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## **A conceptual framework of influences on a non-profit GLAM crowdsourcing initiative: A socio-technical perspective**

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### **Abstract**

*Crowdsourcing theory and research is in its infancy and fragmented with little theoretical agreement. This paper presents a conceptual framework that provides a holistic view of key influences on a non-profit GLAM (galleries, libraries, archives, museums) crowdsourcing initiative through an interpretive analysis. Three key themes of influences emerged from the case analysis: motivation, relational mechanisms and technology; however they were found to be mutually entangled in practice. The conceptual framework acknowledges the role of both crowd participants and organisational stakeholders through recursive use and interaction over time, and the emergence of multiple configurations of influences on crowdsourcing initiatives while aligning motivations of the crowd with that of the crowdsourcing initiative (i.e. motive alignment). The framework developed in this study extends existing knowledge of the key influences on non-profit crowdsourcing in a GLAM context and clarifies and expands our understanding of this phenomenon from a socio-technical perspective.*

### **Keywords**

Crowdsourcing, Influences, Socio-technical, GLAM, Non-profit

### **INTRODUCTION**

Crowdsourcing is an open collaboration system that is inherently socio-technical and entangled in practice. Thus the interconnection of organisation, participant and technology play an important role in any crowdsourcing initiative (Zhao and Zhu 2012, Pederson et al 2013). While previous studies have identified a wide range of motivations behind user participation (cf. Brabham 2012, Kaufmann et al 2011, Pilz et al 2013), these findings are largely based on paid or commercial crowdsourcing ventures. Little is known about motivations for participation and influences on non-profit crowdsourcing initiatives such as those commonly found in GLAM (galleries, libraries, archives, museums) projects where no financial benefits are offered (Afuah and Tucci 2012). Crowdsourcing is increasingly used by not-for-profit organisations as a means of eliciting members of the public to contribute to activities that would normally have been carried out by staff or by external contractors (Dutton 2011). While some studies have attempted to address non-profit contextual issues (e.g., see Oomen and Arroyo 2011, Smith-Yoshimura & Shein 2011; Holley 2010, 2009), these examinations were predominantly descriptive and lacked theoretical orientation. In light of this, crowdsourcing collaboration technologies need to be understood as open and versatile technologies, in that they reveal and unfold their full potential only in the context of emerging practices of technology, organisation and crowd (Orlikowski 2000; Riemer, Steinfield and Vogel 2009).

This research takes a socio-technical approach to studying a successful crowdsourcing initiative where the outcomes are mainly public good benefits with no tangible compensation to participants. The case examined is a crowdsourcing project initiated by the National Library of Australia (NLA) as part of its Australian Newspapers Digitisation Program (ANDP). This research aims to inductively build theory and understanding through the interpretive analysis of the non-profit ANDP real life case. The conceptual framework generated in this study thus contributes to existing theories by using a socio-technical perspective to explain influences on non-profit crowdsourcing in a GLAM context.

This paper proceeds as follows. Firstly the background of the research study is presented; secondly, a review of the emergent influences are undertaken; thirdly a discussion of the interdependence between the influences is undertaken; fourthly a conceptual framework of themes of influence on non-profit (and non-paid) crowdsourcing initiative for a GLAM context is constructed from a socio-technical perspective which will form the theoretical contribution of this research.

## BACKGROUND

Crowdsourcing theory and research is in its infancy and fragmented with little theoretical agreement (Marjanovic, Fry and Chataway 2012, Zhao & Zhu 2012, Pederson et al 2013). Zhao & Zhu (2012) surveyed the landscape of existing studies on crowdsourcing and identified three directions for future research: (1) participant perspectives (motivation and behaviour), (2) organisational perspectives (adoption, implementation, governance, quality and evaluation), and (3) system perspectives (incentive mechanism and technology issues). Pederson et al (2013) carried out a systematic literature survey and devised an analysis framework that consisted of process, technology, governance and people (crowd, individual, problem owner) and outcomes.

In general, there is a lack of empirical research on crowdsourcing methodology, management and governance of crowdsourcing projects (Jain 2010; Geiger, Rosemann and Fielt 2011). IT governance in a crowdsourcing context is complex and potentially requires different foci, governance systems, and controls to ensure that the motivations of the crowd align with that of the organisation (i.e. the crowdsourcing initiative) (Sharma 2010). However, the literature is again scant on studies examining the relationship between governance and motive alignment in crowdsourcing.

From a technology (system) perspective there is evidence that technology can play an important mediating role for incentivising the participation of the crowd through the motivational affordances of the technology, or through different incentive mechanism designs (Zheng, Li and Hou 2011). However not much is known about the relationship between organisational mechanisms (i.e. governance mechanisms) and technology attributes and how they interact and impact crowdsourcing goals and outcomes (Sharma 2010). Even less is known about how to encourage the crowd to participate in crowdsourcing design as well.

Pederson et al (2013) identified that additional research is needed for better understanding how current and future technological capabilities interact with associated management, governance and access measures to best support crowdsourcing endeavours. While research has established the mediating role of technology to motivation, there is very few evidence of established research on the link between organisational mechanisms and participant motivation (Pederson et al 2013). Thus adopting a socio-technical approach to exploring the influences on crowdsourcing from participants, organizational and technology perspectives is an appropriate research technique and there is a need for an inductive approach. Understanding how and why the crowd participate in these kinds of activities, the processes and governance mechanisms invoked; and technology affordance is important for understanding better crowdsourcing phenomena and theory building (Brabham 2012, Zhao & Zhu 2012). The role of motive alignment needs to be studied in terms of how it influences crowdsourcing initiatives (Sharma 2010), in particular in non-profit GLAM initiatives. Hence the research question for this study was broadly defined as: *What are the key influences on a GLAM crowdsourcing initiative?*

Moreover the dynamic relationship between these three factors (e.g. see temporality of motivational influences in Rotman et al's (2011) framework) has been found to play an important role for sustained participation in crowdsourcing. However the role of temporality across other influences such as organisational and technological has not been examined.

## RESEARCH METHOD

This study adopted an exploratory interpretive single case study approach (Walsham 1995). This approach is suitable as the study aims to carry out an in-depth examination of the stakeholder interactions and relational mechanisms deployed.

### **Research Case: The Australian Newspapers Digitisation Program (ANDP)**

This study examined the technological, participant and organisational factors that influenced the Australian Newspapers Digitisation Project (NLA 2013). The ANDP is an ongoing large scale project developed by the National Library of Australia (NLA) in collaboration with Australian Newspaper Plan (ANPlan) (i.e. State and Territory Libraries) to provide an online full-text searchable digitised newspaper delivery system of out of copyright Australian newspapers published between 1803 and 1954. However, numerous errors were recorded during the optical character recognition (OCR) process which greatly limited the searchability of the collection (e.g. missing or wrongly recognized letters and words). Unfortunately the NLA did not have sufficient resources to rectify the errors itself thus crowdsourcing was seen as a potentially viable solution. Through this application users may comment on, tag and correct the OCR text. Since its launch in 2008, the Australian Newspapers site (now integrated into the library's 'Trove' search portal) has had more than 80 million lines of text enhanced or corrected (NLA 2013).

## Data collection

The data for this study was obtained primarily from interviews conducted with a cross section of project stakeholders. Secondary data were collected from other extant sources such as NLA project documents and reports, user surveys undertaken by NLA, media articles, the ANPlan website, the Trove forum and extant literature on the case study (e.g. publications by Holley 2009, 2010 on ANDP). The first author also registered as a text corrector on the site in order to gain hands-on experience of text correction and to obtain access to the Trove forum (Walsham 1995).

Eighteen semi-structured interviews were conducted with stakeholders during 2011-2012 with each interview lasting between 1 to 2 hours. The interviews were: NLA staff and the ANDP project team (5), ANPlan State and Territory libraries (4), text correctors (6) and general Trove users (3) (i.e. who use Trove collections, but do not carry out text correction). Participants were selected using purposeful sampling and snowball approach (Patton 2000). All interviews were transcribed and NVivo was used for textual content analysis using a *thematic data analysis technique* on the basis of data gathered iteratively and explored for theme (Saldana 2009). Further coded data was also analysed iteratively, alternating data coding with investigation of theories that fit the emerging interpretation (Saldana 2009). The overall findings were validated by providing transcripts and summary reports back to the interviewees for review. Triangulation across data sources (multiple informants at different levels and affiliations, from different stakeholder groups and across sites), across data collection methods (interviews, documentation and website observation), and a pluralist approach to data analysis using multiple theories served to strengthen the emergent concepts (Eisenhardt 1989).

## DATA ANALYSIS

Three major themes of influence emerged from the data analysis – (1) Motivation, (2) Relational (governance) Mechanisms, and (3) Technology. Each theme of influence included further categorisations and relevant theoretical concepts. These three influences can be summarised at two levels:

1. Theoretical concepts within each influence consisted of key sub-themes and categories derived from thematic data analysis and theory triangulation.
2. The temporal dimension of each influence over time.

## Review of the emergent influences

Broadly speaking, **motivation** refers to an individual's willingness to perform some tasks and can be defined as the reason, purpose, and direction for any action. Two types of motivation were found to be at work in the ANDP case – 1) **participant** (text corrector) motivation and 2) **organisational** motivation (see Table 1). A multi-faceted complex framework of personal, collective and external factors motivated the volunteers (removed for reviewing). Text correctors from the crowd reported high but apparently sustainable levels of self-motivation. Initial interest stemmed from a variety of egoism-based reasons including personal, community and task-enjoyment based motivations (Alam and Campbell 2012). Participants were highly intrinsically motivated, but valued altruistic and community motivations as well. Community and extrinsic non-monetary motivations played a vital role in their continued involvement. Unlike the numerous motivational factors affecting text corrector's participation, organisational motivations for implementing and participating in crowdsourcing exhibited a more limited motivational range (Alam and Campbell 2013a). Their main purpose was to leverage off crowd wisdom to correct OCR thereby improving the indexing and search functionality. As the project advanced, key NLA stakeholders realised the outcomes were potentially larger than only increased usage or ability to tap into external expertise of public; it also resulted in higher levels of social engagement, active collaborations with and between stakeholders, and the building of social capital. Table 1 provides some sample examples of categories and concepts within motivational influences.

Table 1: Concepts within the thematic category Motivation (Alam and Campbell 2012, Alam and Campbell 2013a)

Sub theme	Category	Sample Concepts	Sample evidence
Participant (Text Corrector) motivation	Intrinsic motivation: Egoism, community, enjoyment Extrinsic motivation: Social (Non-monetary rewards)	Personal interest, Trust, Challenge, Learning new knowledge, Addiction, Obligation, Altruism, Collectivism, Principalism; Fun, Simplicity, Task Autonomy, Attribution, recognition & reward, Indirect Feedback	<u>Interview comment:</u> Consequently my reason for using the site is foremost for family history/genealogy reasons, but I also find the site invaluable as an aid in my research undertakings <u>Data from Trove forum:</u> My motives are far from altruistic. I'm addicted to tating and the prospect of finding new patterns interests me, especially when they're by an Australian author whose book sits on my shelf. I live in the Los Angeles, California area

Organisational motivation	Resource constraints, organisational culture, Engagement	Cost reduction, Social /political environment, Innovation and leadership; New way of engaging, Enriched collection and increased use; Social engagement Collaboration Social capital	<u>Interview comment:</u> I think the value that you get in terms of engagement with the audiences, working with libraries to make that content more searchable and accessible is the value, the greatest value that comes from it. <u>Data from document review:</u> crowdsourcing provided a way for achieving valuable outcomes the library would never have had the time, financial or staff resource to achieve on its own or to outsource (Holley 2009)
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**Relational (governance) mechanisms** are purposeful processes or structures used to support and build relations between (and sometimes within) different stakeholders (Van Grembergen 2004). There were multiple formal and informal structures and processes observed within the ANDP case (Alam and Campbell 2013b). Some of the more formal processes included top management support, the ANDP development team directed by the business team, and the appointment of an experienced external project manager demonstrated leadership in IT management and relational mechanisms largely targeted at alignment and governance at external stakeholders.

In essence four important relational mechanisms were observed (removed for reviewing): (1) Trust, (2) open channels of communication, (3) beta launch of the technology platform, and (4) support for user feedback on system design (see Table 2). The relational mechanisms implemented such as open channels of communication and the support of user feedback through multiple methods fostered an environment of mutual trust, yet provided a sufficient framework of responsibility and authority. The open channels of communication and the beta launch of the crowdsourcing platform facilitated spontaneous engagement with interested participants and facilitated an inclusive stakeholder participation strategy in the design of the ANDP crowdsourcing initiative. Because the ANDP leadership engaged in these ways with the community and deployed participatory and agile design principles, the relational mechanisms employed tended to follow an *emergent approach* with associated proactive and reactive relational structures and processes. Table 2 provides some sample examples of categories and concepts within relational (governance) mechanism influences.

Table 2: Concepts within the thematic category Relational Mechanisms (Alam and Campbell 2013b)

Category	Sample Concepts	Sample evidence
Relational mechanisms Structures Processes	stakeholder participation, Open channel of communication, Built based on user feedback, Beta Lunch, Building Trust, Leadership, Community moderation & monitoring	<u>Interview comment:</u> “The second factor was having open channels of communication. We made it pretty clear why we were doing it and what we expected and how they should contact us. There’s an open feedback form and we took thousands of feedback comments. So they felt they were involved.” <u>Data from document review:</u> The ANDP team received feedback from more than 600 individual users during August – December 2008. During the first 6 months of beta use several methods of monitoring user activity and gaining feedback were utilised (Holley 2009)

**Technology** (i.e. the ANDP crowdsourcing platform and associated ICTs) played a mediating role between user motivation and the relational mechanisms used. Several options for design features were purposely chosen by the ANDP team because of their relevance to the context and often suggested by the text correctors themselves. Various design choices involving the system interface, task, controls, and interactional and motivational features were developed, tested and deployed. After the initial prototype design, the text correction system was made available to the public in beta mode. Through this process the public had an opportunity to use the system at a very early stage of the design and thus were able to co-create value by providing feedback and thereby participating directly in the design process. During this use phase, the technology structures were (re)enacted and new structures emerged and evolved (e.g. incentive mechanisms) (Carroll 2004). Text correction, comments, tags and forums were used in combination with social network sites (SNSs) such as Twitter, Blog and Facebook. The technology design choices facilitated both embodied and emergent technology affordances. Emergent practices such as text correction-in-use, communication-in-use and collaboration-in-use were enacted through recursive use of the technology over time. Due to limited page space, Table 3 provides some sample examples of categories and concepts within technological influences.

Table 3: Concepts within the thematic category Technology

Category	Sample Concepts	Sample evidence
Interface Task design Control mechanisms Motivational affordances Interactional	Artefact and practice level: Intuitive, task autonomy, incentive mechanisms, communication, moderation Emergent: text-	<u>Interview comment:</u> “Most procedure was quite obvious. I received little guidance, nor was much necessary. If I felt that I needed it, I asked and it was provided”. “We do have the facility to roll back changes if we need to.” <u>Data from document review:</u> It was observed that far more users (approximately 10 times more) opted to correct text

	correction-in-use	than added a tag, and five times more articles were corrected than were tagged.
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### Temporal dimension within the influences

It can be seen from the above discussion, that there were temporal aspects at work. Different configurations of relational mechanisms and technology influences were enacted across three distinct phases observed in the ANDP case: (1) the initial stage of design and development, (2) the implementation stage through beta launch, and (3) the operationalization stage where ANDP service was integrated into operational system Trove. Similar stages were also identified in research work on motivations for citizen science projects (Rotman et al 2011). Likewise, Orlikowski and Robey (1991) and Orlikowski (1992) refer to the terms *use*, *design and development* in their work on the structural model of technology. Their *use* mode is when users appropriate technology for their own purposes. The design and development phase is when human agents build interpretive schemes, resources and norms into technology (Orlikowski and Robey 1991). The last two stages can be termed as the ‘use’ phase. Thus the relational mechanisms employed and technology affordance displayed a temporal dimension across these three phases. Motivation also showed temporality across three phases - (1) the initial involvement phase, (2) the active involvement phase, and (3) the sustained involvement phase (Rotman et al 2012).

All three influences demonstrated different temporal effects within the three distinct project phases (see Table 4 below). However, while the phases of *use* and *design (and development)* are referred to separately, in fact they are tightly coupled since use and design (and development) is both recursive and reflexive (Orlikowski 1992, p.408).

Table 4: Temporal dimensions for influences across three broad phases

Themes	Phase 1	Phase 2	Phase 3
Relational mechanisms and Technology	<b>Design &amp; development</b>	<b>Use phase</b>	
	Design & development	Beta Phase	Operational (Trove) Phase
Motivation	Initial involvement	Active involvement	Sustained involvement

In the following section, the interrelationships between these influences in terms of the theoretical concepts are drawn so that the type and nature of the interdependence between the influences can be derived. The aim of reviewing the interrelationships between the themes of influence is to inductively relate the theoretical concepts and to develop a conceptual framework to explain the interdependence between the themes of influences for a non-profit GLAM crowdsourcing initiative. The conceptual framework will be thus empirically grounded in case research data.

### FINDINGS: INTERRELATIONSHIPS BETWEEN THE EMERGENT THEMES OF INFLUENCES

The three influences (relational mechanisms, motivation and technology) discussed above are not clear cut conceptualisations as they might first appear. The influences are more like archetypes – highly simplified but powerful conceptions of categories of influences. There are overlaps but their differences are drawn out in this paper for the purpose of more closely examining each effect. They are not mutually exclusive rather inter-related. Also they are neither exclusive nor exhaustive. In the following discussion it is demonstrated that motivation, technology and relational mechanisms are mutually entangled in practice and their relationship is one of inter-dependence.

#### Interrelationships between motivation and technology

There was strong evidence of inter-dependence between motivation and technology. Motivation often stimulated the technology design with technology features being chosen to satisfy certain motivational requirements. On the other hand, technology played a mediating role to motivation, either used to satisfy a motivation or to reinforce a certain motivation. The following illustrates this inter-dependence.

The online delivery and text correction interface was simple, quick and reliable. The interface was intuitive and required little or no training, and online help could be accessed. The requirements of the task were simple and explained in plain English. There were no strict instructions or rules on how to fix the text. The task was perceived as easy and required low skill level from the text corrector volunteers. These features of the technology satisfied the motivation of simplicity and skill variety. Further there were no restrictions on the time taken to complete a task and the system was accessible 24 hours a day from anywhere through the internet. Multiple options were available for carrying out text correction. These design choices of modularised task design and no strict guidelines resulted in a high-level of autonomy in task selection. Hence technology design choices mediated motivations like simplicity, skill variety and task autonomy.

Driven by budgetary and resource constraints, the NLA initially deployed crowdsourcing technology with an aim to engage the public to enhance digitised newspaper during the design and development phase. Crowdsourcing provided a way for achieving organisational motivations for which the library did not have resources to achieve on its own or with traditional outsourcing (Holley 2009). The NLA's main motivation was to harness the collective intelligence of the public to correct OCR errors so that the indexing and search facility was improved. However as they implemented the online delivery and text correction technology during beta phase, it was realised that the outcomes were not just increased usage and enhancement of library collection but also a higher level of social engagement and built social capital (cf. Alam and Campbell 2013a). Hence the organisational motivations stimulated the creation of crowdsourcing technology, and the evolution of the crowdsourcing technology over time allowed other organisational motivations to surface.

### **Interrelationships between technology and relational mechanisms**

There was strong evidence of inter-dependence between technology and relational mechanisms. Relational mechanisms adopted in the ANDP often required the creation of technology features. On the other hand, technology played a mediating role to relational mechanisms, by either responding to a process need or by facilitating newly identified relational mechanisms. The following illustrates this inter-dependence.

The ANDP implemented several interactional features during the beta release phase such as commenting, tagging, email correspondence, and a 'contact us' form thereby providing multiple ways to communicate with NLA staff and external users. Social networking features (e.g. twitter, blog and Facebook) were integrated into the system during the operational phase. These technology features established multiple channels and mechanisms of communication that enabled both open and frequent communication and both formal, informal communication. In essence these communication design choices helped deploy participatory relational mechanisms that were aimed at stimulating common, open and friendly discussion around digitised newspapers and text correction. Hence technology played a *mediating role* in enacting NLA's relational mechanisms.

Again through these channels of open communication, text correctors were able to provide suggestions for additional design features or reported features that were not working during the use phase (Alam and Campbell 2013b). Many users requested the ability to communicate with each other not just NLA. In response, the NLA implemented forum technology later in the operational phase. Relational mechanisms of taking 'users as partners' and implementing 'user feedback' in turn stimulated creation of these new technology affordances.

### **Interrelationships between motivation and relational mechanism**

Instances of inter-dependence between motivation and relational mechanism were observed in the case, but to a lesser extent to that found between relational mechanism and technology. Nevertheless, motivational needs often stimulated the creation of relational mechanisms, and relational mechanisms were in turn deployed to meet certain motivation factors. The following illustrates this inter-dependence.

During the design, development and deployment (e.g. beta phase), the NLA targeted participatory relational mechanisms aiming to involve volunteer text correctors using a set of relatively informal strategies (cf. Alam and Campbell 2013a). NLA treated '*users as partners*' and adopted an open attitude towards feedback from the broad user stakeholder cohort. Actively seeking feedback from the public through the deployment of the beta version resulted in suggestions from users that were innovative, fresh, and viable and helped shape development of the service to better meet user needs (Holley 2009). In doing so the volunteers could see that their requests or wish lists were being acted upon and they received prompt feedback from NLA. This built further trust in NLA's processes which motivated them further to participate actively in text correction. Another informal relational mechanism deployed was community monitoring and moderation in which some volunteers were empowered to moderate the user forum and field questions from other volunteers. The forum was highly active with most posts promptly replied to by NLA staff or other forum members. There was neither any evidence of bullying activity nor any sign of vandalism. Hence this set of targeted inclusive participatory relational mechanisms resulted in a supportive environment and text correctors found the site to be collegial which also further motivated continued participation.

### **Summary of the Interrelationships between motivation, relational mechanisms and technology**

It was observed in the above discussion that the three influences were essentially interdependent. Motivation and relational mechanisms satisfied each other and thus were interdependent. Technology, on the other hand, played a mediating role to both relational mechanisms and motivation. This inter-dependence among the three influences can be illustrated in single diagram as follows (see Figure 1).

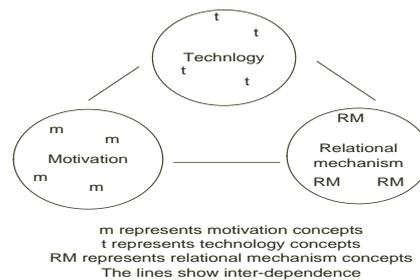


Figure 1: Inter-dependence between motivation, relational mechanisms and technology

Further to the analysis above, in some situations within the ANDP case, there was evidence of interacting relationships between all three influences. Thus motivations, technology and relational mechanisms were mutually entangled in practice (Orlikowski 2000).

### TOWARDS A SOCIO-TECHNICAL CONCEPTUAL FRAMEWORK OF INFLUENCES ON NON-PROFIT CROWDSOURCING

ICTs do not exist in social or technological isolation (Lamb, Sawyer & Kling 2000). Rather ICT are inherently socio-technical, situated, and socially shaped (Orlikowski & Iacono, 2001). Scholars who engage in socio-technical systems (STS) research eschew socially or technologically deterministic discourses in favour of approaches that assign agency equally to the material properties of the computing artifact and the broader social contexts in which the artifact is engaged. Technology shapes, and is shaped by, the social context within which it is used (Orlikowski & Iacono, 2001). One key idea of socio-technical research is that the social context of information technology development and use plays a significant role in influencing the ways that people use information and technologies and thus influences their consequences for work, organisational and other social relationships (Kling 2007). The highly intertwined nature of the social and the technical is central to the theoretical approaches of Social Construction of Technology (SCOT -Bijker 1995), Actor-Network Theory (ANT -Latour 1987), Structural model of Technology (Orlikowski & Robey 1991), Technology-in-practice lens (Orlikowski 2000) and Technology Appropriation Cycle (Carroll 2004).

The structural model of technology reconceptualises the dichotomous role of technology in organisations both as an objective force and a socially constructed product (Orlikowski & Robey 1991, Orlikowski 1992). This model focusses on three components: 1) human agents (e.g. technology designers, users and decision-makers); 2) technology (e.g. product, IT artefact, medium of human action) and 3) institutional properties of organisations (e.g. business strategies, ideologies, divisions of labour, expertise, government regulations, and socio-economic environmental conditions). Figure 2 illustrates the components in the structural model of technology. The discipline of social informatics also views ICTs as a socio-technical network of artifacts, social contexts, and their relationships (Kling, Rosenbun and Sawyer 2005). Their model also focusses on the relationships between three things: 1) technology, 2) culture and 3) institutional properties (Kling et al 2005, pg. 193). Figure 3 illustrates the three components in a triangle diagram. Their ‘cultural and institutional contexts’ influence the ways they are developed, the kinds of workable configurations that are proposed, how they are implemented and used, and the range of consequences for organisations and other social groupings. These components of computing are “configurational” in that their specific forms change over time and are intimately shaped by the social milieu in which they exist (Kling et al 2005).

Similarly, three key thematic components were found to influence the ANDP crowdsourcing initiative: 1) motivation, 2) technology and 3) relational mechanism. It was also evident that the three underlying themes of influences did not exist or operate in organisational or technological isolation. The motivational, organisational and technological contexts influenced the ANDP crowdsourcing initiative – the ways it was developed, the kinds of workable configurations that were recursively enacted, how they were implemented and used and the range of consequences for the organisation and text correctors. Nothing happens in a vacuum - the context of an application plays an important role in reflecting the impacts and significances of crowdsourcing (Zhao and Zhu 2012). The three influences motivation, technology and relational mechanisms were thus found to be mutually entangled in practice.

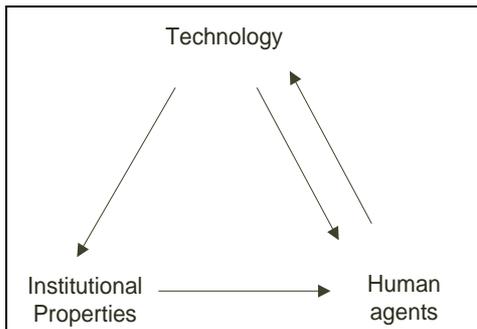


Figure 2: Structural Model of Technology  
(Source: Orlikowski 1992, p.410)

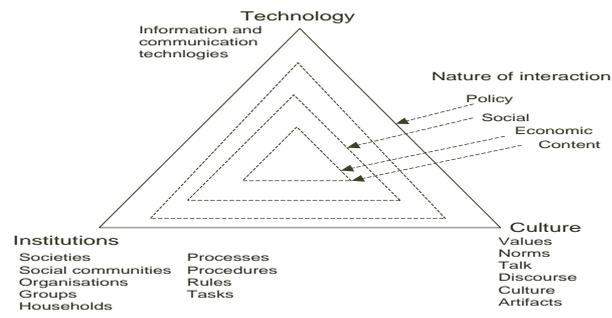


Figure 3: The Triangle diagram: relationship between technology, culture and institutional properties  
(Kling et al 2005, p. 193)

Text correction within ANDP occurred in a socio-technical system in which contributors used various technology features and capabilities (e.g. text editing, commenting, tagging) to enhance a national resource (e.g. Australian Newspapers) and multiple forms of relational and governance mechanisms were enacted by NLA to align organisational and text corrector motivations. Hence in the ANDP socio-technical system institutional properties such as relational (governance) mechanisms and social or human agency aspects such as text corrector, ANDP team and organisational motivation influenced the outcomes of the initiative. The organisational non-profit crowdsourcing domain is simultaneously enabled and constrained by the socio-technical affiliations and organisational environment (e.g. NLA, ANDP team), the crowd (e.g. text corrector & Trove user), and its context (e.g. GLAM and NFP). As discussed earlier within the various sections on interrelationships between the themes, the dynamics between the three thematic influences was dependent upon motive alignment. Motive alignment of the crowd may be defined as the extent to which crowd is able to associate with long term objective of crowdsourcing initiative thereby encouraging its wider participation (Sharma 2010). In order to reach the critical mass in terms of crowd participation incentives ought to be tailored to attract the most effective collaborators and the motive of the crowd needs to be aligned with the long term objective of the crowdsourcing initiative (Sharma 2010). To achieve motive alignment the three key components (i.e. motivation, technology and relational mechanisms) were configured recursively over time.

The following diagram (Figure 4) summarises the findings of this study and shows the scope and impact of the themes of influences on the ANDP crowdsourcing initiative. It is a theoretical account of the interdependence of the themes of influences and depicts the highly intertwined nature of the motivational, the organisational and the technical that is central to the socio-technical approach to crowdsourcing technology. The interdependence is dependent on the need to align motives of both the organisation and the crowd (depicted in the middle of the triangle of Figure 5). This conceptual framework takes into account the importance of human agency and mutual interactions between technological, organisational and motivation specific influences, specifically in the NFP GLAM crowdsourcing context.

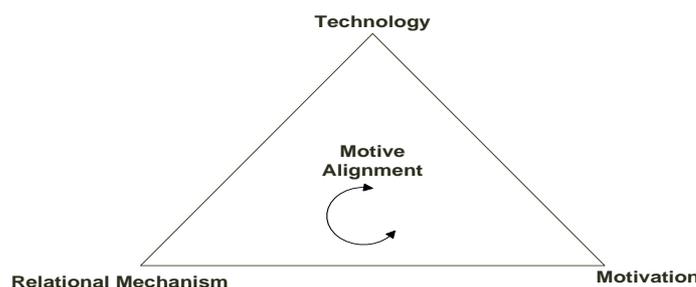


Figure 4: A conceptual framework of themes of influences on ANDP NFP crowdsourcing initiative

### Implications of the conceptual framework and motive alignment

There is no one single theory that can be applied to understand the conceptual framework which can successfully explain non-profit crowdsourcing phenomenon for a GLAM context. The findings in this study and extant literature suggest that a socio-technical and holistic approach is required to understand the influences on crowdsourcing initiative for organisational context (Zhao and Zhu 2012). Clearly it is important to keep in mind an overview of important considerations while implementing a crowdsourcing initiative (Zhao and Zhu 2012). The conceptual framework described in the Figure 5 above provides such an overview of important considerations. It focusses on the domain level of crowdsourcing rather than on the initiating organisation (Gray

& Wood 1991). In this framework, the organisation is the centre of a network of stakeholder relationships and uses various technologies and relational purposeful processes to mediate between multiple stakeholder motivations (i.e. motive alignment). This framework acknowledges the role of human agency (e.g. users and designers) through recursive use over time and the emergence of multiple configurations of motivation, relational mechanisms and technology to achieve motive alignment. A set of institutionalised configurations of the three influences are developed, changed and sustained over time. To some extent, it also shows the power dynamics within a crowdsourcing context by acknowledging the existence of human agency (e.g. users, designers and organisation) and re-establishes the importance of user involvement in crowdsourcing (Zheng et al 2011).

### Limitations of the conceptual framework

One can identify many reservations which make inferences or generalisations from the ANDP case difficult. This was a single case and not all facets of crowdsourcing (e.g. nature of the task, domains of crowdsourcing, forms of crowdsourcing, implementation phases) could be explored with the single case. These reservations are justified, yet they do not undermine the conceptual framework of themes of influences on crowdsourcing as it is generic in nature and highlights the three major themes of influence that are likely to be significant for any crowdsourcing initiative. These influences are abstract enough to be transferable to other NFP non-paid crowdsourcing context. This level of abstraction allowed a generic applicability regardless of the form of crowdsourcing innovation adopted.

### CONCLUSION

Three emergent themes of influences together, with a substantive socio-technical conceptual framework of themes of influences associated with a NFP non-paid crowdsourcing initiative, are the major findings of the study. The findings suggest that a holistic socio-technical approach is required to understand how these influences impact a crowdsourcing initiative, in particular for NFP GLAM context. The conceptual framework built in this paper acknowledges the role of both crowd participants and organisational stakeholders through recursive use over time and establish the emergence of multiple configurations of motivation, relational mechanisms and technology to achieve motive alignment. A complete analysis of the data and the conceptual framework also revealed that the approach to crowdsourcing initiative for the ANDP case reflected a ‘*user-centred participatory*’ stakeholder involvement that focused on an iterative design and relational mechanisms aligned with both organisational and crowd motivations. Noting that text correctors were also involved in early stages of the beta implementation of the ANDP crowdsourcing project, it can be concluded that ‘user involvement’ was a key agency of this crowdsourcing initiative.

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