduction

Collaboration both within and across sectors impacts value-driven coordination among organisations by jointly mobilizing efforts, connecting resources, decision making and sharing ownership of the final product or service (Guo & Acar, 2005) to solve complex social, economic and environmental problems (Kuhn, 2012). Collaboration is defined as *a process in which autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions* (Marie et al., 2009; Thomson & Perry, 2006; Wood & Gray, 1991). Organisations are expanding their presence across economic and strategic regions through various means, such as strategic partnership, joint-ventures,

mergers, acquisitions, and expansions of existing or new business liaisons (Abzug & Webb, 1999; Biedebach & Hanelt, 2020; Peukert, 2018). Through these collaborations, organisations intend to achieve various benefits such as access to new technologies, processes, expertise, and resources (Gazley, 2020; Guo & Acar, 2005). Research on these collaborations suggests that working together does not necessarily ensure successful outcomes, and cooperation may not always result from collaborative partnerships (Bryer, 2007; Gazley, 2020; Myers, 1994). Although collaboration amongst organisations is increasing, formalized collaboration and strategic restructuring is often needed. This suggests there is a need for in-depth understanding and analysis of contributing factors for collaboration (Guo & Acar, 2005). We need to study the influencing internal and external factors to increase the chances of success and decrease the failure rate of collaborations (Gelhaar & Gelhaar, 2020). Success factors differ significantly from factors leading to the failure of a collaborative relationship (Gazley, 2020).

One relatively new kind of cross-organisational collaboration is where a crowdsourcing ecosystem emerges. However, forming and sustaining a crowdsourcing ecosystem is a challenging task and faces various potential setbacks. Hence, in this paper we explore the factors influencing collaboration in a case study of a crowdsourcing ecosystem in the not-for-profit sector. Our research question is as follows: ***What internal and external factors contribute to collaboration during the emergence stage of crowdsourcing ecosystems?***

This paper is organized as follows. The first section introduces the phenomenon of crowdsourcing. Second, we discuss crowdsourcing initiatives in the Galleries, Libraries, Archives and Museum (GLAM) sector. The GLAM sector is a subset of the not-for-profit sector and is the custodian of the artefacts of national identity, cultural pride, human history, and knowledge. In the third section, we discuss our conceptual framework for the emergence stage of digital ecosystems - Strengths, Weakness,

Opportunities and Threats (SWOT) and critical success factors. In the fourth section, we present our research methods along with the case description and research findings. We identify the internal and external factors influencing collaboration at the emergence stage of a crowdsourcing ecosystem. Finally, we conclude by outlining expected contributions to the digital ecosystem and crowdsourcing literature. We hope that this study will open new research perspectives related to collaboration in crowdsourcing ecosystems.

## 2. Crowdsourcing

Crowdsourcing has gained much attention from practitioners and researchers since 2006 when Howe first coined this term (Howe, 2006). It is defined as *a type of participative online activity in which an individual, an institution, a non-profit organisation, or a company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task*" (Estellés-Arolas et al., 2015, p. 197). Crowdsourcing is a collaboration among multiple stakeholders and digital platforms for collective value creation. Crowdsourcing is gaining popularity among both businesses and the not-for-profit sector (Nevo & Kotlarsky, 2020; Qutab et al., 2019). Research streams on crowdsourcing are mostly focused around crowd motivation, crowdsourcing governance, value creation and process (Nevo & Kotlarsky, 2020). Most research focuses on a single crowdsourcing project with three main participants – organisation, platform, and crowd. However, current crowdsourcing practices are going beyond this with multiple stakeholders collaborating on crowdsourcing, leading to the emergence of crowdsourcing ecosystems.

### 2.1 GLAM sector crowdsourcing

The GLAM sector consists of public or semi-public knowledge and cultural heritage organisations working to collect, organise, preserve, and disseminate knowledge and cultural assets. Crowdsourcing is a growing practice in the GLAM sector and is gradually evolving into new forms. Crowds are engaged for: a) mining non-machine readable big data trapped in GLAM collections; b) improving the speed and quantity of data processing; c) adding quality to contents by engaging communities for capturing local context and d) building knowledge-based communities around collections; (Alam & Campbell, 2017; Deupi & Eckman, 2016). However, crowdsourcing poses challenges for the GLAM sector, such as quality control and bias in user-created

content, regulatory issues related to content ownership, authenticity, and incorporation of crowdsourced content into the knowledge lifecycle (Oomen & Aroyo, 2011). Some examples of successful GLAM crowdsourcing projects include the Smithsonian Transcription Center's crowdsourcing projects; *TROVE* by the National Library of Australia; *LibCrowds* by the British Library (UK), *Beyond Words* by the National Library of Congress (USA), and *DigitalKoot* by the National Library of Finland etc. These projects aim to increase accessibility, discovery, humanities research, scientific research, and education, (Qutab et al., 2019).

### 2.2 Crowdsourcing ecosystem - a paradigm shift

In a traditional crowdsourcing setting, there are three main actors: crowdsourcer, crowdsourcee and a crowdsourcing intermediary (Blohm et al., 2013). We term this type of crowdsourcing a **crowdsourcing project** (figure 1). These crowdsourcing projects involve a limited number of stakeholders, and newly generated value remains accessible only to these stakeholders, thus narrowing value creation and value impact. Existing crowdsourcing research is focused on crowd engagement, task management and platform governance for this type of crowdsourcing project (Blohm et al., 2018). This research explains inference, processes and impact of crowdsourcing projects (Estellés-Arolas & González-Ladrón-De-Guevara, 2012; Garrigos-Simon, Gil-Pechuán, & Estelles-Miguel, 2015; Zhao & Zhu, 2012).



Figure 1: Transition of Crowdsourcing Practices

However, with the expansion of crowdsourcing practices, a paradigm shift is happening with multiple stakeholders forming cross-organisational collaborations to expand value creation. We term this type of practice as a **Crowdsourcing Ecosystem**. In a crowdsourcing ecosystem, various organisations collaborate to share their resources and skills and share the ownership of crowd-created content. Many organisations, especially not-for-profit entities, are either creating cross-organisational crowdsourcing networks e.g., multiple crowdsourcing projects by the Smithsonian Transcription Center; or joining existing crowdsourcing networks to share crowd work and extend value creation e.g., the GLAM-Wiki initiative. To our knowledge, there is no extant research on the emergence of these crowdsourcing ecosystems. We believe this paradigm shift calls for a new exploration

of crowdsourcing practices. The current crowdsourcing literature explains crowdsourcing contributing factors from two perspectives – the crowd and the organisation. An organisation might decide to crowdsource in a process that evaluates whether crowdsourcing is an appropriate approach for them. An organisation may consider multiple aspects, including organisational contexts, and crowdsourcing benefits, challenges, and capabilities in order to evaluate their readiness to crowdsource" (Thuan et al., 2016, p. 50). However, there is no discussion about the factors influencing collaboration for a crowdsourcing ecosystem.

### 3. Theoretical framework

Whereas current crowdsourcing research has mostly focused on single crowdsourcing projects, we want to look at cross-organisational crowdsourcing and the emergence stage of a crowdsourcing ecosystem. To better understand the collaboration involved, we combine various frameworks on the contributing factors that include SWOT analysis, Bryson's Framework of cross-sector collaboration (Bryson & Crosby, 2006), critical success factor, critical failure factors and barriers approach (Borman & Janssen, 2013) Using these frameworks, we extend existing knowledge about cross-organisational collaborations in crowdsourcing ecosystems.

In recent years, digital ecosystem research has become voluminous, diverse, and cross-disciplinary (Baskerville et al., 2020; Gawer & Cusumano, 2014; Jacobides et al., 2018). An ecosystem consists of a set of actors with varying degrees of multilateral, non-generic complementarities that are not managed by a hierarchical authority (Jacobides et al., 2018, p. 2264). Moore's business ecosystem concept and its four phases - birth, expansion, leadership, and self-renewal (Moore, 1993) are foundation of almost all ecosystem research in the business and information system domain. In this research we focused on the birth stage that we named as the 'emergence phase'. At the emergence phase mostly the collective value proposition triggers the birth of an ecosystem (Gelhaar & Gelhaar, 2020; Llewellyn & Erkkö, 2015). However, Jacobides et al. (2018, p. 2263) suggest that in general ecosystems do not emerge "spontaneously" or "accidentally" but rather are "the result of a (partly designed) process". These processes can be shaped by various internal and external factors that influence the emergence. At the start of the collaboration, organisations try to find similarities to connect with other organisations. These similarities are explained as *syntactic capacity* that requires the development of a

common lexicon for transferring domain specific knowledge (Carlile, 2004). However, as the collaboration becomes mature, organisations start developing the *semantic* and *pragmatic capacities* to develop common meanings and interests.

Business alignments are required for organisations to achieve their goals from crowdsourcing (Namugenyi et al., 2019). The most common approach in the IS literature has been to understand the factors that lead to IT success and failure (Rose et al., 2015). To understand these business alignments we combined two approaches, SWOT analysis and critical success factors (CSF) (Zahidy, 1986). SWOT analysis stands for Strengths, Weaknesses, Opportunities and Threats, which was first described in detail by Learned et al. (1965). SWOT analysis is commonly used to analyze environments to support strategic decision-making. It can be seen as a process, in which the management team identifies the internal and external factors that affect the company and business performance (Namugenyi et al., 2019). The critical success factors (CSF) literature explains the factors key to successful project implementation (Borman & Janssen, 2013).

We focus specifically on cross-organisational collaboration in the not-for-profit sector. This sector differs from the profit sector by focusing on cooperation more than competition. Previous literature identifies the following major factors of not-for-profit cross-organisational collaboration: agreements, building legitimacy, trust, conflict management, leadership and planning (Bryson & Crosby, 2006, 2015); organisational autonomy, mutuality, norms (Thomson & Perry, 2006), communication, commitment to process, shared understandings, intermediated outcomes (Ansell & Gash, 2008); disruptions (Keller et al., 2021); clarity of vision, development of shared common objectives (Rose et al., 2015); technological similarities, and structural integration (Sun & Lo, 2013). Taking these factors into account, we analyzed our case and discovered factors influencing collaboration at the emergence stage of a crowdsourcing ecosystem.

### 4. Research methods and case description

In this research project we adopted interpretive case study research (Walsham, 1995). A case study is an empirical inquiry investigating a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not evident (Klein & Myers, 1999; Myers, 2020; Yin, 2003). This research method enables us to discover the contributing factors for organisational

collaboration (Gable, 1994) at the emergence stage of a crowdsourcing ecosystem. We studied four different crowdsourcing projects at the Auckland War Memorial Museum (AWMM), New Zealand. AWMM was established in 1856 as the first museum of New Zealand (NZ) concentrating on New Zealand history including natural history, cultural history, and military history. The AWMM case was selected due to the diversity of its' crowdsourcing based cross-organisational partnerships within and outside New Zealand (see table 2). AWMM's collaboration and crowdsourcing story started with the vision of Roy Clare, Director of AWMM, to transform the museum from being a keeper to a sharer:

*"a primary objective of a museum is to keep things...But the evidence is that market forces are now a dominant pressure, with audiences driving the need for museums to share collections... (AWMM) will be discipline in four main ways: 1). Leading collection with a point of difference; 2). Curator expertise to be shared and communicated; 3). Working out of isolation and making partners and 4). Engaging audience for co-production through crowdsourcing."* (Clare, 2016, p. 6).

In 1996 'Online Cenotaph' was initiated that allows researchers, enthusiasts, veterans, and their families to explore the records and stories of those who served for New Zealand in World War I (WWI) and World War II (WWII). This database became the foundation of AWMM's first crowdsourcing project in 2015, with new features for users added enabling them to contribute, share and edit records. Since then, AWMM has been running four crowdsourcing projects by collaborating with multiple organisations from New Zealand: NZArchives, The Ministry of Defence NZ, Ministry for Culture and Heritage, WW100, University of Waikato, NZ; and Auckland Libraries. AWMM also established partnerships with various international organisations including the University of Minnesota, USA; University of Guelph, Canada; Wikimedia Foundation - Wikipedia, WikiData, WikiMedia, and Wikicommons; Zooniverse, Smithsonian Institute, Europeana, the Biodiversity library, the Internet Archives, etc. Through these partnerships, AWMM receives and shares data, exchanges expertise, and collaborates for joint crowdsourcing ventures and access to diverse crowd communities.

**Table 1. Data Sources**

Source	Description
Interviews	23 interviews with project managers and organisers from different organisations.
Observations	Crowdsourcing projects online activity and progress.
Archival data	Project websites, news announcement, annual reports, progress reports and articles
Others	Publicly available recorded talks, informal conversations on conferences, webinars

We collected data over a period of nine months, from December 2018 – April 2019 and from December 2019 – March 2020, in two phases (see table 1). First, we conducted informal interviews with AWMM's crowdsourcing team and prime crowdsources as directed by AWMM's team. These interviewees provided us contacts of other potential respondents from the partnering organisations. Second, we conducted 23 semi-structured informal and formal discussions with 19 different stakeholders of AWMM and from various partnering organisations around the world.

**Table 2. Auckland War Memorial Museum (AWMM) Crowdsourcing Initiatives**

CS Project	Task type and progress	Stakeholders		
		Org.	Platform	Crowd
<b>Online Cenotaph (2015)</b> (in-progress)	Identification, transcription, explanation. The content owning organization or individual(s) create and manage the crowdsourcing project.	AWMM	AWMM's Website	Open
<b>Measuring the ANZAC (2015)</b> (in-progress)	Transcription 5th batch of documents. Organizations or individual(s) knowingly share or lend their contents for crowdsourcing purposes yet does not involve in crowdsourcing processes.	Uni. of Minnesota, USA; Uni. Of Guelph, Canada; Uni. of Waikato, NZ	Zooniverse	Zootes, history teachers, researchers
<b>The Pacific Collection Access Project (2018)</b> (in-progress)	Transcription, Wiki articles editing and writing Crowdsourcing organization received data from the data aggregators, who are unlikely content owners but act as content hubs.	Wikimedia Foundation	Wikicommons, Wikidata	Wikimedians
<b>Cenotaph Memorials (2020)</b> (complete)	Transcription Content owning organization or individual(s) have an active collaboration with other organizations to crowdsourcing. They share their contents, platforms, expertise and learnings to do crowdsourcing.	AWMM	Zooniverse	Zootes

All the interviews were recorded and professionally transcribed. Subsequently, the transcripts were analysed using the NVivo 12 software and by conducting two coding cycles as recommended in (Saldaña, 2009). Our data analysis was guided by the perspectives of collaboration at the emergence stage of business and digital ecosystems (Moore, 1993) and by looking at the internal and external factors of collaboration. We coded our data accordingly (Klein & Myers, 1999; Langley, 1999; Walsham, 2006). The coded quotations were merged under similar categories and subcategories as guided by the theoretical frameworks for this study. To further analyse our data, a bottom-up narrative approach was used because it provides the means to identify and develop concepts and their inter-relationships that

form the building blocks of theory from qualitative data (Baškarada, 2014). Narrative analysis is useful for studying the development and implementation of IT in context. This analysis helped us to explain the internal and external factors of collaboration (Myers, 2020).

## 5. Findings

Our findings reveal that the emergence of a crowdsourcing ecosystem was initiated as part of the transformation of AWMM that was intended to share resources and open the museum to collaborators. The crowdsourcing journey started with a standalone crowdsourcing project, but soon afterwards AWMM's crowdsourcing horizons started to expand. A second cross-organisational crowdsourcing project started with multiple collaborators (see table 2). In 2018, AWMM initiated a third crowdsourcing partnership under the GLAM-Wiki program. Through this partnership, seven partners either coordinated or collaborated with the content provider being AWMM. These crowdsourcing alliances and activities were initiated for mutual growth and survival. We discovered various internal and external factors that affected this cross-organisational collaboration. We categorize these factors into four main categories, the first being 'preparedness' - which is set of internal factors to assess the readiness of an organisation to initiative or participate in a crowdsourcing ecosystem. The next three categories: 'challenges', 'scope' and 'risks' are external factors. Each category consists of further sub-categories (see Table 3).

### 5.1 Preparedness

Preparedness is a state where an organisation estimates its internal readiness to participate in a crowdsourcing ecosystem. Our data reveals that AWMM considered various aspects at this stage. The AWMM has *data available* about World War I and II that was owned by AWMM and was received from NZ Archives and the Ministry of Defence NZ. The objective of this data exchange was to bring the data together and complete information gaps. AWMM spent years completing this data owned by the concerned organisations, and presented it through their website 'Online Cenotaph'. One respondent stated:

*"It's where the data became much more streamlined and cleaned. I mean it's still quite messy. It's 24-years of data that has not necessarily been completely tidied. But it was also put into an ontology, so it's linked open data"* (Collaboration manager).

This was a state of *digital preparedness*: AWMM was already using their website as a *platform* to share stories of war heroes (Dwivedi et al., 2015). However, there were various missing links and gaps in the information. The community wanted to know more.

*"We thought to try digital volunteers to extend our collection but acknowledged the required technical expertise to set up a project on a crowdsourcing platform. At that point, we got a nod from administration but had less resources and no expertise"* (digital volunteer manager).

AWMM continuously received inquiries about the Online Cenotaph website from community and families of WWI & WWII heroes. Some families offered further information and resources e.g., photographs, letters, diaries and stories to enrich the collection. With this increased *community interest*, AWMM decided to open their website for community comments and resources. This was the start of AWMM's crowdsourcing journey.

*"I knew the institution, I trusted the institution and when they ask for help, Oh yeah... I'll give it a go and see if I can help them"* (crowd contributor).

### 5.2 Challenges

After their experiment with a standalone crowdsourcing project, AWMM observed two things: an interest by the administration to expand crowdsourcing, plus expressions of interest from other sister organisations wanting to collaborate. However, this motivation came with various challenges. The first challenge was *data preparedness* for cross-organisational sharing. All the organisations needed to clean, crop, or modify their data before sharing outside their boundaries. Another challenge was *ownership* of crowd created contents. The IP and source link of the original data can be secure to some extent, but the user created content that is available on partnering organisations platforms caused ownership questions to arise



**Table 3. Internal and external factors of cross-organisational collaboration**

Individual organisation	Standalone crowdsourcing	Internal factors	Preparedness	Factors	Descriptions	
				Data availability	The data is available for exchange between partners	
				Digital readiness	The organisations participating in the collaboration have sufficient digital readiness	
				Organisational motivation	Organisation is motivated to start initiating the crowdsourcing	
				Platforms	Availability of internal or external platform to start crowdsourcing	
				Community interest	Community show interest in sharing their knowledge, resources, and efforts	
				Organisational culture	The organisational culture needed to be changed for open data exchange and accepting the crowdsourced contents.	
Cross-organisational	Crowdsourcing Ecosystem Emergence Stage	External factors	Challenges	Data preparedness	The organisations need to prepare the data for exchange in a crowdsourcing ecosystem	
				Content ownership	The organisations feel challenges by the content ownership issues	
				Disruption	Organisations feel disruption due to external check on the data and processes	
				Conflict of interest	The organisations interest may vary and can hinder the participation.	
				Value distribution	Value distribution among ecosystem partners	
				Managing collaborations	Maintaining meaningful participation and management of collaborating organisations	
			Scope	Trust	Trust to build legitimacy through achieving consensus or acceptance on cross-sector information sharing and integration, continuous interaction, and negotiation	
				Community diversity	Organisational access to diverse communities increases by entering ecosystem	
				Shared values of partners	Organisations share similar values	
				Social goals	The partners collaborate as share similar social goals of common good	
				Domain expertise	Organisations share specific domain expertise in an ecosystem	
				Common regulation and standards	Common standards and regulations of data preparation and exchange	
				Institutional visibility	Participating organisations received greater institutional visibility as part of an ecosystem	
				Quality assurance	Collaborations help fill the information gaps to increase the quality	
				Risks	Regulatory compliance	Some participants fail to meet necessary legal or regulatory requirements
					Content control	Lose control over the contents once exchanged
			Conduct control		Loss or no control over the conduct of ecosystem stakeholders including organisations crowds and platforms.	

*Conflicts of interest* can hinder the participation or decrease the motivation to stay in a crowdsourcing ecosystem. The participating organisations do not always have similar interests and motivations. One of the common conflicts of interest is *value distribution* among the participating organisations. Not-for-profit crowdsourcing involves the open sharing of organisational resources and crowd created contents. But organisations sometimes find it difficult to identify the value distribution in the ecosystem (Chen et al., 2021; Gol et al., 2019). Another challenge is *managing collaborating* and maintaining meaningful participation over the time (Kuhn, 2012). The leaders of collaborating organisations need to understand and support collaboration (Thomson & Perry, 2006). Moreover, governance provides the participating

actors with a structure of roles, responsibilities, rules of engagement, communication, and information flow. Therefore, any collaboration is dependent on various traits and experiences that motivate decision makers to pursue interorganisational partnerships and make it successful (Gazley, 2017). The last challenge is *disruption*. Participating organisations feel disruption due to external checks on the data and processes.

### 5.3 Scope

Crowdsourcing ecosystems bring abundant opportunities for generating significantly more value (Annanperä et al., 2016). However, various external factors can increase or decrease the scope of a crowdsourcing ecosystem. *Trust* is at the core of

cross-organisational collaboration. The parties need to build legitimacy through achieving consensus or acceptance on cross-sector information sharing and integration. One factor for cross-organisational collaboration is *shared goals* and *shared values*.

*“We feel that our rich collections were hidden to world partly due our physical isolation - compared to other parts of world, where people are very savvy about collaboration. “What is your open access strategy?” So having a high density of museums and museum professionals to learn from is one possibility. But that’s the only way that people invested in these projects can work together” (coordination manager).*

The partners of AWMM share similar goals as they all intend to bridge the information and knowledge gaps for the common good. Some of the partners joined hands for the remembrance of the WW1 100-year anniversary and to tell the stories of fallen heroes, while others aimed to increase the visibility of regional culture and history to a global audience. Shared social goals lower the barriers to entry for collaborators. Another factor was *common regulation and standards*. The parties in AWMMs crowdsourcing ecosystem understand similar jargon, regulations, and standards for data preparation (metadata schemas), data exchange and content ownership (copyright, creative commons licences). These organisations share values of open sharing, value creation and open value distribution. Each participating organisation brings their own *diverse communities* that increase crowdsourcing process and value.

*“On the public side of it, once you do a GLAM Wiki partnership, it’s much easier for the public to access the content. So, if you’re an educator, an activist, an artist, or anyone from community, like a re-user, they may benefit from this” (GLAM-Wiki Manager).*

Gradually, the collaborators started gaining *domain expertise* as the ecosystem expanded and the partners gained opportunities to work with multiple organisations. In a traditional standalone crowdsourcing project, a single organisation gains expertise over a long period of time. However, in a collaborative environment, the partners gain expertise during a limited period. At the same time, the organisation initiating or actively participating in the crowdsourcing ecosystem gains *institutional visibility*, which helps in the expansion of the ecosystem. AWMM experienced institutional visibility in various national and global arenas.

Another promising opportunity for the collaborating organisation is improving *quality assurance*.

*“Where you’ve got actually quite esoteric subjects like: which specimens of [...] held by which museums? Or are these records all the same person or are they two different people with the same name? it is like helping put one piece into a jigsaw” (coordination manager).*

The main objective of AWMM's crowdsourcing ecosystem is to fill the information gaps, increase the quality of information, and improve value creation. The organisation felt motivated to share resources that were previously limited to a single organisation.

## 5.4 Risks

As cross-organisational collaborations grow, crowdsourcing ecosystems may face a few frictions including regulatory compliance, governance, quality control and conduct control. It is important to understand the risks influencing the formal and informal control structures to govern knowledge creation and sharing in ecosystems (Larsen & Myers, 1999; Majchrzak & Malhotra, 2016). The growth of partners, emerging technologies and global context in a crowdsourcing ecosystem creates various *regulatory compliance* risks. If the collaborating organisations are unwilling to regularly monitor the agreed upon rules, the risk of noncompliance increases (Thomson & Perry, 2006). The rapid pace of change related to global regulations and technology also makes regulatory compliance uncertain. Existing regulations may be good for a single organisation, but may be difficult to implement across an ecosystem. Global regulations, technology access and user interest can be triggered by events that have a global impact. For example, after the Cambridge Analytica scandal, various information sharing regulations were implemented around the world about user created content exchange. Another risk is *content control* in a crowdsourcing ecosystem. Content in a crowdsourcing ecosystem is not subject to traditional centralised control since it involves open sharing with external stakeholders. One of the challenges is to keep a dynamic balance between managing resource dependence and sustaining organisational autonomy (Guo & Acar, 2005). The organisation might lose control over their content as well as crowd created content. Another risk associated with regulatory compliance and governance is *conduct control*. Due to loose leadership in an ecosystem, there is no control on the conduct of the participating organisations (Gawer, 2014). It becomes complex when various

crowd communities are participating on multiple crowdsourcing platforms within a crowdsourcing ecosystem.

## **6. Strategies to increase collaboration for a healthy crowdsourcing ecosystem:**

Cross-organisational collaboration is an area of increasing interest and intense investment (Allen et al., 2014) but it is a complex process of value exchange driven by diverse factors. In the light of our study, we propose a few strategies for cross-organisational collaboration in crowdsourcing to increase the chances of crowdsourcing ecosystem success:

- a) The central organisation (s) can engage with external contributors by increasing communication and reporting the outcomes with partners and co-creators. Collaboration needs to evolve as stakeholders interact over time (Thomson & Perry, 2006).
- b) A balance between control and openness is required as control hinders value creation, but openness may lead to a loss of value.
- c) As a crowdsourcing ecosystem grows, the partners need a better understanding of both internal and external regulations to ensure compliance. Internal regulations are related to the ecosystem governance and external regulations include data privacy, data exchange, intellectual property rights, data protection and data provenance.

## **7. Research and practical implications**

Our study is intended to contribute to crowdsourcing theory and digital ecosystem theory in two ways. First, most existing studies on crowdsourcing focus on a single organisation or platform. However, cross-organisational crowdsourcing practices are emerging. A better understanding of these practices is required to ensure value creation for the collaborating organisations (Nooshinfard & Nemati-anaraki, 2014). Second, by identifying the factors influencing collaboration in crowdsourcing ecosystems, we hope that better governance of a crowdsourcing ecosystem might be possible. Success factor studies indicate that managers have an important role to play in the success of IT based initiatives, particularly with respect to support, leadership, clarity of vision and the development of shared common objectives (Rose et al., 2015). Our study contributes to those organisations intending to leverage their crowdsourcing collaborations. First, by

understanding the internal and external factors of crowdsourcing based cross-organisational collaborations, managers can make more informed decisions about whether to form or to enter a crowdsourcing ecosystem. Second, the value from a standalone project might be increased if organisations enter in crowdsourcing ecosystems. A larger and diverse content creating and content using community can help in quality assurance that is not possible in one-off crowdsourcing projects. Third, if the collaborating organisations can keep in mind the critical success factors, this might help them with governance and the sustainability of their crowdsourcing ecosystem.

## **8. Conclusion, Limitations and future research**

Organisations can benefit by recognizing and understanding the factors influencing collaboration (Nooshinfard & Nemati-anaraki, 2014) in the crowdsourcing context. Crowdsourcing aims to bring value to organisations by collaborating with others. Until now the IS literature on crowdsourcing has been focused on one-off projects (Nevo & Kotlarsky, 2020), but we have identified the emergence of crowdsourcing ecosystems. A crowdsourcing ecosystem involves collaboration with many external stakeholders. We suggest that at the emergence stage of a crowdsourcing ecosystem, a better understanding of internal and external factors can be helpful. The collaborators need to assess their preparedness, challenges, and risks before initiating the formation of a crowdsourcing ecosystem. We believe our findings might be applicable to the crowdsourcing practices of other not-for-profit sectors because these sectors share similar infrastructure, knowledge flows, organisational motivations, and interactions as the GLAM sector. However, given the nature of our case study methodology, we acknowledge that there may be differences due to the size of the organisations, motivations, culture of country, technological accessibilities, and stage of crowdsourcing. We also acknowledge the limitation of studying factors only at the emergence stage of a crowdsourcing ecosystem. In future we hope to expand this study to all stages of a crowdsourcing ecosystem. In conclusion, we hope that a crowdsourcing ecosystem perspective will open new streams of research related to crowdsourcing and digital ecosystems.

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