CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Competitive market innovation contests and social capital: diametrically opposed, or inherently linked?
Authors	Treacy, Stephen;Feller, Joseph;O'Flaherty, Brian;Nagle, Tadhg
Publication date	2017
Original Citation	Treacy, S., Feller, J., O'Flaherty, B. and Nagle, T. (2017) 'Competitive market innovation contests and social capital: diametrically opposed, or inherently linked?', in Proceedings of the 25th European Conference on Information Systems (ECIS), Guimarães, Portugal, 5-10 June, pp. 1695-1712. Available at: http://aisel.aisnet.org/ecis2017_rp/109 (Accessed: 15 February 2019)
Type of publication	Conference item
Link to publisher's version	https://aisel.aisnet.org/ecis2017_rp/109/
Rights	© 2017, the Authors. This material is brought to you by 25th European Conference on Information Systems (ECIS 2017) at AIS Electronic Library (AISeL).
Download date	2026-11-01 13:14:07
Item downloaded from	https://hdl.handle.net/10468/7507



UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Association for Information Systems
AIS Electronic Library (AISeL)

Research Papers | ECIS 2017 Proceedings

Spring 6-10-2017

COMPETITIVE MARKET INNOVATION CONTESTS AND SOCIAL CAPITAL: DIAMETRICALLY OPPOSED, OR INHERENTLY LINKED?

Stephen Treacy
Cork University Business School, Ireland, stephen.treacy@ucc.ie

Joseph Feller
Cork University Business School, Ireland, jfeller@ucc.ie

Brian O'Flaherty
Cork University Business School, Ireland, b.oflaherty@ucc.ie

Tadhg Nagle
Cork University Business School, Ireland, t.nagle@ucc.ie

Follow this and additional works at: http://aisel.aisnet.org/ecis2017_rp

Recommended Citation
Treacy, Stephen; Feller, Joseph; O'Flaherty, Brian; and Nagle, Tadhg, (2017). "COMPETITIVE MARKET INNOVATION CONTESTS AND SOCIAL CAPITAL: DIAMETRICALLY OPPOSED, OR INHERENTLY LINKED?". In Proceedings of the 25th European Conference on Information Systems (ECIS), Guimarães, Portugal, June 5-10, 2017 (pp. 1695-1712). ISBN 978-989-20-7655-3 Research Papers.
http://aisel.aisnet.org/ecis2017_rp/109

This material is brought to you by the ECIS 2017 Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in Research Papers by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

COMPETITIVE MARKET INNOVATION CONTESTS AND SOCIAL CAPITAL: DIAMETRICALLY OPPOSED, OR INHERENTLY LINKED?

Research paper

Treacy, Stephen, Cork University Business School, Ireland, stephen.treacy@ucc.ie

Feller, Joseph, Cork University Business School, Ireland, jfeller@ucc.ie

O'Flaherty, Brian, Cork University Business School, Ireland, b.oflaherty@ucc.ie

Nagle, Tadhg, Cork University Business School, Ireland, t.nagle@ucc.ie

Abstract

Competitive market innovation contest platforms are increasingly used by businesses to identify new products or services to offer their customer base; yet, the degree to which social capital has been ex-plored within these online communities remains scarce. While there is ample support for the presence of social capital within other forms of virtual communities to facilitate knowledge sharing, competitive markets represent a unique setting given the inherent competitive nature of their contest solvers. This has led to a distinct lack of prior research exploring this area, especially as previous studies have chosen to focus instead on social capital vis-à-vis solver motivation rather than a standalone theory. We investigate six competitive markets from the perspective of their experts to explore how the three dimensions of social capital have a role within this setting: (1) the structural dimension (involving social ties), (2) the relational dimension (involving trust, reciprocity and self-identity), and (3) the cognitive dimension (involving shared language and shared vision). Through this study, we present a theoretical model of both the emergent themes and the net impacts of social capital within competitive markets, and discuss its implications for both IS research and practice.

Keywords: Open Innovation, Innovation Contests, Competitive Markets, Social Capital.

1 Introduction

The ability for an organisation to achieve continuous innovation is indispensable as it subsequently leads to stronger growth, competitive advantage, increasing sales, profitability and overall success (Nonaka and Takeuchi, 1995). In seeking to capture this transformative potential, the movement from a closed innovation approach to one of an open innovation paradigm for developing innovation enables companies to use external channels of knowledge (Chesbrough, 2003), such as IT-enabled innovation contest platforms. Forged by globalization and digitalization, these contest platforms allow organisations to post an innovation challenge to a global population of problem solvers (Feller et al., 2012), allowing vast quantities of geographically dispersed individuals to actively participate in idea generation and development. The solvers that produce the best solutions are the ones ultimately rewarded for their submissions. These open innovation contest platforms not only encourage solvers to submit their ideas, but also allows them to interact and collaborate with like-minded peers (Morgan and Wang, 2010). This provides the solvers with opportunities to communicate and share their insights and experiences, establishing a sense of community (Bullinger et al., 2010). Since their inception, different models have emerged for their implementation, with Boudreau and Lakhani (2009) in particular identifying competitive markets as being an important subset. These markets however only add value to an organisation's innovation process if the solvers are willing to share their ideas and submit their

solutions (Kathan et al., 2013), making their decisions to do so an imperative research area. To that end, this paper explores the theory of social capital within an innovation contest setting, which is defined by Nahapiet and Ghoshal (1998) as being "*the sum of the actual and potential resources embedded within available through, and derived from the network of relationships possessed by an individual or a social unit*" (p.243). The research questions addressed in this study are therefore: (1) "*what are the emergent themes of social capital within competitive markets' solver communities*?" and (2) "*what are the net impacts of social capital within competitive markets' solver communities*?"

The remainder of the paper is organised as follows: Section 2 discusses the theoretical and conceptual background of this research, introducing the reader to innovation contest platforms, identifying competitive markets as an appropriate subset of these platforms in which to base this investigation. The theoretical lens of social capital is then presented, introducing the reader to the three distinct dimensions to be explored, before presenting the overall research gap addressed in this study. Section 3 presents the research strategy adopted herein, before Section 4 provides the main findings of this investigation, while identifying a preliminary theoretical model of social capital themes and impacts within competitive markets' solver communities. Section 5 finally provides the conspectus, highlighting the principal conclusions for industry applications, areas for future research, and the study's limitations.

2 Theoretical and Conceptual Background

2.1 Innovation Contest Platforms

An innovation contest is an approach implemented by firms to encourage a public crowd to co-creatively develop innovative responses to an issue posed by organisations (Füller et al., 2014, Hutter et al., 2011). During these contests, an announcement is made by the sponsoring organisation, describing the organisation itself, the problem, issue, or question that the organisation is raising, information about the problem, a request for innovative requests, and a timeframe during which the event will occur (Armisen et al., 2015). The questions posed are often left quite open, asking the crowd to offer recommendations for new sources of revenue, new business models, or new strategic priorities (Armisen and Majchrzak, 2015). Frey et al. (2011) define these platforms as being *"virtual environments (where) external experts or users are invited to contribute to solving predefined innovation challenges" (p. 398).* Through participation, problem solvers become active stakeholders in defining the context of the innovation being sought, including their unique personal understanding (Lenssen et al., 2007). It is this personal experience that generates new dimensions of value, based on these solvers influencing their own unique end products, experiences and services. These dimensions place the external solvers at the centre of the innovation experience. Through these outcomes, this paradigm represents a targeted, market-orientated approach to the adoption of an open innovation business philosophy (Bullinger et al., 2009).

Current literature shows that an increasing number of organisations continue to implement innovation contests worldwide (Brabham, 2010, Jouret, 2009, Andersen et al., 2013, McIntyre et al., 2013, Armisen et al., 2015), for product development and sustainability (Adamczyk et al., 2012). Problem solving through innovation contests therefore involves creating a network of synergistic interactions across solver communities, with the prospect of an economic gain for the winner. These communities are comprised of complex, interconnected webs of interacting individuals and organisations focused on producing knowledge-intensive innovative outputs (West and Lakhani, 2008). For organisations seeking to implement such an open-innovation philosophy in practice it is very communication intensive. Multi-layered webs of interactions by stakeholders emerge both within and outside the organisation to generate, connect and coordinate the required ideas, processes and outputs (Lundstrom et al., 2013). These factors create further complicated issues for organisations and researchers because they are more multifaceted than technology-enabled groups; they are a mix of power and knowledge, liberty and enlightenment, progress and intervention (Kelty, 2009). The technology used is only one half of

the process, with the other, equally important half including the reflective, active and interactive practices that the community members engage in.

2.2 Competitive Markets

As organisations continue exploit these virtual environments to tap into external knowledge, various models of innovation contest platforms have emerged by recognising that open innovation reflects not so much a dichotomy between open versus closed innovation, rather than a continuum with varying degrees of openness (Dahlander and Gann, 2010). With this in mind, Boudreau and Lakhani (2009) present competitive markets as being a successful model for online innovation contest platforms, defining them where "*external innovators supply variants of mix and match, substitutable components… (and) have competitive relationships among one another*" (p. 70). Within competitive markets the exchange of ideas usually takes place through one-to-one interactions where external problem solvers disclose their innovation concepts to the innovation seeker via the platform, but often not to other registered solvers (Frey et al., 2011). *InnoCentive* has become a prominent example of such a model in several studies (Billington and Davidson, 2013, Feller et al., 2012, Feller et al., 2010). *InnoCentive* allows innovation seekers to post scientific or technical problems for solvers to address. When posting a problem, the innovation seeker outlines the expected time frame for the submission of a successful solution and describes the cash prize available for the winning solution. As of 2016, *InnoCentive* has a network of over 375,000 solvers from 200 countries. These solvers have provided over 59,000 solutions for existing problems in the fields of biology, chemistry, physics, math, engineering, computer science among others. Due to this success, *InnoCentive* have dispensed over $48 million to winning solvers on their platform (InnoCentive, 2016).

2.3 Social Capital Theory

Through these competitive markets, global communities of solvers can work closely with experts, sharing their knowledge and expertise in order to build and implement solutions for a wide range of organisations. These projects often demand interdisciplinary collaboration and sharing of knowledge, making the relationships between individual solvers within these communities fundamental to the platform's success (Adamczyk et al., 2012, Lakhani and Euchner, 2016, Prpić et al., 2015). Given that the projects hosted on competitive markets are critically knowledge intensive, in which knowledge relating to technical capabilities, strategy, operations and vision are paramount, we argue that the social capital developed and maintained among solver communities is the baseline for sharing knowledge and collaborative problem solving.

The tenet of social capital theory is that social relationships among people can be productive resources (Coleman, 1989), referring to social networks, the reciprocities that arise from them, and their value within the business environment (Sen and Cowley, 2013), with Putnam (2000) describing it as having "*forceful, even quantifiable effects on many aspects of our lives*" (p.23). Social capital has been offered as explanations for a variety of pro-social behaviours, including community involvement and collective action (Coleman, 1989), making it a critical component in the knowledge transfer process (Reagans and McEvily, 2003). This is imperative as the innovative solutions organisations seek through innovation contest platforms do not arise spontaneously. They are instead the result of conscious, semiconscious and unconscious mental sorting, matching, grouping and melding. Interpersonal interactions at the conscious level stimulate and enhance these activities, with prior literature suggesting that interplay among individuals appears to be essential to the innovation process (Leonard, 1998).

Unfortunately, beyond the basic consensus that social capital is derived from social relations, there is considerable disagreement concerning the specific aspects of social relations that develop social capital (Adler and Kwon, 2002). While authors agree on the significance of relationships as a resource for social action (Bourdieu, 1983, Burt, 1992, Nahapiet and Ghoshal, 1998), they lack consensus on a pre-

cise definition of social capital. Here, we argue that the extent to which organisations acquire external knowledge from problem solvers however, depends on their ability to recognize the value of repeated, intense interaction, and the willingness of the solver to share information (Cohen and Levinthal, 1990, Dyer and Singh, 1998). We therefore adapt the social capital conceptualisation as proposed by Nahapiet and Ghoshal (1998), distinguishing social capital as encompassing three particular dimensions (structural, relational and cognitive), with their respective constructs outlined in Table 1 below. Firstly, for the structural dimension, theories of social capital propose that the social interactions between participants are important predictors of collective action (Putnam, 1995). Social interactions develop over time in dyadic relationships as exchange participants become comfortable with each other's competence and reliability in resource exchanges (Larson, 1992, Ring and Van de Ven, 1994). The more these social interactions build, the greater the intensity, breadth and frequency of information exchanged (Yli-Renko et al., 2001), making social ties a critical channel for the flow of information and resources (Tsai and Ghoshal, 1998).

Dimension	***Construct***	***Definition***	***Source***
Structural	Social Ties	*"A combination of the amount of time, the emotional intensity, the intimacy (mutual confiding) and the reciprocal services which characterise that tie."*	Granovetter (1973) p. 1361
Relational	Trust	*"A generalised expectancy held by an individual that the word, promise, oral or written statement of another individual or group can be relied upon."*	Rotter (1980) p.1
	Reciprocity	*"Actions that are contingent on rewarding reactions from others and that cease when these expected reactions are not forthcoming."*	Blau (1964) p.6
	Self-Identity	*"Individuals see themselves as one with another person, or group of people."*	Nahapiet and Ghoshal (1998) p.256
Cognitive	Shared Language	*"The acronyms, subtleties and underlying assumptions that are the staples of day-to-day interactions."*	Lesser and Storck (2001) p.836
	Shared Vision	*"The bonding mechanism that helps different parts of an organisation to integrate or combine resources."*	Tsai and Ghoshal (1998) p.467

Table 1. Social capital dimensions, constructs and definitions.

Secondly, knowledge contribution is also facilitated by the affective nature of the relationships within a collective, referred to as relational capital (Nahapiet and Ghoshal, 1998). From the perspective of this study, the main function of this relational aspect of social capital is to facilitate actions for participants within the innovation contest platforms making it an important asset that benefits both the community and its members (Coleman and Coleman, 1994). Solvers are willing to help other members, even strangers, because everybody is part of the collective (Leana and Van Buren, 1999). This exists when members develop a strong identification with the collective (Lewick and Bunker, 1996), perceive an obligation to participate in the collective (Coleman and Coleman, 1994) and trust other members (Putnam, 1995). Thirdly, the cognitive dimension of social capital incorporated into this study refers to the resources that make shared representations, interpretations and systems of meanings within a collective possible (Wasko and Faraj, 2005). Engaging in a meaningful exchange of knowledge, whether generating a solution or collaborating among peers, requires some level of shared understanding between solvers, such as a shared language and vocabulary (Nahapiet and Ghoshal, 1998). Solvers must also understand the context in which their knowledge is relevant (Orr, 1996). A solver's cognitive capital therefore develops as they interact over time with others sharing the same interests and learn the skills, knowledge and norms of practice.

2.4 Research Gap

We argue that the success of competitive markets will be determined not by what the innovation seekers are asking the crowd to achieve, but how social capital contributes to the solvers contribution, communication, and interaction behaviour within the contest community. While previous explorations toward innovation contests have extensively investigated the influence of incentives (Boudreau et al., 2011), and the motivations of innovation solvers (Fuller, 2010, Zheng et al., 2011), research highlights that the social knowledge created by these solvers also relies on the their participation, experience and interactions with the community (Silva and Ramos, 2012). Competitive markets must therefore take into account solver behaviour, and in particular understand the strategic interactions of solvers (Yang et al., 2011). While the development of solver communities within these platforms is therefore imperative, the perspective of platform experts have rarely been sought within these research streams, with previous literature choosing instead to focus predominately upon the solvers themselves (Gebauer et al., 2013, Zheng et al., 2011, Zhao and Zhu, 2012). This is surprising as expert perspectives can offer the researcher more detailed, first hand experiences (Wilson, 2017) into how social capital shapes the fundamental structure of the platform itself, and how in turn social capital impacts on the efforts of their solver community. We therefore want to take the aforementioned aspects of social capital into account from the perspective of platform experts, and state our first research question of: *what are the emergent themes of social capital within competitive markets' solver communities*?

Unfortunately, to date not only is there scant empirical literature on competitive markets as a standalone model of these innovation contests, but theoretical gaps also remain in our understanding of how social capital impacts these solver communities, especially when these knowledge exchanges are voluntary beyond the winning contest solver (Chiu et al., 2006). We thus present our second research question: *what are the net impacts of social capital within competitive markets' solver communities*? To sum up, we present an investigation into how social capital influences solver communities within competitive market innovation contest platforms by presenting its net impacts (second research question), based on identified emergent themes therein (first research question) from the perspective of the platform experts.

3 Research Strategy

This section is dedicated to both the key research decisions and the methodological choices that have been taken to guide this study. The purpose of this study is to investigate the emergent themes and the net impacts of social capital within the competitive market setting from the perspective of platform experts. Expert judgement can be used informally, when no data are available, and formally, to bound problems, quantify unknowns within models, and to qualitatively structure models (Wilson, 2017), through the use of semi-structured interviews. This allowed the researcher to explore emergent topics within the interview setting as they arose, while also empowering the researcher to pursue additional lines of questioning towards social capital constructs that the experts had evident experience of.

3.1 Judgement Study Research

As argued previously, there is much to be learned by examining the impact of social capital through expert judgement. A predominant reason for developing theory from this approach is that it facilitates rich, qualitative evidence, along with testable theoretical propositions (Gregor, 2006, Sutton and Straw, 1995). Given how this approach is deeply embedded in rich empirical data, building theory from evidence gathered produces theory that is accurate, honest, interesting and testable (Eisenhardt and Graebner, 2007). For any expert judgement study however, the question of whose judgements are to be elicited needs addressing, i.e. what constitutes an expert?

Role of Expert	*Competitive Market*	*Clients*	*Founded*	*Contest Example*	*Winning Prize*
Founder and CEO	*Crowd-ANALYTIX*	Facebook, SanDisk, Honeywell	2012	Reducing fuel consumption and developing cost saving strategies within the aviation industry.	$3,000
Founder and CEO	*Crowding*	SME's	2012	Organisational and product development for their clients.	Not disclosed
Innovation Program Manager	*InnoCentive*	MasterCard, Royal Society of Chemistry, NASA	2001	Sought the world's most impactful and sustainable financial services provider to put clients at the centre of its thinking.	€ 150,000
CEO	*Innoget*	Electrolux, Pepsico, University of Louisiana	2007	Create software for client that processed captured videos, and turned them into a single composite image with better resolution.	$5,000-$12,000
Business Development Manager	*NineSigma*	Siemens, Unilever, Pfizer	2000	Client sought an affordable shipping system to keep chocolate close to packing temperature for 48 hours.	$25,000
Operations Manager	*Presans*	Danone, Airbus Group, Statoil	2008	Developed an overview of the properties, modes of implementation, and fields of application of ultra-high performance concrete for the fabrication of marine structures for client.	€ 10,000

Table 2. Platform details used for judgement studies, including their description, the role of the interviewees and previous contest examples.

There are multiple viewpoints on this issue, for example in a pure subjectivist Bayesian analysis an expert could simply be the person from whom unknowns are being elicited (Wilson, 2017). However, when considering the expert problem outlined by French (2011) in which experts are being asked for advice by a specific decision maker, then the choice of expert requires more justification. In this instance, we use the definition of Garthwaite et al. (2005) that experts are "*persons to whom society and/or his peers attribute special knowledge about matters being elicited*" (p.681). Crucially, it is also the ability to use this knowledge that defines a good expert (O'Hagan et al., 2006). Experts were identified through appropriate case selection methodologies in accordance with Seawright and Gerring (2008) and Yin (2008), ensuring multiple objectives: (1) a representative sample of competitive markets was obtained where similar results were predicted and used as literal replications; (2) useful variation on the dimensions of theoretical interest were obtained; (3) experts should occupy roles that make them knowledgeable about the issues being researched; and (4) experts should hold a managerial position, or be involved in decisions around contest strategy. It is from these cross-case characteristics that six competitive market experts were identified, with titles including CEOs and founders. These experts, as well as the competitive markets themselves, are summarised above in Table 2.

3.2 Data Analysis

The data obtained from the judgement studies were coded and tabulated (as outlined throughout the next section) before a matrix of categories was developed and evidence placed within each matrix. An example of how these clusters were achieved and visualised within this study is presented subsequently in Appendix 1. Displaying the data in this method allowed the researcher to combine, compare and contrast data, and report findings visually, while also facilitating an initial high-level analysis. The data was then organised into meaningful clusters through the process of coding, a central approach to data reduction (O'Flaherty and Whalley, 2004). Miles and Huberman (1994) refer to these codes as

"*tags, or labels for assigning units of meaning to the descriptive or inferential information compiled during a study*" (p.56). By implementing a coding strategy, the researcher undertook a delimitation process whereby irrelevant, repetitive or overlapping data were eliminated. Regularities and patterns, drawing explanations, re-checking data, and reviewing findings amongst third persons also formed part of this process as per Yin (1994). Content analysis was subsequently used to identify core themes within each interview, as a means of ensuring consistency and regularity.

4 Findings

This section presents the results from the multiple judgement studies investigated, outlining both the emergent themes and the net impacts of each social capital construct. Figure 1, below, presents the social capital preliminary model that has emerged from this research.

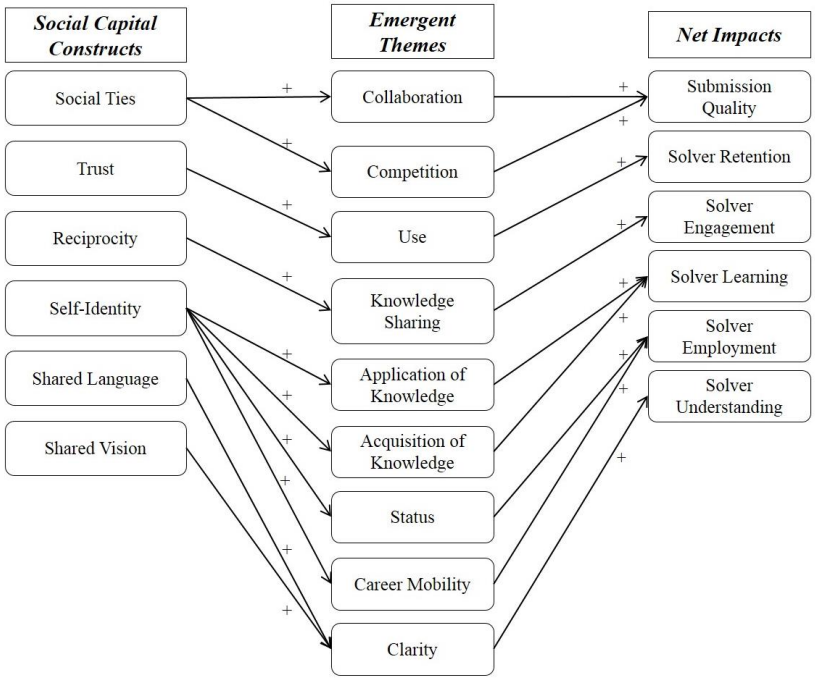


Figure 1. A preliminary theory of social capital for competitive markets.

Only impacts that were encountered multiple times, by two or more platforms formed the basis of these findings. This was to ensure that the findings would be generalizable across multiple competitive markets, not just those with unique features. For example, *Innoget* revealed that they offer two distinct platforms: one for the transfer of IP, with the second offering a closed environment to real communities and various brands. This strategy is unique to *Innoget* among the competitive markets investigated, and therefore non-comparable. In answering both research questions outlined previously, each construct outlines both the emergent themes that emerged from the data analysis, along with the overall net impacts they contribute to, as evidenced through the coding samples provided below.

4.1 Social Ties

Two primary themes of social tie development emerged from the data (outlined below in Table 3), being "*increased competition*", and surprisingly "*increased collaboration*", arguing the claim that "*social ties influence the submission quality generated by the solvers*". Levels of increased competition were identified to be prevalent in several platforms including with experts arguing that it serves to both galvanise the community, and challenge individual solvers to best their peers. *CrowdANALYTIX* in particular believed that weak social ties result in increased competition between solvers, which pro-

vides the best solutions: "*150 plus people compete against each other to deliver the best solutions... they are competing, and competitors are always a great motivator of yielding better results*". This heightened standard of submission for the most part was the by-product of their community of solvers being able to "*compete with the best in the industry*". This level of competition is an important element to the competitive market model, with *InnoCentive* revealing that "*The whole design of the platform business model... does not really encourage social interaction among the solvers... It is really an individual effort*".

Impact of social ties within competitive markets			
Theme	*Experts*	*Evidence from Study Participants*	*Claim*
Increased Collaboration	*Crowding InnoCentive Innoget NineSigma Presans*	Crowding: "*I think it is important that you have some kind of co-creation…**co-creation creates better results***."	Social ties influence the **submission quality of solutions** provided by the solvers.
		Presans:" *One of the motivations for (solvers) is that **they are going to get to know somebody else**, so sometimes... **it is necessary to have experts from different fields that are going to work together*** (when discussing higher submission quality)".	
Increased Competition	*Crowd-ANALYTIX Crowding InnoCentive Innoget Presans*	CrowdANALYTIX: "*They are competing, and **competitors are always a great motivator of yielding better results***."	
		Innoget: "***We have more than 100,000 members competing worldwide** (for high quality solutions), covering various disciplines from life science, chemistry, physical science, engineering technology etc...*"	

Table 3. Coding sample for social ties within competitive markets.

Of particular interest however, was the emergent theme of developing strong social ties among the solvers of the platform, and in turn, the levels of collaboration present within these competitive markets. Several platforms highlighted the importance of facilitating a degree of collaborative co-creation between the solvers to promote social interactions within their communities. For example, *Crowding* believed that it was vital there should be some level of social tie development within the platforms as such relationships would serve to provide better results in the long term: "*I think it is important that you have some kind of co-creation because our point of view is that the co-creation creates better results*." This vast network of solvers willing to collaborate over various disciplines was argued by *Innoget* as being a primary component to how they increase the standard of submissions from their solvers. Furthermore, the findings also reveal there have been various attempts from competitive markets including *InnoCentive* and *CrowdANALYTIX* to incorporate this level of heightened interactivity within their platforms. These insights reveal that competitive markets are capable of adopting both strong and weak social ties in order to improve the quality of submissions from their community.

4.2 Trust

One primary theme of trust emerged from the data, as summarised below in Table 4: "*increased levels of use*" which argues the claim that "*trust impacts the levels of solver retention experienced by the platform*". The findings reveal that trust is a vital component in maintaining and increasing the levels of solver retention within competitive markets. *InnoCentive* in particular cited trust to be the main reason why solvers return to the platform after engaging it in the first instance: "*People trust, otherwise, well, they won't come next time*." Developing trust within their solver community was also stressed by *CrowdANALYTIX* as being crucial in reaching their objectives in terms of growth and success, and is an area they have marked for continued focus. *CrowdANALYTIX* described that while the primary activity of their platform is competition based, they would like to see solvers exhibiting indications of trust amongst themselves by enabling increased collaboration. In doing so, *CrowdANALYTIX* revealed that "*the chances that they will become more engaged and remain on the platform longer will go up, so that is where we want to evolve to going forward*".

Impact of Trust			
Theme	*Experts*	*Evidence from Study Participants*	*Claim*
Increased Use	*Crowd-ANALYTIX InnoCentive Innoget*	CrowdANALYTIX: "*In fact, we want to grow that (trust) aspect of the platform... **The chances that they will become more engaged and remain on the platform longer will go up***."	Trust impacts the levels of **solver retention** experienced by the platform.
		InnoCentive: "***People trust, otherwise, well, they won't come next time***."	

Table 4. Coding sample for trust within competitive markets.

Indeed, both *CrowdANALYTIX* and *Innoget* argued that trust is not only important between the solvers themselves, but also between the solvers and the platforms, highlighting the need to ensure their solver communities trust the processes in place for IP exchange. For example, the data reveals several examples of solvers being worried their work would get either stolen or copied by other solvers, due to ineffective processes implemented by the platform. The levels of transparency present on the platform therefore play an important role in the successful retention of solvers on the platform. This involves providing solvers with an environment that is forthcoming in the steps involved in the overall contest process, while also exhibiting a degree of openness toward their solver communities.

4.3 Reciprocity

One key theme of reciprocity emerged from the data in the form of "*increased knowledge sharing*", arguing the "*reciprocity impacts the levels of solver engagement*" towards competitive markets, as outlined below in Table 5.

Impact of Reciprocity			
Theme	*Experts*	*Evidence from Study Participants*	*Claim*
Increased Knowledge Sharing	*Crowd-ANALYTIX InnoCentive NineSigma*	CrowdANALYTIX: "***We want them to help us create knowledge,** create and write white papers, talk about their approach when they won*."	Reciprocity impacts the levels of **solver engagement**.
		InnoCentive: "***People would come and share knowledge because they know this is the goal. People really do want to make an impact to society***."	

Table 5. Coding sample for reciprocity within competitive markets.

This finding was surprising at the outset given how the nature of the competitive market is geared primarily toward the individual solver acting on their own self-interests, as opposed to the good of the collective. However, the data also revealed alternative motives that support this theory: the first explanation involved the solvers' own self-promotion. By showcasing their knowledge, solvers highlight to their peers their own proficiencies in their subject area. Indeed, reciprocity was shown to increase the levels of knowledge sharing among the community of solvers both during, and outside of the contest setting. *CrowdANALYTIX* in particular described how reciprocity resulted in increased knowledge sharing on their platform: "*Absolutely, I think these guys; you see a lot of discussions on the forums. So yes, without a doubt, it is a community that wants to learn from each other and that is why it's working*." *CrowdANALYTIX* have made a concentrated effort to promote this aspect of reciprocity, explaining that "*We want them to help us create knowledge, create and write white papers, talk about their approach when they won, give them more visibility as well and get them engaged more*." The second explanation was identified by *InnoCentive*, who argued that solvers were also motivated to share their knowledge depending on what the contest sought to achieve, making reciprocity merely a product of the type of challenge being issued, the reward being offered, and the target solver demographic. *InnoCentive* described how their platform have posted challenges involving sub-African countries by an innovation seeker who might not necessarily "*have the ability to pay people*". *InnoCentive* revealed their solvers would "*come and do that (share knowledge) because they know that this (social good) is the goal. People really do want to make an impact to society*." *InnoCentive* subse-

quently outlined that should the contest revolve around producing a solution that could be sold on the open market, solvers would be less inclined to share their efforts with their peers as their emphasis would be focused on the monetary reward on offer by the innovation seeker, thus limiting reciprocity.

4.4 Self-Identity

Four key themes of self-identity emerged from the data, shown below in Table 6: "*enhanced career mobility*", "*increased status*", "*acquisition of knowledge*", and "*application of knowledge*". These themes support two claims: (1) "*self-identity provides the solver with enhanced employment prospects*", and: (2) "*self-identity provides the solver with increased learning opportunities*". It is clear from the data that self-identifying with either the challenge, or indeed the competitive market itself provides the solver with enhanced career mobility. Career mobility in this instance refers to the prospective hiring, or job relocation as a result of engaging with the innovation challenge. For example, *Presans* provide their clients with the contact details of the experts. This allows their clients to contact non-selected solvers to work on future projects: "*The client afterwards can contact non-selected experts, or selected experts to work on another project, or to continue working on the project they were contracted initially to so*." This exposure to the innovation seeking organisation was also experienced by *NineSigma*, who identified the close working nature between the platform and the companies seeking solutions as a main reason for solvers engaging with them. *NineSigma* explained how their platform strives to keep business opportunities for their solvers active: "*We want to be sure that the companies that are doing it, they really offer opportunities for the solvers afterwards*" and in doing so, that "*there is a real business opportunity for them*." *Innoget* also believed this aspect allows their solvers to "*keep track on what is going on in other sectors or technology areas where they can find the opportunities that they couldn't find elsewhere, or in their current industry*".

Impact of Self-Identity			
Theme	*Experts*	*Evidence from Study Participants*	*Claim*
Enhanced Career Mobility	*Innoget NineSigma Presans*	Innoget: "*That often allows people to keep track on what is going on in other sectors, or technology areas where* ***they can find the opportunities that they couldn't find elsewhere***."	Self-identity provides the solver with enhanced **employment prospects**.
		NineSigma: "*We want to be sure that the companies that are doing it,* ***they really offer opportunities for the solvers afterwards****… There is a* ***real business opportunity for them***."	
Increased Status	*Crowding Innoget Presans*	Crowding: "***They could have an influence in that they could speak to higher level people in the company and give ideas***."	
		Presans: "***They want to be recognised*** *by some of the huge companies they know about*."	
Acquisition of knowledge	*NineSigma Presans*	NineSigma: "*When (the solvers) follow what kind of topics, or questions we post,* ***it helps them to actually better their own product development activity***."	Self-identity provides the solver with increased **learning opportunities**.
		Presans: "***They are absolutely going to learn something.***"	
Application of knowledge	*Crowd-ANALYTIX Innoget*	CrowdANALYTIX: "*(Solvers)* ***get exposed to real life problems, they get to test their skills and they want to know if they are good enough and show they can do it****...*"	
		NineSigma: "*We keep solution providers active. Almost every day* ***we open a new technology tender*** *on our website.*"	

Table 6. Coding sample for self-identity within competitive markets.

The opportunity to promote one's status among a large community of peers emerged as the second theme as to why solvers self-identify with the challenge being issued, or the competitive market itself. The enhancement of a solver's status results from the prowess the solvers exhibit while competing, and range from increased visibility of their worth, to being exposed to key decision makers within the

challenging organisations. *Crowding* argued that by self-identifying with the platform, it affords the solver the opportunity to be "*a part of something, while experiencing a level of participation and influence*". Solvers can easily signal their abilities to a large number of peers and may easily gain status enhancement this way, with *Presans* explaining that "(*The solvers) want to be recognised by some of the huge companies they know about.*" The third theme to emerge involved solvers self-identifying with the contest platform in order to develop new skill levels or expand their existing repertoire of tacit knowledge, as outlined by several platforms. This acquisition of knowledge was highlighted in particular by *NineSigma* as being an important feature of self-identification, based on the exposure to world issues and topics presented by the platform. This exposure allows solvers to better understand how to approach challenges: "*An important benefit (of self-identity), and what we have heard from some of our most active solvers, is that when they follow what kind of topics, or questions we post, it helps them to actually better their own product development activity*."*Presans* similarly outlined that solvers self-identify with their platform as it provided them an opportunity to "*learn something new from another field*." Fourthly, in addition to acquiring new dimensions of knowledge, competitive markets also provide the solvers a unique environment with which to showcase their existing skill sets and knowledge base, further strengthening the solvers self-identification towards the platforms and the contests being hosted. *CrowdANALYTIX* in particular believed the application of knowledge to be a main reason why solvers self-identify with their platform. The interviewee provided the example of a senior marketing manager in Amazon who was always passionate about math and statistics. By engaging with *CrowdANALYTIX*, it "*gives him a way of almost, like a hobby, to express his own interest which he would not be allowed to do in his current career... nobody is going to accept a transition from a senior marketing manager to a statistician, but here he gets to do it*".

4.5 Shared Language

One key theme of shared language emerged from the data analysis, outlined below in Table 7: "*increased clarity*", arguing the claim that "*shared language impacts the solver understanding of a challenge*". *NineSigma* in particular illustrated this need for clarity, outlining how, as a platform, they place an increased focus on the topic formulation before it is send out to their solvers: "*Yeah, I think we recognise (shared language) as being a very important dilemma that is why we put so much effort into the topic formulation that would have all these details laid out in our technology brief.*" *NineSigma* revealed that they often take a retrospective look at the language they used to describe their various challenges in order to better present future contests: "*Although sometimes with some topics, we come back and say "*Actually, we should have better articulated it this way, not that way.*"" CrowdANALYTIX* agreed with this point, arguing that "*If your output expectations are not absolutely clear, that is an issue*".

Impact of Shared Language			
Theme	*Experts*	*Evidence from Study Participants*	*Claim*
Increased Clarity	*Crowd-ANALYTIX InnoCentive NineSigma Presans*	CrowdANALYTIX: "***If you are clear about the output expectations... Now they know what to do****, it doesn't matter what country they are from.*"	Shared Language impacts **solver understanding** of a challenge.
		NineSigma: "**We *put so much effort into the topic formulation*** *that would have all these details laid out in our technology brief... Sometimes, with some topics we come back and say* "Actually, **we should have better articulated it this way**, not this way.""	

Table 7. Coding sample for shared language within competitive markets.

Presans also outlined that establishing a shared language is vital in providing clarity to the various solvers on a platform: "*It is the importance of being understandable to different people*." *Presans* described that once a deliverable is expressed by their client, the platform then retrofits the challenge description so their solvers are absolutely clear as to what is being expected of them: "*In order to*

make it more understandable, they are going to reformulate the need so it can be more understandable to different experts." This process is also repeated when the solution is presented back to the clients: "*There is always a tendency to use your vocabulary that you are used to, but there is also the work of the fellows that they are going to make it understandable afterwards to the client*."

4.6 Shared Vision

Similar to its cognitive dimension counterpart of shared language, the theme of "*increased clarity*" emerged from the shared vision data, arguing that "*shared vision enhances overall solver understanding*", summarised below in Table 8.

Impact of Shared Vision			
Theme	*Experts*	*Evidence from Study Participants*	*Claim*
Increased Clarity	*Crowd-ANALYTIX Crowding InnoCentive*	CrowdANALYTIX: "*So **if your output expectations are not absolutely clear, that is an issue***."	Shared Vision enhances the overall **solver understanding**.
		InnoCentive: "*Obviously, when you pose the question, **you really have to define the scope. If you don't do that, there is really no point in discussing anything else…** You really have to **make sure that your solvers understand everything...***	

Table 8. Coding sample for shared vision within competitive markets.

The importance of achieving a shared vision is illustrated by *InnoCentive*, stating categorically that: "*If you post a problem wrong, then forget it. No question about it*." Developing a shared vision through the contest requirements is important as it outlines to the solver community what the contest is trying to achieve, how the solvers are to set about addressing the issue, and for what in return they should expect to receive if their solution is successful: "*You really have to make sure that your solvers understand everything. So to make sure they understand the requirements, the scope, yes, you must do that (achieve a shared vision)*."*CrowdANALYTIX* mirrored these arguments, stating that the accurate presentation of what the contest seeks to address is fundamental to its success. Failure to do so can lead to deep rooted problems as the contest progresses due to the solvers being unsure of the overall objective: "*if your output expectations are not absolutely clear, that is an issue*." *InnoCentive* also pointed to the to the short time periods available to solvers to submit their entries. *InnoCentive* outlined that because of such time frames, should the initial vision be ambiguous the likelihood of receiving the target amount of submissions would be reduced: "*They create quite narrow times for entry. So the challenge lasts for no more than three months, mostly. So, if you post a problem wrong, then forget it. No question about it*."

5 Conclusions, Limitations and Future Works

The research questions addressed in this paper were: (1) "*what are the emergent themes of social capital within competitive markets' solver communities*?" and (2) "*what are the net impacts of social capital within competitive markets' solver communities*?" These questions were answered by implementing *a-priori* theory and testing it through several judgement studies from the perspective of platform experts. This research develops the literature in the still infant field of IT-innovation contest platforms by revealing social capital as having a fundamental role in the facilitation of competitive markets, while singularly investigating each of the inherent dimensions (structural, relational, cognitive) of social capital, along with their associated constructs. The identification of six net impacts through nine emergent themes represent the main contributions of this paper and by extension, it offers several approaches to how the study's findings can be utilised in practice to assist competitive market platforms in the implementation and exploitation of social capital constructs, while also offering several future research directions.

Firstly, this research serves to identify the strategic value of certain social capital constructs for competitive markets. The platforms investigated reacted positively to the presence of social capital, revealing that social capital has far reaching consequences, impacting on both the platform itself as well as their solver community including: (1) increased levels of solver retention, (2) increased standards of submission quality, (3) increased levels of solver understanding toward the expectations of the innovation seekers, (4) increased levels of solver engagement, and (5) increased opportunities for personal (learning) and professional (career mobility) growth for the platform solvers. Secondly, the model presented herein provides competitive market platforms with an effective roadmap to measure the overall impacts of social capital, demonstrating its dynamic nature. Understanding these impacts allows for a more microscopic view of social capital and, by extension a more in-depth appreciation of how social capital as a resource may be developed and managed. To foster this value within competitive markets, our theoretical model reveals that experts need to do more than merely encourage social interactions among solvers. Indeed, identifying the mechanisms of social capital development highlights a particular area of future research we believe is in need of investigation.

Thirdly, from a practical point of view these are original results that reveal the importance of developing social capital within not only a competitive market setting, but arguably innovation contest platforms in general. This research serves to identify the strategic value of certain social capital constructs for competitive markets, and while this relationship has not previously been explored, this investigation highlights that should platforms neglect or ignore its development, they are immediately placing themselves at a distinct disadvantage. This is quite important as the majority of platform experts that took part in the study were unfamiliar with the concept of social capital to begin with. It was only when the specific dimensions and associated constructs of social capital were presented to them did they begin to understand how prevalent it was within their platforms. Through the theoretical model presented herein, practitioners are now capable of immediately understanding the nature of social capital theory, along with the emergent themes and overall impacts of each construct. Fourthly, the introduction of social capital variables into the analysis of competitive markets adds a level of complexity that has not yet been examined empirically. While we endeavoured to achieve the highest levels of objectivity, accuracy and validity, as is true of any research this study has several limitations, which can be addressed by future research. Given the novel approach of this research, a relatively small population size of qualitative interviewees from platform experts was pursued which might present generalizability limitations. As a result, our understanding of social capital and its influence was presented by those responsible for the platforms operationalisation. While this research makes an initial foray into understanding the implications of social capital, future studies are now advised to also capture the understanding of social capital from the solver's perspective through large scale, quantitative investigations aimed at larger population sizes. In addition, we also encourage future research to investigate social capital within other models of innovation contest platforms, in particular collaborative communities as also outlined by Boudreau and Lakhani (2009) for cross comparative purposes. To achieve this, we fully encourage this study to be not only replicated, but also to be extended to provide further validations to these findings.

In closing, contrary to preconceived ideologies we find that social capital is actually inherently embedded within these competitive structures, and offers a rich array of distinct advantages to both the competing solvers and the innovation platform hosting the challenge. Further investigations of social capital within these domains is an exciting research area, and one which is ripe for future study.

Acknowledgements

This paper reports on research funded by the Lewis Charitable Foundation (USA) through the Technology-Enabled Organizational Transparency and Openness (TOTO) project hosted at University College Cork, Ireland.

References

ADAMCZYK, S., BULLINGER, A. C. & MÖSLEIN, K. M. 2012. Innovation contests: A review, classification and outlook. *Creativity and Innovation Management,* 21**,** 335-360.

ADLER, P. S. & KWON, S.-W. 2002. Social capital: Prospects for a new concept. *Academy of management review,* 27**,** 17-40.

ANDERSEN, P. H., KRAGH, H. & LETTL, C. 2013. Spanning Organizational Boundaries to Manage Creative Processes: The Case of the Lego Group. *Industrial Marketing Management,* 42**,** 125-134.

ARMISEN, A. & MAJCHRZAK, A. 2015. Tapping the innovative business potential of innovation contests. *Business Horizons,* 58**,** 389-399.

ARMISEN, A., SÁNCHEZ-HERNÁNDEZ, G. & MAJCHRZAK, A. 2015. Consensus in innovation contest categorisation by means of fuzzy partitions. *Applied Soft Computing,* 35**,** 921-930.

BILLINGTON, C. & DAVIDSON, R. 2013. Leveraging Open Innovation Using Intermediary Networks. *Production & Operations Management,* 22**,** 1464-1477.

BLAU, P. M. 1964. *Exchange and power in social life*, Transaction Publishers.

BOUDREAU, K. J., LACETERA, N. & LAKHANI, K. R. 2011. Incentives and problem uncertainty in innovation contests: An empirical analysis. *Management Science,* 57**,** 843-863.

BOUDREAU, K. J. & LAKHANI, K. R. 2009. How to manage outside innovation. *MIT Sloan Management Review,* 50**,** 69-76.

BOURDIEU, P. 1983. The forms of capital. *In:* RICHARDS, J. (ed.) *Handbook of Theory and Research for the Sociology of Education.*

BRABHAM, D. C. 2010. Moving the crowd at Threadless: Motivations for participation in a crowdsourcing application. *Information, Communication & Society,* 13**,** 1122-1145.

BULLINGER, A. C., HALLER, J. & MOESLEIN, K. Innovation Mobs-Unlocking the Innovation Potential of Virtual Communities. *AMCIS*, 2009. 540.

BULLINGER, A. C., NEYER, A. K., RASS, M. & MOESLEIN, K. M. 2010. Community-based innovation contests: Where competition meets cooperation. *Creativity and Innovation Management,* 19**,** 290-303.

BURT, R. S. 1992. *Structural Holes: The Social Structure of Competition,* Cambridge, MA, Harvard University Press.

CHESBROUGH, H. 2003. *Open Innovation: The New Imperative for Creating and Profiting from Technology,* Boston, Harvard Business School Press.

CHIU, C.-M., HSU, M.-H. & WANG, E. T. 2006. Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision support systems,* 42**,** 1872-1888.

COHEN, W. & LEVINTHAL, D. 1990. Absorptive-Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly,* 35**,** 128-152.

COLEMAN, J. S. 1989. *Social capital in the creation of human capital*, University of Chicago Press.

COLEMAN, J. S. & COLEMAN, J. S. 1994. *Foundations of social theory*, Harvard University Press.

DAHLANDER, L. & GANN, D. M. 2010. How open is innovation? *Research Policy,* 39**,** 699-709.

DYER & SINGH 1998. The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage. *Academy of Management Review,* 23**,** 660 - 679.

EISENHARDT, K. M. & GRAEBNER, M. E. 2007. Theory building from cases: opportunities and challenges. *Academy of Management Review,* 50**,** 25-32.

FELLER, J., FINNEGAN, P., HAYES, J. & O'REILLY, P. 2010. Leveraging 'The Crowd': An Exploration of how Solver Brokerages enhance Knowledge Mobility. *European Conference on Information Systems.*

FELLER, J., FINNEGAN, P., HAYES, J. & O'REILLY, P. 2012. 'Orchestrating' sustainable crowdsourcing: A characterisation of solver brokerages. *Journal of Strategic Information Systems,* 21**,** 216-232.

FRENCH, S. 2011. Aggregating expert judgement. *Revista de la Real Academia de Ciencias Exactas, Fisicas y Naturales. Serie A. Matematicas,* 105**,** 181-206.

FREY, K., LÜTHJE, C. & HAAG, S. 2011. Whom Should Firms Attract to Open Innovation Platforms? The Role of Knowledge Diversity and Motivation. *Long Range Planning,* 44**,** 397-420.

FULLER, J. 2010. Refining virtual co-creation from a consumer perspective. *California Management Review,* 52**,** 98-122.

FÜLLER, J., HUTTER, K., HAUTZ, J. & MATZLER, K. 2014. User Roles and Contributions in Innovation-Contest Communities. *Journal of management information systems,* 31**,** 273-308.

GARTHWAITE, P. H., KADANE, J. B. & O'HAGAN, A. 2005. Statistical methods for eliciting probability distributions. *Journal of the American Statistical Association,* 100**,** 680-701.

GEBAUER, J., FÜLLER, J. & PEZZEI, R. 2013. The dark and the bright side of co-creation: Triggers of member behavior in online innovation communities. *Journal of Business Research,* 66**,** 1516-1527.

GRANOVETTER, M. 1973. The strength of weak ties. *American Journal of Sociology,* 78**,** l.

GREGOR, S. 2006. The Nature of Theory in Information Systems. *MIS Quarterly,* 30**,** 611 - 642

HUTTER, K., HAUTZ, J., FÜLLER, J., MUELLER, J. & MATZLER, K. 2011. Communitition: The tension between competition and collaboration in community-based design contests. *Creativity and Innovation Management,* 20**,** 3-21.

INNOCENTIVE. 2016. *About Us* [Online]. Available: https://www.innocentive.com/about-us/ [Accessed 11/30/2016].

JOURET, G. 2009. Inside cisco's search for the next big idea. *Harvard Business Review.*

KATHAN, W., FÜLLER, J. & HUTTER, K. 2013. Reciprocity in innovation contest communities reciprocity vs. free-riding in an environment of competition. *ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM).* IEEE.

KELTY, C. M. 2009. *Two bits: The cultural significance of free software,* Durham, NC, Duke University Press.

LAKHANI, K. & EUCHNER, J. 2016. Innovating with Crowds: An Interview with Karim Lakhani: Karim Lakhani talks with Jim Euchner about using communities and contests to access the power of crowds for innovation. *Research-Technology Management,* 59**,** 15-21.

LARSON, A. 1992. Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. *Administrative science quarterly,* 37.

LEANA, C. R. & VAN BUREN, H. J. 1999. Organizational social capital and employment practices. *Academy of management review,* 24**,** 538-555.

LENSSEN, G., PERRINI, F., TENCATI, A., LACY, P., HOLMES, S. & MOIR, L. 2007. Developing a conceptual framework to identify corporate innovations through engagement with non-profit stakeholders. *Corporate Governance: The international journal of business in society,* 7**,** 414-422.

LEONARD, D. A. 1998. The Role of Tacit Knowledge in Group Innovation. *California Management Review,* 40**,** 112-132.

LESSER, E. L. & STORCK, J. 2001. Communities of practice and organizational performance. *IBM systems journal,* 40**,** 831-841.

LEWICK, R. & BUNKER, B. B. C. 1996. Developing and maintaining trust in work relationships. *Trust in Organizations: Frontiers of Theory and Reach***,** 114-39.

LUNDSTROM, J. S. E., WIBERG, M., HRASTINSKI, S., EDENIUS, M. & ÅGERFALK, P. J. 2013. *Managing Open Innovation Technologies*, Springer.

MCINTYRE, A., REYNOLDS, M., MCGUIRE, M. & MILANESI, C. 2013. Consumer analytics and personalized user experiences transform competitive advantage. Stamford, CT: Gartner.

MILES, M. & HUBERMAN, M. 1994. *Qualitative Data Analysis: An expanded source book,* Thousand Oaks, CA, Sage publications.

MORGAN, J. & WANG, R. 2010. Tournaments for ideas. *California Management Review,* 52**,** 77-97.

NAHAPIET, J. & GHOSHAL, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of management review,* 23**,** 242-266.

NONAKA, I. & TAKEUCHI, H. 1995. *The knowledge-creating company: How Japanese companies create the dynamics of innovation*, Oxford university press.

O'FLAHERTY, B. & WHALLEY, J. Qualitative Analysis Software Applied to IS Research - Developing a Coding Strategy. ECIS, 2004.

O'HAGAN, A., BUCK, C. E., DANESHKHAH, A., EISER, J. R., GARTHWAITE, P. H., JENKINSON, D. J., OAKLEY, J. E. & RAKOW, T. 2006. *Uncertain judgements: eliciting experts' probabilities*, John Wiley & Sons.

ORR, J. E. 1996. *Talking about machines: An ethnography of a modern job*, Cornell University Press.

PRPIĆ, J., SHUKLA, P. P., KIETZMANN, J. H. & MCCARTHY, I. P. 2015. How to work a crowd: Developing crowd capital through crowdsourcing. *Business Horizons,* 58**,** 77-85.

PUTNAM, R. D. 1995. Tuning in, tuning out: The strange disappearance of social capital in America. *PS: Political Science & Politics,* 28**,** 664-683.

PUTNAM, R. D. 2000. *Bowling alone: The collapse and revival of American community*, Simon and Schuster.

REAGANS & MCEVILY 2003. Network structure and knowledge transfer: the effects of cohesion and range. *Administrative Science Quarterly,* 48**,** 240 - 267.

RING, P. S. & VAN DE VEN, A. H. 1994. Developmental processes of cooperative interorganizational relationships. *Academy of management review,* 19**,** 90-118.

ROTTER, J. B. 1980. Interpersonal trust, trustworthiness, and gullibility. *American psychologist,* 35**,** 1.

SEAWRIGHT, J. & GERRING, J. 2008. Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options. *Political Research Quarterly,* 61**,** 294-308.

SEN, S. & COWLEY, J. 2013. The Relevance of Stakeholder Theory and Social Capital Theory in the Context of CSR in SMEs: An Australian Perspective. *Journal of Business Ethics,* 118**,** 413-427.

SILVA, C. & RAMOS, I. 2012. Crowdsourcing Innovation Intermediaries Functions. *Mediterranean Conference on Information Systems.*

SUTTON, R. I. & STRAW, B. M. 1995. What theory is not. *Administrative Science Quarterly,* 40**,** 371-384.

TSAI, W. & GHOSHAL, S. 1998. Social capital and value creation: The role of intrafirm networks. *Academy of management Journal,* 41**,** 464-476.

WASKO, M. M. & FARAJ, S. 2005. Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly***,** 35-57.

WEST, J. & LAKHANI, K. R. 2008. Getting clear about communities in open innovation. *Industry & Innovation,* 15**,** 223-231.

WILSON, K. J. 2017. An investigation of dependence in expert judgement studies with multiple experts. *International Journal of Forecasting,* 33**,** 325-336.

YANG, CHEN & BANKER 2011. Winner Determination of Open Innovation Contests in Online Markets. *International Conference on Information Systems.* Shanghai.

YIN, R. 1994. *Case Study Research: Design and Methods 2nd Edition*, SAGE Publishing.

YIN, R. 2008. *Case Study Research: Design and Methods 4th Edition*, London: Sage Publisher.

YLI-RENKO, H., AUTIO, E. & SAPIENZA, H. J. 2001. Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal,* 22**,** 587-613.

ZHAO, Y. & ZHU, Q. 2012. Exploring the Motivation of Participants in Crowdsourcing Contest. *International Conference on Information Systems.* Orlando.

ZHENG, H., LI, D. & HOU, W. 2011. Task Design, Motivation, and Participation in Crowdsourcing Contests. *International Journal of Electronic Commerce,* 15**,** 57-88.

Appendix 1

	Impacts of Social Ties within Competitive Markets					
	CrowdANALYTIX	*Crowding*	*InnoCentive*	*Innoget*	*NineSigma*	*Presans*
Quote	This is an interesting place for not only networking, but also making a bunch of money as well.	I think it is important that you have some kind of co-creation because our point of view is that the co-creation creates better results.	InnoCentive solvers are solo, and InnoCentive has struggled for years to create this in a team challenge, they struggled to allow people to work in teams.	We facilitate connections and promotions in building the crowd.	They can do it alone, but more often maybe in a team and if it's an innovation contest which means they get afterwards shortlisted and they have to develop something, to provide a prototype, then it would be in a team.	If the need is not too complex, you really don't need to have a team of experts because it means that you need to manage more, invest more time by managing more people etc.
Theme	Collaboration	Collaboration	Competition	Collaboration	Collaboration	Competition
Quote	What is common across, apart from just the fact that they enjoy the challenges, is that they are competing, and competitions are always a great motivator of yielding better results.	There could be a group of 5 that are a team on a platform that are announced as the winner, and then they will get less, like for example 10,000 euro for the first prize reward	It is really an individual effort.	We have more than 100,000 members competing worldwide, covering various disciplines from life science, chemistry, physical science, engineering technology etc...	In principle, yes great, cooperation is the best. But in practice, a little bit challenging.	That sense of community, we don't need it.
Theme	Competition	Competition	Competition	Competition	Collaboration	Competition
Quote	On our platform, every project is held as a data competition, where 150+ people compete against each other to deliver the best solutions.	The problem is if the company will start implementing and all five people want to be a part of that in some way and have discussions, I think there could be big problems in the long term prospect.	The whole design of InnoCentive platform and business model… does not really encourage social interaction among the solvers.	Some of these companies might be start-ups and spin off companies, but also public sector related to research universities, research centres and also a big crowd of individuals, let's say inventors, scientists, whoever is active on sharing technology and innovation and willing to connect with new partners and do collaborative projects for innovation.	So we are thinking how we can bring in these kind of (social ties) activities in the future, but of course we have to think through all the little aspects of this, under what conditions, what they present themselves, what they present the organisation, when do we sign the next deal with them, if they work on some kind of solution together and they create something great, how can we divide the result between them and our client.	We are not really talking about the community in our case because the experts, they do not know each other, there is no building of communities, except those in the groups, but very often we have more projects that are individuals.
Theme	Competition	Reward	Competition	Collaboration	Collaboration	Competition

Appendix 1. Example of social ties impact coding for competitive markets.