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A Case Study Analysis of the Success Factors in Web-based and Offline Social Innovation Competitions

By

Gareth P. Beeston

Thesis for the completion of a Doctor of Philosophy (PhD)

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UNIVERSITY OF Southampton

Academic Thesis: Declaration Of Authorship

I, GARETH PAUL REESTON [please print name]

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

[title of thesis] A CASE STUDY ANALYSIS OF THE SUCCESS FACTORS IN WEB-BASED AND OFFLINE SOCIAL INNOVATION COMPETITIONS

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ABSTRACT

UNIVERSITY OF SOUTHAMPTON

FACULTY OF PHYSICAL SCIENCES AND ENGINEERING

School of Electronics and Computer Science

Web And Internet Science

Thesis for the completion of a Doctor of Philosophy

A CASE STUDY ANALYSIS OF THE SUCCESS FACTORS IN WEB-BASED AND OFFLINE SOCIAL INNOVATION COMPETITIONS

By Gareth P. Beeston

Social innovation competitions are short-term, non-profit social innovation practises, utilised to drive collaborative effort for encouraging the production of innovations that have a dedicated social impact. Factors such as innovation quality, collaboration potential and social impact are perceived as being central to the success of social innovation competitions. From these three core factors, this thesis determines the strength of these factors amongst Web-based and offline social innovation competition. With reference to these success factors, the definition of social innovation competitions is founded, stating that without these primary factors, one may not be able to operate a successful social innovation competition. Detracting from the typical for-profit innovation and fundraising models, social innovation competitions are focused on obtaining solutions to the challenge rather than profit or finance. Facilitated by the Web, social innovation competitions can be conducted in an online or an offline setting, with innovation managers selecting either method depending upon their particular objectives.

This selection is largely because each method of social innovation competition (online or offline) appears to have comparatively different success factors and outcomes as a result. Namely, social innovation competitions conducted in an online setting are potentially subject to higher scalability, through an increase in innovation responses and potential for more participants, but such innovations may indeed lack in the quality necessary to tackle the

challenge in any great depth. On the other hand, offline social innovation competitions are understood to be subject to lower scalability, but can provide better methods of collaboration with a few high quality innovations, that are targeted and facilitate the use of multiple sets of skills from a variety of innovators. These factors of social innovation competitions determine that innovation managers and innovation professionals can appropriately leverage the optimum method of social innovation competition dependant upon the aims and objectives of the organisation or challenge.

This exploratory study utilises a mixed methods approach to uncovering such success factors and their respective trade-offs. Initiating the line of enquiry with two cases (the PORT social innovation competition and the Microworkers social innovation competition) observations are made as to the format, structure and outputs of each competition, gaining insight from innovators and their innovative endeavours. Furthermore, surveys are conducted to gather perceptions on the success factors in both online and offline social innovation competitions, aiming to understand whether there are trade-offs that occur when either performing an online or an offline version of a social innovation competition. Finally a Delphi study is conducted in order to gather opinions from experts on these topics. This final study supports the triangulation of data for further insight into this new and uncharted field of study. It is concluded that offline social innovation competitions should generally be used for obtaining targeted, product-based innovations of a high quality, whereas Web-based social innovation competitions should be used as a market research method, obtaining surface-level insight into the trends and expectations of consumers and innovators in a particular market.

Keywords:

Social Innovation Competitions, Innovation Competitions, Open Innovation.

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Declaration of Authorship

I, Gareth P. Beeston, declare that this thesis entitled *Streamlining Social Innovation: An Analysis of the Success Factors in Web-Based and Offline Social Innovation Competitions* and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
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1 Introduction

In the earliest writings of the topic, Fairweather (1967) described social innovation as being a method of leading and directing social responsibility, rationality and order to influence social change. This definition still seems to stand today. However, in the past 20 years or so, there appears to have been a resurgence of interest in the topic, potentially as a result of changes in the technological and political landscape. Firstly, the fact that the Web provides a wealth of information to consumers, increases the awareness of dishonest and unethical practices. With more consumers being aware of such practices, organisations are pressured to become more socially responsible and seek new ways to affect changes in society. Moreover, lack of social innovation or social responsibility may dissuade customers from purchasing such products, due to a potential decrease in customer satisfaction (Luo & Bhattacharya 2006) following finding out about such unethical practices. Governments also pressure organisations to innovate for the good of society, for example to utilise green energy. A policy report written by the Social Innovation eXchange and the Young Foundation detailed that global financial and economic crises have encouraged an upsurge in creativity and innovation for social output in the past 10 years (Social Innovation eXchange & The Young Foundation 2010). Moreover it was recognised that social innovation is an increasingly important stream of innovation theory to foster sustainable growth in economies, provide employment, security, and boost competitiveness amongst for-profit and non-profit firms (Social Innovation eXchange & The Young Foundation 2010). Furthermore, the Theoretical, Empirical and Policy for Social Innovation in Europe (TEPSIE) noted that governments should support social innovators by facilitating networking, engaging with citizens, stimulating funding, and building development programmes for encouraging social innovation (Boelman et al. 2014). These factors led to the insurgence of interest in social innovation and innovation competitions of late, encouraging organisations to work with innovators to develop socially responsible products and services and tackle innovation challenges. As Bingham & Spradlin (2011) states: we are moving towards a challenge-focused economy.

Although very few, we have started to see cases of innovation competitions that focus on providing a social output: social innovation competitions (e.g. European Social Innovation Competition, Dell Social Innovation Competition, the PORT Social Innovation Competition).

However, very little academic research has been done with regards to this model of social innovation. This lack may be because of the minimal number of social innovation competitions being operated (an exact search for social innovation competition in the Web of Science database returned 0 results, and Google Scholar returned less than 10 papers noting either the Dell Social Innovation Competition or European Commission Social Innovation Competition, one of which is for-profit). Therefore, this thesis provides one of the very first studies on social innovation competitions: short-term, non-profit social innovation practises, utilised to drive collaborative effort for encouraging the production of innovations that have a dedicated social impact. This exploratory study utilises a mixed methods approach to uncover the perceived factors that contribute to the success of social innovation competitions. This will help to support the development and modelling of social innovation competitions in the near future. Initiating the line of enquiry with two cases (the PORT social innovation competition and the Microworkers social innovation competition) observations are made as to the format, structure and outputs of each competition, gaining some insight from innovators and their innovative endeavours. Furthermore, surveys are conducted to gather further insight into their perceptions on the success factors in both online and offline social innovation competitions, aiming to understand whether there are trade-offs that occur when either performing an online or an offline version of a social innovation competition. Finally a Delphi study is conducted in order to gather opinions from experts on these topics. This final study supports the triangulation of data for further insight into this new and uncharted field of study.

As a result, factors such as innovation quality, collaboration potential and social impact are perceived as being central to the success of social innovation competitions. From these three core factors, and stemming from an initial contextualisation of social innovation competitions, this thesis determines the strength of these concepts amongst the different types of social innovation competition. With reference to these success factors, the definition of social innovation competitions is strengthened, stating that without these primary factors, one may not be able to operate a successful social innovation competition. Further to this, the type of innovators participating in the process determines the concept of social innovation competitions – they are innovators focused primarily on tackling social challenges and benefitting society; instead of donating finances, solutions are donated. This detracts from the typical notion of innovation for-profit that is substantially covered in the literature since the 17th century (e.g. Bacon 1625), and the fundraising model widely used amongst charities and Non-Profit Organisations (NPOs). Bearing this factor in mind, social innovation competitions can be conducted in an online or an offline setting, with innovation managers utilising either method for innovative benefit depending upon their particular objectives.

This is largely because each method of social innovation competition (online or offline) appears to have comparatively different success factors and outcomes as a result. Namely, those social innovation competitions conducted in an online setting are potentially subject to higher scalability, through an increase in innovation responses and potential for more participants, but such innovations may indeed lack in the quality necessary to tackle the challenge in any great depth. On the other hand, offline social innovation competitions are understood to be subject to lower scalability, but can provide better methods of collaboration with a few high quality innovations, that are targeted and facilitate the use of multiple sets of skills from a variety of innovators. These factors of social innovation competitions determine that innovation managers and innovation professionals can appropriately leverage the optimum method of social innovation competition dependant upon the aims and objectives of the organisation or challenge. As such, this thesis provides an exploratory understanding of social innovation competitions, the specific factors that are attributed to the success of the competition, and the trade-offs between running online and offline versions of social innovation competitions.

1.1 Justification

Humankind has a deeply ingrained compulsion to apply knowledge to create, invent and innovate in order to make changes in society (Mast 2013).With this, social innovation has been written about since the 1960's, with Wilber & Fairweather (1968) determining it as a method of directing and leading social responsibility, rationality and order to influence and optimise change. There seems to have been resurgence in interest in this topic of late. This appears to stem from the fact that the availability of information in the 21st century increases the awareness of dishonest and unethical practices has encouraged customers to become more selective in their purchases. Moreover, lack of social innovation or social responsibility may dissuade customers from purchasing such products, due to a potential decrease in customer satisfaction (Luo & Bhattacharya 2006) following finding out about such unethical practices. Aligned with this, there is an increasing amount of pressure on western organisations to support the development of society through utilising green energy, reducing pollutants, and providing universal healthcare, to name a few (European Commission 2016b).

However, even with this upsurge in studies on social innovation, they still tend to discuss the concept of social innovation, and limited academic studies have been conducted thus far on social innovation competitions specifically. The lack of studies on social innovation competitions, thus far, has led to minimal social innovation competitions being operated in industry, even though they are generally perceived as successful (see European Social Innovation Competition). Whether performed online or offline, social innovation competitions enable innovators to work collaboratively to tackle pressing issues. With particular focus on online social innovation competitions, may help innovators overcome systemic barriers that may be in place to inhibit innovation. Mulgan (2006) describes these stringent rule-based organisational structures as personal failings on the part of the powerful: rigidity and lack of imagination stands between an idea and its execution. Generally, the perception is that to maintain the status quo is a less risky option due to the lack of need for resource and utility to dedicate to innovation. Nevertheless, studies are required to encourage such organisations to break away from the status quo and cause change amongst society and the wider world (Young 2011). As the world becomes more connected through Web technologies, there is an increasing need for such innovation models to be conducted successfully in order to affect change and encourage innovators to overcome such barriers.

Contributing to this field, this exploratory study aims to uncover industry perceptions of what factors contribute to the success of social innovation competitions. This will help to support the development and modelling of social innovation competitions in the near future. Secondly, this study seeks to compare the opinions on differences and similarities between the success factors across online and offline social innovation competitions. The secondary study will determine which medium of social innovation competition is most appropriate for the particular objectives of the organisation. This thesis focuses on the perception of innovators and opinions of the experts in order to develop a foundation for which further study can be conducted. The data is collected through case study analysis and surveys in order to provide a mixed method approach to this exploratory research. With the increasing interest in social innovation in the literature, and the *Horizon2020* (European Commission 2016b) initiative funding the development of socially-impactful innovations, it is understood that this is an important time to conduct research in social innovation competitions. As such, this thesis presents mixed methods study of social innovation competitions, presenting contributions that potentially drive more efficient social innovation in this Web-based economy.

1.2 Scope of the Thesis

Social innovation practices can be utilised in diverse ways and with a variety of different outcomes and benefits to the organisation. Furthermore, there are a number of alternative perspectives that can be studied such as the innovator, policy maker, organisational, psychological etc. While it is possible for organisations in this field to develop successful innovations without the requirement for formalised innovation practices, it is primarily of the interest of research, of innovators and other organisations that these formalisations are put in place and the identifying of success factors is conducted. Even with the vast array of perspectives and research points, it is deemed outside of the scope of this thesis to aim to tackle all of them. Aiming to combat this wealth of perspectives and scenarios would indeed dilute the impact of the outcomes of the research. Instead, this thesis focuses on two primary themes: the success factors of social innovation competitions and their respective trade-offs.

These two themes are constituted as the primary research questions in the thesis: 1) What are the perceived core success factors of social innovation competitions?, and 2) What trade-offs are at play between online and offline social innovation competitions, and why?. The two research themes, and their respective research questions each are answered utilising the overarching mixed methodology, which uses a combination of social innovation competition cases and follow-up surveys to gather data based upon the perceptions and practices of innovators and experts (managers, researchers etc.). The data from each is then analysed and cross-analysed to gather information on whether there is a convergence of opinion and practice on success factors of social innovation competitions. Where there is a convergence, conclusions can be drawn so as to better formalise and streamline social innovation competitions for subsequent research and practice.

1.3 Contributions

The contributions of this thesis are primarily aimed at exploring what particular factors contribute to the success of social innovation competitions. These contributions, and the respective methods used to study it, are devised from an extensive evaluation of the literature, and a mixed methodology, which obtain the perceptions of three key stakeholders on the particular success factors they think most affect the success of a social innovation competition.

From this study, the perceptions of the key stakeholders indicated that Quality, Collaboration Potential and Social Impact are the most prominent success factors in social innovation competitions, representing the key success factors for which social innovation competitions should be modelled. Online social innovation competitions were perceived as having more scalability, having a higher quantity of innovations, and having more innovation responses, whereas offline social innovation competitions were understood as receiving higher quality innovations, having better idea feasibility, and producing better methods of collaboration. Through collaboration, it is understood that not only is it determined as more useful in offline social innovation competitions, but multidisciplinary collaboration, and guidance from experts in the field, can be essential resources for optimum innovation output, due to the complexity of social challenges. From this study, it was also highlighted that there appears to be a difference between the types of innovations that each type of social innovation competition outputs: products tended to come from offline competitions, whilst software innovations tended to be outputted from online methods.

Contributions are developed in accordance with a wide array of literature streams. Firstly, management literature is contributed to by providing exploratory research what the success factors are in social innovation competitions. By providing a better understanding of the success factors, non-profit can develop their own social innovation competitions for better social impact in accordance with the European Commission initiatives. Moreover, more effective social innovation competitions can be developed in-line with the success factors concluded from this thesis. With regards to the Web Science literature, it is understood that this thesis presents an exploratory comparison between offline and online methods of the social innovation competition model, bearing a comparison of the different success factors that appear in online and offline methods. Although, it was perceived that quality is reduced when conducting an online method of a social innovation competition, scalability was thought to increase. This suggests that social innovation competitions have to be applied to the Web in a specific way in order to be effective. Moreover, business owners must bear in mind the limitations of the Web as a platform for social innovation. With regards to Open Ideo, there is a requirement for part of the innovation process to occur offline, as many aspects of collaboration and communication seem to be sacrificed if such a social innovation initiative were only to be conducted online.

Contributing to both academic fields enables this thesis to have more grounding in both academic theory and industrial practice, supporting the development and effectiveness of social innovation competitions in the future. It must be stated that further advancements of this field may indeed stem from other approaches to understanding social innovation competitions.

For example, psychological and cognitive processes associated with operating and performing in social innovation competitions may provide further contributions to the management literature, but also provide an alternative viewpoint from which they can be reviewed and analysed. Alternatively, computer science may wish to review the topic from the technological perspective, developing software and computational processes which better support the development of social innovation competitions and their respective outputs. Although these particular viewpoints would provide further contributions to this field, it must be stated that they remain outside the scope of this thesis.

1.4 Document Structure

This thesis follows a systematic order through which work was conducted in the general theme of social innovation competitions. This document first discusses the literature surrounding similar concepts akin to social innovation competitions (chapter 2), in order to contextualise and justify the research questions of this thesis. Following chapter 2, the methods, methodological process and decisions are discussed and justified in detail in order to formalise and present the structure of the research supporting the thesis. This thesis is then divided into two separate cases: success factors of social innovation competitions, and online and offline social innovation competitions, each written in chapter 4. Subsequent to these studies, the conclusions of this research are detailed with regards to the studies' as individuals, then in terms of a cross-reference between studies' in order to provide further conclusions. These conclusions are contained within chapter 5. The thesis finishes by noting what future work can be conducted in order to extend the literature in the field (chapter 6), and the publications and workshop that have resulted from the PhD research, and other research projects (chapter 7).

2 Literature Review

2.1 Social Innovation

Even though social innovation stems back to the works of Fairweather (1967), the concept has been weakly conceptualised (Mulgan et al. 2007). In the earliest writings Fairweather (1967) describes social innovation as being a method of leading and directing social responsibility, rationality and order to influence social change. Since that time, Drucker (1987) refers to social innovation as a means to impact societal or organisational change by implementing new initiatives and strategies. Akin to this theoretical viewpoint, Mumford (2002) adds that social innovation is a means to change social relationships between stakeholders, and to encourage transformative change from existing practices. Thus, social innovation can be idolised as a game-changer for organisations, individuals and society alike. Young (2011) conceptualises this aspect of social innovation as a means to challenge and break away from the status quo, recognising the barriers to innovation and progress of society. Once the barriers are recognised, innovators must look beyond the technological, political and economical limitations, seeing how innovations can be created that add value to society and are considered important. This can be done through the development of dedicated social goods, products or services that have a significant impact on wider social challenges in order to provide added public value (Pol & Ville 2009).

However, Moulaert (2013) states that understanding social innovation is posed with a number of epistemological challenges. Firstly, it was noted that, in order to analyse the effectiveness and new directions for social innovation, ideological, cultural and political structures would need to be contested. This may present further challenges in more oppressive societies that disable communities from questioning such structures, in turn reducing the social progression of that particular society. Akin to this point, social, cultural and ideological norms vary across a certain geographic location, thus, what may be a beneficial social change away from the

status quo for one individual or community may have a detrimental affect on other individuals within the same respective community. Even so, Mumford (2002) contests that social innovation is founded upon a common goal that the majority of individuals are striving for, thus social innovation is on the wider community level rather than simply the organisational and individual levels. In addition, it has been detailed that social innovation processes require a certain degree of ethical legitimacy and unison in order for social change to occur (Dart 2004), else discrepancies in the social innovation process will begin to affect the resulting output negatively. Taylor (1970) hypothesises that successful social innovation stems from the implementation and utilisation of five primary principles: 1) maximum investment, 2) co-optation, 3) egalitarian responsibility, 4) research as creative play, and 5) ideological research leadership. They also add that social innovation is a means to describe the dynamics of community development, recognising collaboration as a key component of the social innovation method.

Moreover, as social innovations are targeted at producing outputs that really matter to society, it is understood that the key stakeholders within such a community (e.g. the environmental agency, lawyers, councils) must work collaboratively with social innovators to target and tackle the key challenges being presented (Bason 2010). Pol & Ville (2009) agree with this notion detailing that interdisciplinary communication between stakeholders has the potential for fruitful outputs in the social innovation process. However, not only must the stakeholders be involved with the innovation process, they are deemed as being required in the design, implementation and adoption of an innovation (Rogers 1962). Coordinating and organising this collaboration across multiple organisations, governmental departments and individuals coincides with the open innovation model penned by Chesbrough (2003), which describes the inflows and outflows of knowledge from an organisation to have a mutual benefit for the partnering organisations. Relevant stakeholders are required to bring their expertise, resources, knowledge, experiences and information so that others can be informed of any potential barriers that may restrict innovation from that particular perspective, and in order to create social innovations that are relevant to society at that point in time. Thus, co-creation and co-innovation are at the very heart of social innovation, requiring such skills and knowledge from a broad range of individuals and organisations. Murray et al. (2010) states that it is a concept that expands further than that: it is a structure to which wider communities can operate in unison to tackle pressing issues of our time, such as, chronic disease, widening inequalities and climate change among others. Young (2011) adds that it is a coordinated novel mechanism to develop the welfare of individuals affected by social challenges, in turn, altering the status quo of a particular social issue.

Social innovation is deemed as not only an innovation process, a method through which goods are developed that create value, but a method through which stakeholders can learn and adapt their preconceptions of a particular aspect of society (Moulaert 2013). Moreover, it is a process through which organisations and individuals can reflect on the current nature and status of a given society (Albury 2005). This aspect of social innovation can enable further innovation through means of realising that a particular aspect of society is not at the required standard or expectation. The learning aspect of social innovation stems largely from the willingness of stakeholders to share and link ideas, as well as exchange vital resources such as data. The rather free exchange of knowledge, information, ideas and experiences encourages inter-organisational cooperation through networks of collaboration. A more recent model combines the already engrained means of social innovation with open innovation: Open Social Innovation (OSI) (Chesbrough et al. 2014). OSI is described as the collaborative work of organisations, individuals, groups and communities for sustainable, transformative change in a given oppressed society, but with an open approach that stems beyond the key stakeholders. In this model, it is detailed that the innovators and organisations must focus on the social objectives of the initiative and refrain from standard profit-seeking innovation practices, suggesting that there is a requirement for organisations within this process. This model, coined in 2014, depicts a shift from large corporations to organisations that operate to tackle social challenges, utilising a wealth of personnel and resources from outside the boundaries of the firm. However, it may be noted that this new concept is an adaptation of the original social innovation concept defined by Fairweather (1967), in that it still abides with the core concept of directing social responsibility for innovative output, but with a primary focus on the organisation being tasked with the lead role instead of governmental bodies.

2.2 Stakeholders of Social Innovation

Ya & Rui (2006) note the importance of the relationship between stakeholders in the success of an innovation practice, specifically within technology and the social sector. In particular, social innovation requires numerous stakeholders to operate in unison to tackle pressing issues of our time (Murray et al. 2010). Such stakeholders can stem from any aspect internal or external to the organisation being senior managers, shareholders, government, advisors, competitors and the innovation/R&D staff. In addition to this, Hall & Martin (2005) state that innovation practices have a value chain, consisting of suppliers, customers, complementary innovators and management. This value chain, when discussing social innovation, extends out to the societal level, which increases the level of uncertainty in a given innovation process

(Hall & Martin 2005). This uncertainty is largely due to the increased complexities of societal structures, and often, conflicting concerns from external/secondary stakeholders. With respect to social innovation, it must be understood who is the final stakeholders in the process: who is the end consumer and beneficiary of the innovation. Although this is evident in for-profit innovation practices where the lead business is the primary beneficiary, this is not always evident in social innovation practices. Social innovation practices bear reference to supporting the development of an innovation to encourage change in a society or resolve a society-wide issue, rather than directly benefit a specific organisational entity.

Akin to the previous section, Preez & Louw (2008) discuss the importance of an integrated design process for encompassing and prescriptively planning for innovation ideas that could "come out of the blue". This integrated design is supported by the cohesion of good management and collaboration between respective stakeholders in the social innovation process, with key players being required to converge to make decisions and develop innovative thinking. This collaborative practice is further supported by a 'knowledge supply chain' consisting of a number of innovators whom drive innovative effort through providing innovation ideas to the internal organisation (Preez & Louw 2008). Along this line of theory, in open collaborative innovation, the stakeholders are defined as any person who contributes to the innovation process, its design or its implementation (Baldwin & von Hippel 2011). As such, innovators play an essential role in the development and diffusion phases of social innovations, and are active engagers in creating the value products and services (Truffer 2003). In this process it is deemed necessary to ascertain the lead users within the process, who have the capacity and ability to steer the social innovation in a fruitful direction, and provide expert insight into its development (Antikainen et al. 2010; Martínez-Torres 2013). The recognition and nomination of lead users largely stems from the objectives and the aims of the social innovation process, and its respective challenge. For example, Omachonu & Einspruch (2010) demonstrate the requirement for a number of stakeholders from the healthcare profession when aiming to develop a health-based innovation. It may be noted that lead users may not be chosen from a bank of innovators that possess little-to-no knowledge of the particular industry or profession, as they would lack the knowledge to be able to develop an innovation bespoke to the aims and objectives of the innovation call. This is arguably more critical in social innovation in that incorrect innovations as a result of invalid knowledge or data may result in a domino effect of issues throughout society.

As such, Howell & Higgins (1990) state that there is a requirement for recognising champions within an innovation process: the innovators that have a certain set of characteristics conducive to leadership, creativity, higher risk and innovative thinking. It is noted that such

champions possess the skills and abilities to take a set of innovation ideas and 'bring them to life' (Howell & Higgins 1990). In contrast to lead users, champions are not required to have specific domain knowledge, but instead, can be deemed as a catalyst to encourage innovation practices in others, leading users by way of experience in innovation practices and the processes of developing innovation outputs. Pemberton & Mavin (2007) add to this concept of innovation champions, stating that social innovation communities can be developed through recognising a series of champions of innovation within a particular organisation. These champions provide the necessary knowledge and experience in innovation practices to support sustainable innovation (Pemberton & Mavin 2007). From an innovators perspective, this may be the case, but it is arguable that such a community requires lead users from a range of domains bespoke to the particular innovation call in order to provide the necessary knowledge and key expertise. For example, one may note that in social innovation practices it is important to include those personnel who have experience in the specific social challenge, e.g. green energy, to provide key market knowledge and insight for appropriate innovation development.

It appears that there are a series of stakeholders that remain central to the management and development of a given social innovation practice. Firstly, management, decision-makers, advisors are crucial to the correct direction of a given social innovation initiative. Such personnel can provide the infrastructure and leverage the community appropriately to press for social innovation outputs. Furthermore, these stakeholders are deemed as the personnel whom set the innovation challenge, and thus present an opportunity for innovators to innovate. Akin to this, it is notable that lead users can support the steering of a given social innovation practice in a fruitful direction. Lead users and topic experts bring with them the knowledge, data, expertise and experience required for a given social innovation initiative. It is understood that such a social innovation practice cannot even be completed without the efforts and drive of innovators themselves; whether they are champions, lead users or otherwise.

2.3 Drivers and Motivations for Social Innovation

Social innovation is omnipresent in today's corporate discussions with government initiatives such as the Horizon2020 innovation framework pressing organisations to tackle social challenges that can develop the welfare of a given society (Osburg & Schmidpeter 2013). In addition we see an ever-increasing systemic demand and pressure on organisations to meet their Corporate Social Responsibility (CSR) through using, for example, animal-free testing and pesticide-free agents (McWilliams & Siegel 2001). This indeed contributes to the level of

social innovation required by organisations in today's market. Bekkers et al. (2013) suggests a number of other factors that may also influence such organisations to increase their social responsibility, and in turn, social innovation practices: 1) legal cultures in a given society, 2) governance and state tradition, and 3) resource and relationship dependency. Due to the privatisation and liberalisation of service and public domains, citizens are increasingly having an active role in the development of their respective society, and with this, cities, societies and countries begin to compete against one another to become a more attractive place to live, work or visit (Bekkers, Tummers & Stuijfzand 2013).

However, the pressure to produce social innovations not only derives from the top-down from government initiatives and other organisational pressures, customers and consumers also are deemed to possess the power to influence demands in the market for social innovation (Luo & Bhattacharya 2006), having higher expectations for public and private sector organisations (Bekkers, Tummers & Stuijfzand 2013). The availability of information in the 21st century increases the awareness of dishonest and unethical practices has encouraged customers to become more selective in their purchases. Moreover, lack of social innovation or social responsibility may dissuade customers from purchasing such products, due to a potential decrease in customer satisfaction (Luo & Bhattacharya 2006) following finding out about such unethical practices. This presents an alternative bottom-up driver to social innovation, noting the relative impact that customers can have on organisations that do not have a socially or environmentally beneficial outlook.

With these pressing drivers for social innovation and social responsibility, and the identification that collaboration is at the very core of social innovation practices, organisations are increasingly pressured to co-create innovations with external personnel (Almirall et al. 2014). These innovation practices can be conducted through an outside-in, an inside-out or coupled open innovation approach (Gassmann & Enkel 2004). Outside-in open innovation is noted as being an approach that leverages external innovations to increase the R&D outputs and minimise the costs associated with taking products and services to market (Chesbrough 2013). Alternatively, the inside-out approach refers to the process of earning profits from selling Intellectual Property (IP), offering innovations to other organisations in the market, and/or multiplying and sharing technology to facilitate this offering (Enkel et al. 2009). This method facilitates the production of new ventures, spin-offs and new business models (Chesbrough 2007), through the 'matching' of innovations to better-suited businesses and technologies (Chiaroni et al. 2011). The third, coupled, approach describes the formation of an open innovation ecosystem that encompasses both outside-in and inside-out approaches. With

regards to social innovation, the outside-in approach is far more common due to the need to discover new ideas and innovations to tackle particular issues.

Even though the outside-in approaches are more common across organisations in the social sector (see OpenIdeo, The Young Foundation) when faced with external drivers for social innovation, one difficulty is to motivate the personnel on the exterior of the organisation to tackle these challenges. Such processes would inevitably require commitment from the external personnel, to create, submit and share an idea, whom may not necessarily benefit from it. One particular motivating driver for an increase in social innovation may be the leveraging of social entrepreneurs within such a collaborative system (Osburg & Schmidpeter 2013). Social entrepreneurs are driven to develop innovations that are focussed on tackling social or environmental issues. Mair & Noboa (2006) add that social entrepreneurs are influenced by a number of indicators - first, their attitudes, moral judgement and behaviours, and second, by their perceived self-efficacy belief. With information being more widely available on the Web, innovators become more aware of unethical practices and thus can alter their judgements towards a particular issue. In support of self efficacy, Antikainen et al. (2010) found in their FellowForce open innovation case that many innovators were leveraging the system for social recognition instead of utilitarian reward. Social recognition enabled social entrepreneurs and innovators to gain valuable feedback for their innovation ideas and proposals, which were deemed as more valuable to the innovator than monetary reward. Furthermore, (Bandura 1995) found that individuals within large-scale online communities tended to support its development in order to retrieve a sense of efficacy and knowledge that they have had a direct influence on the shaping of the environment. Such intangible (hedonic) success factors may constitute a perceivably more valuable return than tangible (utilitarian) incentives due to the aims of the innovators to provide solutions to the particular challenge rather than gain monetary reward.

With regards to social innovation practices, social entrepreneurs are already actively involved in tackling particular social challenges that they will be presented, possessing skills, knowledge and behaviour that enable them to encourage social change. Such social entrepreneurs can be deemed, in this instance as lead users (Hippel 1986), who drive social innovation and motivate others within a collaborative innovation ecosystem. On this point, Antikainen et al. (2010) note that such innovation initiatives operate more effectively if the innovators, also known as ‘lead users’ in this study, are provided with a platform for collaboration and collective intelligence through which they can motivate others. In support of this, social motivation is identified as a strong catalyst in encouraging user interaction and subsequent innovation (Kaufmann et al. 2011). In line with Kaufmann’s theory, Antikainen &

Vaataja (2010) demonstrate the practical effectiveness of ranking submitted innovations, generating a sense of competition through social recognition. Antikainen's (2010) work identifies that pecuniary rewards are not necessarily the most effective form of motivation: learning new ideas, receiving recognition and having fun trended as being the most effective forms of incentive, even in a for-profit scenario studied in this paper. This particular type of reward system is arguably strengthened in a social innovation ecosystem in that the innovators within the network seek to, not only solve the challenge being presented, but also receive recognition in doing so. As such, it seems that innovators within a social innovation system do not seek utilitarian returns, instead, social recognition is deemed as a primary driver in motivating individuals to innovate. On this point, organisations appear to require such social recognition features within their particular ecosystem in order to abide by the social, economic, political, market-based and legal drivers that are becoming more prominent.

2.4 Barriers to Social Innovation

Identified in the previous sections, one of the key assets of a given social innovation practice is the actors within it. How much they collaborate, motivate and lead each other to innovate is central to the success of a particular social innovation practice. However, there are a distinct number of barriers relating to conducting social innovation in practice that must be discussed here. This is deemed as important as such barriers can indeed restrict or deny actors in a particular social innovation process from achieving the intended output. D'Este et al. (2012) state that barriers to innovation, and indeed social innovation can be divided into two types: revealed barriers and deterring barriers. Revealed barriers are primarily centred on any difficulties presented to the innovators at the time of innovation. Examples of this could include the challenge being too complex, the technology impinging on the innovation processes or the management constantly changing the scope of the challenge. Deterring barriers tend to be externalities that prevent firms from committing to innovation. For example, social innovation processes can be subject to systemic barriers – oppressive, bureaucratic or authoritarian governments that deny any form of social innovation or change to occur that may question their authority (Murray et al. 2010). This will indeed restrict or even prevent particular organisations within that jurisdiction to be able to innovate. Bekkers et al. (2013) notes that these systemic barriers can be in the form of legal, cultural, political or traditional restrictions, that dissuade actors within a social innovation framework to innovate. Such societies may be seen to intend to restrict the development of such social innovations as a means for the authorities to maintain the status quo (see Young 2011) and their power. As

such, legal and political structures may indeed constrain social innovation, creativity and risk-taking especially if the ideas proposed question the respective authority.

Akin to these structures that may reduce the ability for organisations to innovate for social causes, poor economic standing and organisations placed on geographical peripheries can have a direct impact on social innovation practices (McAdam & McConvery 2004). Lack of financing from local and national governments can indeed restrict the ability for firms such as socially focused organisations to innovate. Further to the systemic nature of some public institutions, private institutions can indeed mirror this organisational culture, having stringent and standardised rules that stagnate the flow of innovations. Mulgan (2006) describes these stringent rule-based organisational structures as personal failings on the part of the powerful: rigidity and lack of imagination stands between an idea and its execution. This deeply engrained organisational culture is one of the primary barriers to innovation in the public, private and third sectors, bringing with it restrictions and reluctance to innovate as a means to maintain their perceived power. This critical factor is discussed widely in the innovation literature as innovation resistance (Talke & Heidenreich 2014; Kleijnen et al. 2009; Garcia et al. 2007). This innovation resistance can stem from a number of stakeholders in a given ecosystem: the policy makers, the management, the innovators, the collaborators or the consumers, and works as a means to restrict or deny the process of innovation through a reluctance to change. Innovation resistance tends to be seen widely in large organisations, however small and social organisations tend not to face this issue, as there remains a requirement to innovate in order to survive. Smaller firms are pressed to innovate more frequently to ensure they do not fail.

Hitt et al. (1996) notes that innovation resistance can largely stem from one underlying barrier: risk aversion – a reluctance to accept a scenario when exposed to uncertainty, and choosing the less risky alternative. Generally, the perception is that to maintain the status quo is a less risky option due to the lack of need for resource and utility to dedicate to innovation. Risk aversion can be prominent in the management of a given firm and public institutions, both of which will restrict the flow and effectiveness of innovation. In accordance with potential high levels of risk aversion, there appear to be difficulties in measuring innovation in order to calculate which option is less risky. As such, Smith (2005) suggests that innovation, and indeed social innovation, are immensely difficult to quantify, due to its nature of combining a variety of social and quantitative factors. Akin to this, theories of innovation subjectivity and contextual dependency (MacKenzie & Wajcman 1985; Baregheh et al. 2009) appear to apply as social innovation appears as a construct that abides even more so to these preconceptions due to its dependency on social change for an understanding of its success. Therefore,

innovation measurement in the service and social sectors are deemed as a challenging prospect to attempt (Coombs & Miles 2000), and thus limits the ability of management to quantify the related risk. Taking the interdisciplinary nature of social innovation into account, Morris (2008) presents 'The Innovation Funnel', which incorporates a number of qualitative and quantitative procedures for measuring a firms overall level of innovation. This procedure of measurement starts from the early research and development stages in the innovation process, taking right through to the adoption creating a quantified unit of measurement for each stage. Nevertheless, it is restricted to attempting to combine qualitative and quantitative aspects of the innovation process that is, at the very least, highly challenging. Thus, as firms are pressed to become increasingly creative, collaborative and innovative within the progressively competitive markets (Chesbrough 2013), methods to measure such outputs become necessarily complex or out-dated (McAdam & Keogh 2004). With this notion, managers and innovators within organisations must endeavour to produce novel and interdisciplinary approaches to measurement (McAdam & Keogh 2004) to reconcile the nature of social innovation, and calculate the risk, payoffs and outputs accordingly.

Regulation being authorities attempting to maintain a status quo whether through legal, financial or political restrictions, knowledge being a factor that generally encourages revealed barriers, market being external competitive factors, and cost being akin to the financial limitations provided to a particular innovation practice from an organisation. This paper also states that the barriers to innovation, and social innovation, primarily stem from revealed barriers rather than deterring barriers (See Murray et al. 2010; Bekkers, Tummers & Voorberg 2013; McAdam & McConvery 2004). This means that barriers to innovation are often discovered during the course of an innovation practice rather than in advance, suggesting that social innovation practices have to be tested in order to gather valuable data on these revealed barriers. As we see a rise in the use of technology in innovation and social innovation practices, as seen in the open innovation and open social innovation paradigms (Chesbrough et al. 2014), the barriers are arguably different. With technology being able to transcend geographical, political, economic boundaries, it is deemed important to what potential implications there are with the use of technology in social innovation practices.

2.5 Collaborative Technology for Social Innovation

As was previously highlighted, collaboration appears as a core determinant of successful social innovation output, due to the requirement for a series of diverse actors to operate within

the innovation process (Baldwin & von Hippel 2011). As such, this section will review the literature surrounding collaborative innovation and the uses of technology to facilitate such practices. Early work on the ARPANET in the 1960's recognised the intrinsic benefits for collaboration through technological means, and thus, through this same method the Web was developed (Tuomi 2002). Paulus & Nijstad's (2003) research on group creativity also noted the fundamental need for group collaboration specifically for achieving optimum innovation outputs. As a result of research in these fields, it has been widely recognised in innovation literature that, with the advent of collaborative networks, innovation outputs are decreasingly as a result of the isolated efforts of the organisation, and increasingly as a result of interactions between consumers' and organisations' (Sawhney 2005; Antikainen et al. 2010; Carbone et al. 2012). This is arguably more the case when discussing social innovation, as social innovation requires the input and collaboration of numerous stakeholders in order to target and tackle the key challenges being presented (Bason 2010). Thus, in order to reach communities and stakeholders that exist outside the boundaries of the organisation, previous models of internal innovation are deemed as less useful.

Chesbrough (2003) defines these methods and models of innovation as 'closed innovation': utilising only internal innovation personnel and resources to develop competitive advantage through getting to the market before others. This particular type of innovation process stems from traditional economical models such as those detailed in Schumpeter's (1934) work. In comparison, open innovation is identified as being a method that provides an opportunity for organisations to commercialise and capitalise on innovation, through utilising internal and external ideas in order to create more valuable outputs, build better business models and increase competitive advantage (Chesbrough 2003a). Furthermore, it enables value to stem from the collaboration between internal and external networks of partners, affiliates, customers, consumers and suppliers rather than revealing innovations ideas at the end of the innovation process, of which is highly critical for social innovation practices. Elmquist et al. (2009) divide open innovation tools and technologies into three distinctive groups: 1) coordinating/aggregating, 2) liberating, and 3) allowing/including. The first group of tools enables for the collection and aggregation of ideas and innovations on mass to tackle a certain problem within the organisation, whereas the second group encompasses many of the intermediary platforms that support "sticky knowledge" (Piller & Walcher 2006) that is not easy to reveal through traditional marketing research techniques (Elmquist et al. 2009). The final approach to developing open innovation tools is the allowing/including structure that formulates a process that is directly aligned with the goals of the organisation (Elmquist et al. 2009). These tools are depicted as a means to collaborate with external personnel who possess talents often outside the skillset of the organisation (Baldwin & von Hippel 2011).

Akin to these design types, open innovation networks represent themselves as a form of collaborative platform, possessing the ability to achieve a high degree of product innovation, either through stemming sources of innovation from the external network of individuals (Nieto & Santamaría 2007). This leveraging of an external network of individuals, that span many disciplines, is deemed as key to the success of a given social innovation practice (Taylor 1970). Moreover, such collaborative technologies can transcend particular legal, political and economical barriers to social innovation identified in the previous section. Fichter (2009) notifies the concept that, open and social innovation, emphasize the importance of communities in creating, shaping and developing innovations both within the system and externally. Antikainen et al. (2010) add that collaborative communities tend to output more market applicable, appropriable and complete innovations. This factor is mirrored in much of the collective intelligence literature that details the idea that collaborative teams can cover many aspects of the innovation through a collective vision enabled by collaborative tools, such as innovation networks (Paulus & Nijstad 2003; Carbone et al. 2012). Such tools, innovation marketplaces and networks provide a platform to which this collective vision can be leveraged more effectively through learning processes, transaction mechanisms and communication tools (Hossain 2012). Additionally, pivotal research performed by von Hippel (1986) examined the roles of users, consumers and external organisations in knowledge transfer processes, and the assimilation of such innovation. Further research along this vein, however, has been deemed as Open Collaborative Innovation, whereby actors or users within a modular network leverage innovation openness for the co-creation of openly available innovations (Baldwin & von Hippel 2011). This de-facto openness lends itself primarily to the open source community with projects such as Apache, Github and Wikipedia being beneficiaries of the open collaborative innovation model. In this instance, the open source community appears to mirror social innovation, in that there is a pressing need for innovations to be produced that benefit society without the requirements for monetary reward (Antikainen et al. 2010; Osburg & Schmidpeter 2013).

Vanhaverbeke & Cloodt (2006) state that the value of the innovation is dependent upon the perceptions of the individual, society or the organisation, and it may occur that value perceptions of the process either clash or compliment each other. For example, consumers within the innovation network are said to submit innovations to the organisation to establish a dialogue between themselves and the business (Gassmann & Enkel 2004) or retrieve fun or fame (Antikainen et al. 2010). Whereas some reasons for SMEs is that they require the collaborative nature of the innovation network for the commercialisation of their existing products and services, and to streamline their existing internal processes and practices (Lee et al. 2005; Vanhaverbeke & Cloodt 2006). Meanwhile, larger organisations utilize collaborative

innovation networks to gather new insights into the market and innovate quicker, more effectively and with higher appropriability (Chesbrough 2003a; West et al. 2014). With regards to social innovation, social entrepreneurs and innovators in a given innovation network have a distinct drive to produce solutions to challenges without seeking these forms of returns, they simply want to solve the problem (Bason 2010). Such 'lead-users', who have the capacity and capability to direct the innovation production, are required to steer the social innovation process in a fortuitous direction and provide expert insight into its development (Antikainen et al. 2010; Martínez-Torres 2013). Products and services, and innovations in general, are rapidly becoming more multi-technological, multi-formatted and multi-cultural, so much so that it requires a number of external expertise across many disciplines to collaborate and create a successful innovation (Narula 2004). As much of these collaborative networks appear to reside on the Web, it is deemed important to review the literature surrounding the use of the Web in social innovation.

2.6 Social Innovation on the Web and Internet

In the past decade, it seems that a large quantity of the literature has begun to focus on innovation in relation to the Web (Loudon 2001; Tuomi 2002; Chesbrough et al. 2006; Wirtz et al. 2010; Dini & Tiropanis 2013). It has been noted that the Web has facilitated a plethora of innovations through social and open innovation processes (Chesbrough et al. 2006). In addition, Dini & Tiropanis (2013) state that the Internet is divided into two primary layers, both of which possess the ability to foster innovation. Firstly, the top layer provides a platform to which communities can be developed through communication and the dissemination of content, whereas the bottom layer facilitates innovation through technological means (Dini & Tiropanis 2013). Oerlemans & Meeus (2005) adds that innovation is facilitated through a clustering network, such as the Web, with high spatial connections and interactions between organisations and others in the supply chain. Further to this, Prandelli et al. (2006) note that the Web has the ability to create new opportunities for consumer integration, and appears to contribute to the rapidly increasing diversity, scale and level of innovation. As such, it is suggested that the Web is directed towards a 'downstream' innovation model where social communications occur, instead of the 'upstream' traditional linear model of innovation (Tuomi 2002). The sheer diversity and multiplicity of the Web, arguably, has led to the increasing maturity of innovation, velocity of innovation, and engagement by consumers and customers. For example, many articles note the economic, technological and social importance of specific innovations that enable vast social communication across global networks: social

media (Ala-Mutka et al. 2009). Adding to this, Molina-Morales & Martinez-Fernandez (2010) state that social interactions, trust and a shared vision can encourage higher levels of innovation in firms, and are becoming an increasing requirement for organisations of any type. With this, the level of pressure from the consumers and customers for social innovation is increased (Luo & Bhattacharya 2006), as they are empowered and facilitated by the Web to have such social interactions. Consequently, this evident direct interaction and engagement with consumers has a huge amount of potential benefit for the firm in question (Chesbrough 2003; Enkel et al. 2009), and also for the consumer (Antikainen & Vaataja 2010).

As such, business models are required to be largely more open and flexible to cater for the growing levels and diversity of innovation over the Web, and the social interactions occurring between actors in a given network van der Meer (2007). Organisations are increasingly pressed to leverage information and feedback from their consumers via the Web in order to maintain a level of innovation that is deemed appropriate to the audience. Understanding this pressure, Gagliardi (2013) adds that many organisations have begun to fill their knowledge gap by utilising and leveraging Web 2.0 technologies in their innovation strategies, representing a behavioural shift from 'closed' to open innovation strategies. Web-based technologies can and do transcend systemic barriers, enabling a wider spectrum of people to innovate from wherever they are, and develop social movements that empower oppressed societies to revolt against these systemic barriers to innovation (Mulgan et al. 2007) (e.g. the Arab Spring). As such, private and public organisations are pressed to innovate more frequently in order to maintain a competitive advantage (Wirtz et al. 2010) amongst the increasingly socially-aware and socially-informed consumers. Thus, we see a rise in civic innovation networks that leverage the use of Web-based technologies to encourage social change in a given society (see Civic Innovation Network). More open and democratic societies also see a development in civic participation and co-creation portals that leverage the innovativeness and creativity of civilians to develop a better society (Mainka et al. 2016).

As more data is published on and through the Web, levels of innovation increase exponentially, due to the ability for firms to access information about the market, their competitors, and/or the trends in technology (Kozinets 2002). With regards to organisations what have a social outlook, such organisations are informed by civic audiences about specific problems in their community, and empowered with platforms to develop innovations to tackle such issues. Furthermore, Prandelli et al. (2006) states that the Web has the ability to facilitate innovation through a large percentage of the product development process: from idea generation to product launch. Even so, stringent legal and political barriers can discourage further action – if a particular government is resistant to such changes in society, innovation

can be halted or diluted. As such, even though the Web can encourage a wider spread of social innovation, it cannot necessarily have a direct positive impact on the implementation of the innovation. Even without the systemic barriers in place, social innovation on the Web is still subject to caveats that can affect the effectiveness of innovation. Firstly, collaborative networks are very difficult to manage (Boudreau & Lakhani 2012), and if managed incorrectly can be detrimental to the innovation process. Secondly, suitable methods and models of innovation have to be correctly implemented as this also may be detrimental to the level of innovation sourced from the network (Mainka et al. 2016).

As such, Toivonen (2016) argues that social innovation communities should not be developed solely on the Web, but also in an offline environment, as hybrid models are deemed to be the most efficient models for complex innovation practise such as social innovation. Without the introduction of both types of social innovation model, cultural awareness, collaboration and diversity may be reduced, and ultimately social entrepreneurship is hindered (Toivonen 2016). Even though this is arguably the case, offline social innovation practices may indeed lack the reach and scale of Web-based innovation practices due to the lack of collaborative networks to support them. Therefore, interdisciplinary communication across the Web is required by social innovation practices in order to create fruitful outputs (Pol & Ville 2009). As such, practitioner networks, the leverage the expertise of a wide range of experts from many different fields, are deemed a critical aspect to social innovation due to the level of complexity of social challenges (Mulgan et al. 2007). With the support and facilitation of the Web, innovations can spread quickly, being cheap to launch on the national and international levels (Mulgan et al. 2007), and consumer engagement, over the Web, can reduce perceived risk, support the identification of upcoming trends, and increase the number of creative ideas (Fuller 2006). The Web makes it possible to create and spread new social organisations much more quickly and to meet new needs in different ways (Mulgan et al. 2007), utilising many different models to approach complex social innovation challenges.

2.7 Social Innovation Contests and Competitions

With the advent of Web-based innovation practices, innovation competitions and contests are increasing in popularity in practice and within the literature stream (Adamczyk 2012). This is largely due to the fact that innovation contests and competitions are time-finite, being between

a few hours and 14 days long (Bullinger & Neyer 2010), enabling empirical research to be conducted with speed and efficiency. These particular innovation competitions can either be performed in an online environment (Hallerstede & Bullinger 2010) or in offline, being adaptable to the objectives of the research. Thus, this particular benefit coincides with the notification that social innovation must occur both in an offline and online environment in order to avoid potential pitfalls (Toivonen 2016). As a result of being adaptable to online and offline environments, a review of literature surrounding these concepts can support the development of this research on social innovation competitions. Thus, this section of the literature review will examine the existing literature stream associated with these innovation methods, enabling a conceptual foundation to be built for subsequent research in this field.

According to Bullinger & Neyer (2010) innovation competitions are defined as a competition amongst innovators, who utilise their skills, experience and creativity, to develop solutions to particular innovation challenges posed by individuals, organisations or groups. As opposed to the benefits of collaboration detailed in the previous section, competition provides a time-finite, super-short being between a few hours to 14 days, competitive method through which innovations can emerge (Bullinger & Neyer 2010). Innovation competitions are designed with the aim of collecting a series of early-stage innovation concepts and ideas, such as sketches, prototypes, elaborated concepts, and depending upon the timescale provided, fully functional solutions (Ebner et al. 2009). These innovations, in whatever form they take, are deemed as being as a result of altruism or an attempt for status within the community (Bullinger & Neyer 2010), conducive to fame (Antikainen et al. 2010).

Akin to innovation competitions, innovation contests are detailed as being a short-term innovation events conducted amongst competing individuals or groups, with a granted reward, either pecuniary or non-pecuniary (Terwiesch & Xu 2008). Alongside the potential returns for innovators in producing innovations in innovation competitions, rewards appear as central to the motivation of the innovators (Bullinger & Neyer 2010). The primary difference between the two formats is in the source of the reward and the drive of innovator. Social innovation scholars suggest that social entrepreneurs are driven to develop innovations that are focussed on tackling social or environmental issues, by way of their attitudes, moral judgement and behaviours, or by their perceived self-efficacy belief Mair & Noboa (2006). As such, rewards are criticised by the Stanford Social Innovation Review when focused on social innovation practices (Starr 2013). Innovation competitions are detailed as enabling communities and individual innovators to develop their own rewards, through fame, altruism or increased knowledge (Antikainen & Vaataja 2010), whereas the successful innovators within an innovation contest is awarded with a pecuniary or non-pecuniary award from the challenge-

setting organisation or individual. With particular reflection upon the European Commission Social Innovation Competition, that provides a monetary reward, it is clear that the terms competition and contest are used interchangeably in practice. In relation to the objectives of this research, it may be argued that social innovation events of this type would pertain primarily to innovation competitions if there is a lack of returning rewards form the organiser, but instead a sense of social fulfilment and gratification from participating and providing solutions to pressing social issues. This lack of focus on rewards appears to align with Chesbrough et al. (2014) conceptualisation of the open social innovation framework.

Even though, social innovation practices in this format may not have a primary focus on reward returns, such rewarding methods are detailed as being highly motivating to the individuals taking part in the innovation process (Antikainen & Vaataja 2010). Furthermore, this format of innovation production is regarded as developing a competitive environment for producing higher quality innovations (Bullinger & Neyer 2010). Nevertheless, with regards to the previous chapter on collaboration, it is still understood that collaboration is key to the development of a feasible appropriable innovation (Antikainen et al. 2010). Understanding this statement, Bullinger & Neyer (2010) notes that although innovation competitions' core practices are providing a process for competition, collaboration can and should be implemented. These types of innovation practices encourage collaboration by forming small teams for short periods of time, with such teams competing against other teams in the innovation process. Even so, as noted by large-scale collaborative networks in an online format can be difficult to manage, due to a number of factors such as structuring communications and distancing effects between team members (Boudreau & Lakhani 2012). Thus, it may be identified that an offline innovation competition may provide such teams with the methods of collaboration that are deemed necessary, and enable organisers to manage the events more easily.

Along this stream, Boudreau (2011) notes that there is an issue within the innovation contests' management community in understanding the optimum number of innovators to admit to the event. This is as a result of either not receiving enough innovations from too few innovators, or not being able to manage its efficiency by having too many innovators (Boudreau 2011). It is also notable that due to the competitive nature of the innovation competitions, a number of innovations and ideas would remain unused or discarded by the innovation organiser. Furthermore, it is noted that greater rivalry amongst innovators within such a system may be detrimental to the innovation output, as the likelihood of the innovator receiving such a reward is reduced (Boudreau 2011). Therefore, it is understood that the innovation competition or contests' manager is required to define their objectives appropriately prior to deciding on the

amount of innovators they should have participating. Lack of understanding key objectives may be detrimental to the quality of the innovations outputted and, potentially, damaging to the success of the event, and even furthermore, damage to the reputation of the organiser.

Adamczyk (2012) divides the research on innovation contests and competitions into five primary research categorises: 1) economic perspective, 2) management perspective, 3) education focus, 4) innovation focus, and 5) sustainability focus. Although this paper does not directly analyse social innovation competitions, it appears clear that at least point 5 refers to a social innovation output. The wide spread of focus in the literature is largely due to the widening range of scholars that are reviewing and utilising innovation competition processes to analyse innovation amongst teams, utilising technology, as individuals, amongst much else. Thus, it is identified that utilising this process as a method of experimentation can enable the researching of a wide array of research questions. As such, the research comprised in this thesis, utilises the innovation competition as a means to collect data and analyse this method from a social innovation standpoint, not noted within the categories devised by Adamczyk (2012). Furthermore, as was noted in this section of the literature review that such innovation formats can be performed both online and offline, it is understood that the Web Science perspective is fundamental to an intrinsic review of and experimentation in such innovation methods.

2.8 Conclusions and Open Challenges

The literature review first noted a series of definitions associated with the conceptualisation of social innovation. Fairweather (1967) describes social innovation as being a method of leading and directing social responsibility, rationality and order to influence social change. Adding to this, Young (2011) conceptualises this aspect of social innovation as a means to challenge and break away from the status quo, recognising the barriers to innovation and progress of society. D'Este et al. (2012) state that barriers can be divided into two types: revealed barriers and deterring barriers, with revealed barriers being those that emerge from operating innovation processes, and deterring being external regulatory bodies that restrict the innovation process. As such, literature discussing collaborative technology, and indeed the Web, suggest that these technologies can and do transcend deterring barriers enabling those in less democratic and open societies to innovate (Mulgan et al. 2007). Even though there has been a large amount of advocation for utilising such technologies, it appears to remain relatively untested in comparison to offline social innovation practices. Therefore, a comparison between online and

offline social innovation practices is truly sought after to underline the potential differences in revealing barriers that may emerge. In accordance with this assertion, Toivonen (2016) argues that social innovation communities should not be developed solely on the Web, but also in an offline environment, as hybrid models are deemed to be the most efficient models for complex innovation practise such as social innovation. Without the introduction of both types of social innovation model, cultural awareness, collaboration and diversity may be reduced, and ultimately social innovation is hindered (Toivonen 2016). Taking this into account it is deemed important to study both offline and online versions of social innovation practices to understand the relative revealed barriers and drivers.

It is also widely discussed that collaboration and innovator interactions are key to the development of innovation processes (see Chesbrough 2003; Sawhney 2005; Antikainen et al. 2010; Molina-Morales & Martinez-Fernandez 2010) - collaborative communities tend to output more market applicable, appropriable and complete innovations. Pol & Ville (2009) add that interdisciplinary communication provides more potential for fruitful outputs in a social innovation process. Moreover, as social innovations are targeted at producing outputs that impact society, key stakeholders within such a community (e.g. the environmental agency, lawyers, councils) must work collaboratively with social innovators to tackle the key challenges being presented (Bason 2010), as without this emergent knowledge barriers become prominent (D'Este et al. 2012). As such it is deemed necessary to ascertain the lead users, who have the capacity and ability to steer the social innovation in a fruitful direction, and provide expert insight into its development (Antikainen et al. 2010; Martínez-Torres 2013). This concept of lead users abides by the original conceptualisation of social innovation by Fairweather (1967), in which they describe social innovation as a means to direct and lead social responsibility to influence change. In addition to the leveraging of lead users, social innovation practices should refrain from profit seeking (Chesbrough et al. 2014), and pecuniary rewards are criticised in social innovation literature (see Starr 2013; Antikainen et al. 2010). Instead, learning new ideas, social recognition, fame and fun are more meaningful rewards for innovators in a given social innovation competition or practice in general (Antikainen et al. 2010). This is due to the understanding that social entrepreneurs are driven by their attitudes, moral judgement, behaviours and perceived self-efficacy, rather than driven by pecuniary gains (Mair & Noboa 2006). In turn, such social entrepreneurs become innovation champions – individuals that encourage and mentor innovators within a social innovation process to maintain motivation (Pemberton & Mavin 2007). Nevertheless, one may question how social entrepreneurs and innovation champions can encourage motivation in online social innovation environments. Boudreau & Lakhani (2012) notes that large-scale collaborative networks can be difficult to manage, due to a number of factors such as

structuring communications and distancing effects between team members. Thus, collaboration in social innovation must be analysed, firstly, because of its prominence in the literature and secondly, because of the lack of comparison between online and offline social innovation practices in reference to collaboration.

With regards to social innovation practices it seems opportune that one would study innovation competitions due to the fact that innovation competitions are short (Bullinger & Neyer 2010), enabling empirical research to be conducted with speed and efficiency. They are designed to collect a series of early-stage innovation concepts and ideas to tackle a specific challenge (Ebner et al. 2009). They can be conducted in an online and an offline environment, enabling this study to better understand what the revealed barriers are in both types of social innovation competition. One may also note that Adamczyk's (2012) review of innovation competition literature does not state the opportunity of a social perspective to innovation competitions, suggesting that limited literature currently exists on this topic. Moreover, it is understood that innovation competitions do align with the social innovation literature. For example, innovations being sourced from innovation competitions are deemed as being as a result of altruism or an attempt for status within the community (Bullinger & Neyer 2010), conducive to fame (Antikainen et al. 2010). This particular aspect coincides with social entrepreneurship theory and lead users in that they are directed at tackling a specific social challenge by way of their moral judgement, behaviour and attitude (Mair & Noboa 2006). Innovation competitions also enable structured collaboration, which appears in the social innovation literature all the way back to the original works of Taylor (1970).

Moreover, social innovation competitions can be operated in an online and an offline environment, avoiding potential pitfalls noted by Toivonen (2016), each of which can leverage lead users, social recognition (Antikainen et al. 2010) and interdisciplinary communication (Pol & Ville 2009). However, the understanding of the revealed barriers and/or success factors that emerge from social innovation competitions forms the crux of this study - even though Web-based social innovation has more potential to overcome deterring barriers, revealed barriers may be more prominent. The long-standing promise of the Web and collaborative technologies being of benefit to innovation practices, relatively goes uncontested. A study to better understand the revealed barriers and success factors is thus sought after, especially in the growing and expanding research topic of social innovation. As consumers and citizens become more informed, through technologies such as the Web, social innovation becomes a primary objective for democratic, open and collaborative communities, and innovation competitions provide a means through which to study it in practice. Furthermore, with the limited amount of literature on the topic of social innovation competitions, it appears as an

opportune area of study. Moreover, the very limited research performed on social innovation competitions, and the growing interest in social innovation, gives testament to the premise that exploratory research must be performed in this growing and topical research field. As such, exploratory sets of studies are outlined in this thesis in order to appease this sought after field of research.

3 Methodology

3.1 Introduction

This methodology section presents a series of studies aimed at gathering data around innovators' and experts' perceptions of success factors in social innovation competitions. The data consists of two cases (an online and an offline social innovation competition) and three sets of surveys to collect numerical data surrounding the case studies. Combining both sets of data will work towards a better understanding of how social innovation competitions can be designed in the future to ensure that the competition can be as successful as possible. The numerical data collected from the studies is analysed statistically, both within and between respondent groups, to develop a quantified understanding of which success factors are most appropriate and important to the particular competition. Following these analyses, proposals are presented for how social innovation competitions in the future can be designed to achieve optimum levels of innovation. As there are limited academic studies in this field it must be noted that this is an exploratory study performed to initiate a line of questioning into social innovation competitions and their effectiveness. As with the limited amount of cases currently available, perceptions of the respondent groups are drawn upon. Nevertheless, as a result of this study, and others subsequent to it, it is projected that more research will be performed around this growing topic, and more social innovation competitions will be ran. This chapter outlines the research questions, philosophical approach, and methodological process utilised during the course of this research, detailing the reasoning behind these choices.

3.2 Research Questions

Aligned with the research objectives, it is clear that research questions are required in order to develop methodological practices and subsequent conclusions to the research. Each of the research questions run under the overarching premise of better understanding the particular factors that contribute to the success of social innovation competitions. In addition to this, how can we leverage them more effectively and what impact does this have on the organisations operating, and aiming to operate, such practices. Under this primary research objective, the research follows a systematic method, through which it aims to underpin a formalisation of social innovation competitions through understanding the key success factors. Basing the subsequent research upon these factors, comparisons between offline and online innovators are drawn for understanding the compromises and gains of each and how the success factors are impacted as a result of operating each type.

3.2.1 Research Question 1: What are the success factors of social innovation competitions?

As a definition is lacking in the literature, and industrial practices don't tend to abide by the current framework of innovation competitions, defining social innovation competitions is largely required. This is important, as it will determine the context within which the research questions will be set. This research question aims to uncover the primary success factors for determining the success of a social innovation competition.

- What are social innovation competitions?
- Are there agreements amongst key stakeholders on what the success factors are?
- Do these success factors contribute to the success of a social innovation competition?

3.2.2 Research Question 2: What are the trade-offs in success factors between online and offline social innovation competitions?

From a managerial perspective, compromises refer to the types of resources, outputs and outcomes of a particular process or practice that hinder innovation, whilst gains refer to such aspects being a conduit to the innovation process. Here the potential trade-offs are analysed. Such compromises and gains follow from the first research question in determining the success factors, then analysing the data with regards to a comparison between online and offline social innovation competitions.

- What are the success factor trade-offs between online and offline social innovation competitions?
- What is the role of collaboration in each type of social innovation competition?
- What outputs emerge as a result of each type of competition?

3.3 Philosophical Approach

In the literature it is clear that the majority of studies in the fields of innovation, social innovation and open innovation have tended towards a managerial perspective, collecting primarily qualitative data to form research contributions (e.g. Chesbrough 2003). Although, there are many benefits to performing qualitative analyses in this type of research, such as enabling the research to be provided with in-depth contexts to the running and managing of social innovation, it may not necessarily provide data that would be quantifiable, significant and generalisable that quantitative data can provide (Field 2013). It is understood that the quantitative approach supports this research in social innovation competitions, as providing quantified research outputs will enable definitive conclusions to be drawn that stabilise the definition of social innovation competitions, determine the significance of success factors, compromises and gains. However, analysing practical cases in a case study analysis adds to the descriptive and inferential statistics and provide a qualitative angle to the studies. As a mixed methodology is used, the research lends itself to a pragmatic approach in that methods used are determined as most appropriate to the study, its questions and to the topic area. This type of philosophical approach is used because there is a limited amount of research in the field, to follow a pre-determined methodology, and there are a limited amount of cases to run

rigorous practical analyses. Combining elements of quantitative and qualitative studies will support an exploratory approach to determining the success factors of social innovation competitions.

3.3.1 Inductive Pragmatic Approach

An inductive approach is performed to uncover patterns and theories at the end of the methodological process. Firstly, observations and tests are performed in an exploratory nature to determined if there is or isn't a pattern. Following this, patterns are determined and potential theories are created. In this thesis, literary resources are reviewed to understand the gaps in the literature. In this particular example, there is a limited amount of research that indicates that an exploratory approach to data collection is required. Secondly, commonalities amongst the respondent groups in the success factors are noted and form patterns across the respondent groups in terms of their agreements. These patterns will then form initial theories in this widely unstudied field. Due to the limited studies in this field, it would not be possible to utilise a deductive approach, as overarching theories have not been postulated. In understanding that an exploratory approach is utilised, a mixed methodology would be the most advantageous methodology to the research questions above.

3.3.2 Mixed Methods Approach

In line with the philosophical and methodological approaches a mixed methodology will be utilised. This is due to the exploratory nature of the thesis in understanding the success factors of social innovation competitions and determining the patterns in the data. Combining qualitative and quantitative data will provide a more holistic understanding of how both what the success factors are and why they are determined as such. In this thesis, the qualitative data stems from the two case studies and the elements of qualitative data within each of the two surveys and Delphi study. Within those same surveys and Delphi study, quantitative data is also collected to add weighting to the perceptions and opinions of the respondents and their respective groups. A purely quantitative approach would not support the formation of potential theories or best practices in designing social innovation competitions as it would not provide the necessary reasons for the outcome. Similarly a purely qualitative approach would

determine the reasons for the choice of the success factors, but would not be able to postulate the size and gravity of the success factors. Combing both elements will support the production of more justified success factors and their perceived prominence in the field of social innovation competitions. In this methodology, the cases are presented with descriptive analyses on the demography of the respondents. Following this, many of the analyses within this thesis are from a statistical approach. This is due to the understanding that the data must be analysed statistically in order to determine the patterns. Following determining the patterns, qualitative data from the surveys is presented to provide further contexts and reasoning behind the patterns. In essence, a mixed methodology is an ideal way to lay the foundations for further research in this field and provide future studies with a base to which further quantitative and qualitative studies can be performed.

3.3.3 Data Triangulation

Combining a number of research methods under the inductive pragmatic approach encourages triangulation to be used as a method in order to form further conclusions across the multiple datasets. As detailed by McMurray (2004), triangulation is a means to discuss and utilise multiple methods of data collection to confirm or verify conclusions related to a particular research question. It is identified that the data collected from the various methods should be complimentary in order to develop solid conclusions to the questions. Triangulation techniques can be used in a number of different ways. Firstly, investigator triangulation can occur by utilising data collected from multiple researchers, theoretical triangulation can be performed in which more than one perspective is used to interpret the data, and methodological triangulation can be used through which multiple data collection techniques are used. Finally, data triangulation can be used to merge and compare data from a number of different sources (McMurray 2004). Through identifying these factors and techniques of triangulation, it is understood that the triangulation within this research is to be conducted through means of data triangulation, as this research utilises multiple data sources to contribute to the studies findings.

3.4 Methodological Process

The study follows a systematic process, initiating the line of enquiry with a review of the literature depicted in a previous chapter of this thesis. Following this, the literature review uncovers a series of research gaps that require further investigation. These research gaps form the basis for research questions and hypotheses detailed in the respective section of this thesis, aiming to contribute to the body of literature in the fields of innovation, social innovation and open innovation. The subsequent methodological process that aims to answer these questions combines both qualitative and quantitative studies. Firstly, two cases are analysed to determine a better understanding of the patterns in the success factors by observing the cases. Following each of these cases, surveys are ran to collect data from the innovators themselves on what the perceived success factors and trade-offs are between online and offline social innovation competitions. One example is of a survey that is run following an offline social innovation event, taking place at CERN in Switzerland in early October of 2015. This method gathers the ratings and perceptions and practices of offline innovators in order to contribute to a more informed understanding of offline social innovation competitions. Similarly, an online social innovation competition is conducted through a crowdsourcing platform, gathering data from a series of online innovators. Finally, a Delphi study is conducted with a set of industry experts, innovation competition organisers and managers to gather the final set of data to contribute to answering the research questions. Gathering data from all these datasets enables the research to follow an exploratory understanding of the success factors in social innovation competitions and combine quantitative and qualitative data to determine patterns and postulate theories of best design practices for future social innovation competitions.

Table 1 shows the datasets collected throughout this study and the respective questions applied to each method.

Dataset	**Data Form**
The PORT case study and survey	Quantitative and Qualitative
Microworkers case study and survey	Quantitative and Qualitative
Delphi Study	Quantitative and Qualitative

Table 1 Datasets Used in Methodology

3.5 Research Design and Methods

As previously detailed, the studies within this research are performed primarily to collect mixed method data based upon the perceptions of innovators' (offline and online) and experts in social innovation competitions. The three primary studies are conducted from a number of different perspectives, with the PORT respondent group contextualising the perceptions of innovators in an offline social innovation setting, Microworker respondent group constituting the perceptions of innovators combating social challenges in an online setting, and opinions of experts and organisers of similar innovation challenges, collected through the Delphi Study. Triangulating the three perspectives, within an inductive pragmatic approach, will enable conclusions to be drawn with regards to better understanding what the success factors are whether the Web affects these success factors.

3.5.1 Literature Review

As shown in the previous chapter, a review of the literature is performed to justify the direction of the research and extract particular themes that require further analysis in this research. Namely, the factors utilised in the subsequent research methods are extracted from the literature review and used for analysis (e.g. Table 2).

3.5.2 Offline Social Innovation Competition Case: the PORT

Surveys are detailed as being able to provide statistical estimations of the characteristics and perspectives of a given population within a predefined topic area (Fowler 2013). It is understood that the sample, those who were invited to respond, are representative of the overall population on that particular topic. The PORT case study was conducted following an offline social innovation competition aiming to tackle challenges on social and health issues. This social innovation competition was operated by and located at the European Organisation for Nuclear Research (CERN) and co-located at Campus Biotech, both in Geneva, Switzerland. This event was chosen as it met the requirements for having a social objective, based within an offline innovation competition format. The survey was conducted following

the innovation competition as a number of respondents had not previously been involved in such events, and thus would not be able to provide insight into the presented questions. A mixed methods design was chosen due to the amount of innovators within the social innovation competition, representing the sample frame, as it was deemed as infeasible to collect solely qualitative data on that size sample frame (N = 112), and also that qualitative data supported the reasoning behind the perceptions of the respondents. The location and event chosen potentially affected the population of the survey, reducing it to the size detailed above. This small population/sample frame may potentially limit the representativeness of the results. Nevertheless, due to the very specific requirements of the study in needing to have a short-term, offline social innovation competition, it is understood that there would be a limited number of innovation practices of this type and format. Even so, representativeness of the data is analysed through obtaining the p significance level.

As detailed in (Fowler 2013), survey answers can be placed into two separate categories: objective facts and subjective states. Such objective facts can be associated with a respondents' identity such as their demographic profile, and subjective states refer to ratings and views of respondents within the dataset. The questions utilised in this survey depict a combination of both question types. As such, innovators were asked a series of demographic questions relating to their job/role, their years of experience within similar innovation competitions/competitions, and what industry sector they work or research in. Following this, a series of Likert-scale, and success/failure questions are asked to the respondent to gather data on their experiences in social innovation competitions in general, and the one they had just participated in. The survey also presents questions to the respondent group on the success factors, in order to gain a better understanding of the offline perspective on these elements of the research. A number of comparative questions are asked to the respondent group that depict ratings of online and offline social innovation competitions from the perspective of the offline innovators. It may also be noted that surveys are not without their limitations. For instance, surveys rely upon participant memory of the event, clear and unbiased responses, and can induce tedium (Fowler 2013). This inevitably may affect the reliability of the responses to the survey dataset, and as such, the surveys were kept succinct and simplistic in order to alleviate these potential pitfalls.

3.5.3 Online Social Innovation Competition Case: Microworkers

In order to triangulate the data amongst the various respondent groups, comparable questions were asked to the online innovators in this method. This method comprised of two stages: the Microworkers social innovation competition case, and the Online Innovator Survey. Each component of this method was deemed as integral to the development of this method due to its complexity, and as such a breakdown of each stage is presented below.

3.5.3.1 Microworkers social innovation competition case (Innovation Experiment)

The competitions itself was run on a crowdsourcing system named www.microworkers.com to encourage a large influx of innovators in a short space of time. This system also enabled the researcher to direct all innovators to the follow-up survey detailed below. Alternative crowdsourcing systems such as Crowd Flower and Amazon Mechanical Turk were reviewed but not used due to their comparative complexity. It was prescribed that each participant within the online and offline studies would have at least acted as an innovator in at least one social innovation competition; a requirement that was met. More details regarding how the experiment was conducted is provided in the studies further in this thesis.

3.5.3.2 Microworkers social innovation competition case (Survey)

In order to complete this method, an online survey, through the iSurvey system, was conducted following the innovation experiment. This survey asks the online innovator respondent group a set of questions aligned with those that are asked of the offline innovators.

3.5.4 Expert Delphi Study

The third study in the methodology is a Delphi Study focusing on the perceptions and ratings of industry experts and academics that have researched and/or conducted innovation, social

innovation or open innovation for at least three years prior. The Delphi Study is detailed as being a method through which expert opinions are collected and converged to form the theories of specific real-world issues (Hsu & Sandford 2007). Developed by Dalkey & Helmer (1963) at the RAND Corporation in the 1950s, the Delphi study maintains the ability to build a consensus of 'expert knowledge' (Miller 2006). Furthermore, a Delphi study alleviates some biases (e.g. noise, dominant individuals, group pressure) in polling opinions, as each participant remains anonymous to each other and to the researcher (Dalkey et al. 1969).

Delbecq et al. (1975) detail that the Delphi study is primarily used for understanding any number of five key objectives:

1) *To determine or develop a range of possible program alternatives;*
2) *To explore or expose underlying assumptions or information leading to different judgements;*
3) *To seek out information which may generate a consensus on the part of the respondent group;*
4) *To correlate informed judgements on a topic spanning a wide range of disciplines, and;*
5) *To educate the respondent group as to the diverse and interrelated aspects of the topic.*

Hsu & Sandford (2007) state that the Delphi study can be formed utilising a sequence of 'rounds' each with their own purpose that provides the basis for the succeeding round. (Graham 2003) adds that items or variables may be dropped or added into each subsequent round, constituting an iterative process learning from the data of the previous round. The design of this method was modified from Hsu & Sandford's (2007) four-round design:

Round 1: Open-ended based upon factors of the literature

Round 2: Using importance rankings to enrich the data of the first survey

Round 3: Participants may be asked to revise their inputs and produce qualitative data to contextualise their answers

Round 4: Provides a summary of all data and asks the participants to comment on it

The structure of the study is based upon the guidelines of the initial four-phase process noted by Hsu & Sandford (2007) so as to ensure that consensuses are developed in multiple variables. Nevertheless, there will be some operational changes that fit more with the aims of this research. Firstly, the number of rounds within this study is limited to three, due to the

potential implications with participant attrition that occurs as a result of an increased number of rounds (Mullen 2003), and furthermore, the possibility for combining Round 3 and 4 to shorten the overall procedure, and reduce participant attrition; a potential pitfall of the Delphi method. Supporting this decision, Brooks (1978) notes that three rounds are usually enough to develop and validate a series of consensuses. Secondly, those variables that do not reach a minimum of 60% (weak) and 70% (strong) (Green 1982) agreement among participants will be discarded from the subsequent rounds, and others will be introduced according to the textual responses of the participants (Graham 2003). This is in order to focus the degree of analysis on the remaining variables and note test any further variables that the experts deem as important. Finally, consensus data from the previous round will be provided at the end of the survey so as to avoid the potential 'social pressure' biases detailed by Zolingen & Klaassen (2003) in a critical analysis of Delphi studies. The above design techniques within this method enable the researcher to investigate the reliability of consensuses over time, performing consensus change analyses on opinions of experts.

The three surveys, in the Delphi method, utilised experts within given area of social innovation in order to aggregate the viewpoints of only those knowledgeable about the related topic(s). The three rounds were carried-out as follows: 1) creation of consensuses on the success factors, and 2) testing of consensuses and rankings of importance of remaining success factors, and 3) perform longitudinal consensus change analyses and gather qualitative contexts on the success factors. The variables were tested from numerous perspectives, namely appropriateness, usefulness, agreement, and importance where applicable. As such, each variable was tested utilising five-point Likert scale judgments of the aforementioned perspective criteria. For example, importance criteria options were tested on a scale as follows: 1.'Not Important', 2.'Of little Importance', 3.'Moderately Important', 4.'Important', and 5.'Very Important'. Five-point Likert scales were used in order to collect the degree and strength of agreement among participants. Only those responses that achieved point 4 or 5 were considered as contributing to the consensus of agreement in favour. This avoided including those respondents' answers that were either uncertain of their position (point 3) or disagreed with the statements (points 2 and 1 ('strongly disagree' and 'disagree')). These were not reviewed because the research is centred around the success factors and not those that are not perceived as such. Of those that received points 4 and 5, only those variables that achieved a minimum of 60% agreement (the weak threshold) were retested in the subsequent round from an alternative perspective. As such, the three-round Delphi study enabled variables to be tested and retested for validity and reliability throughout each of the rounds, rather than only at the completion of the method.

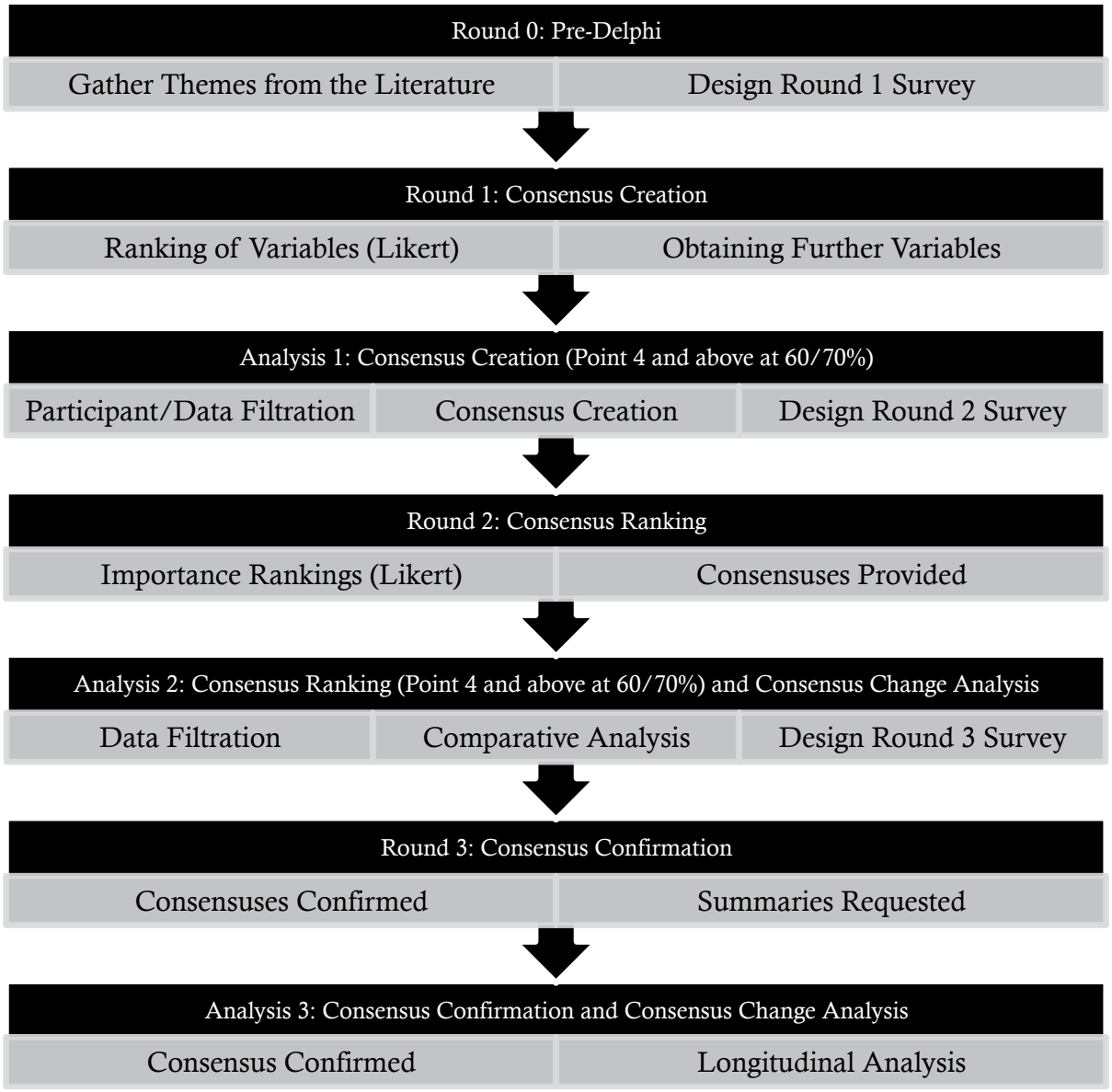

Figure 1 Delphi Study Process

3.6 Triangulation Application

Following the pragmatic approach it is understood that triangulation is necessary to draw holistic conclusions from the data collected. Prior to the overall triangulation method in each of the studies (applied to each research question), individual analyses of the data are performed on the statistical significance and reliability of the data. These statistical tests are performed on the survey data, with the Expert Delphi study being subject to consensus stability and change analyses, as detailed in the Delphi literature. In summary, the triangulation method enables an additional layer of analyses to be conducted across each of the respondent groups and their respective datasets, strengthening the conclusions from each individual study.

3.7 Methodological Limitations

As is evident in all research, the methodology is not without its limitations. Firstly, it is understood that although the social innovation competitions conducted as part of the methodology are comparable in nature, they do not exactly match each other with regards to the population size and the amount of social challenges being presented. The difference in population size indeed created comparably different sample frames across the two innovator experiments. Nevertheless, the samples remained consistent across the two methods, even with this difference in population and sample frame. With regards to the amount of challenges being presented it may be notable that a comparative increase in social challenges dilutes the outcome of the social innovation competition. However, as all challenges were presented with a social output, it was understood that they were comparable within the studies in this research. It is notable that the two sets of innovators were presented with social innovation competitions, of their respective type, and surveys afterwards. In comparison, the experts were presented with an Expert Delphi Study. This may present a limitation in the data in that all 3 stakeholders were not questioned using the same method. However, one may note that experts and managers cannot be placed within a social innovation competition prior to the data collection because that would then turn them into innovators. Furthermore, the very limited population size of experts in this field, and obtaining responses from this demographic is highly challenging. Although, the first survey in the Delphi reached the minimum sample size requirement for a survey, as noted by Field (2013), this alternative method was sought to

extend this sample size, and therefore the Expert Delphi study was used. Although, the Delphi study does not present the same statistical significance as the other methods it does enable convergences of opinion and thus conclusions to be drawn. For the purposes of this research, it is appropriate and aligned with the inductive approach.

3.8 Ethical Considerations

One may determine that the studies presented within this methodology are largely ethical due to anonymity that remains throughout. Nevertheless, some other ethical considerations are required in order to ensure that participants within the studies' are not subject to deception, misleading or false information. Each of the participants' within the studies are informed of the overall agenda of the research prior to them taking part in the study and were made aware that their participation is voluntary. Furthermore, they are provided with the option to withdraw their participation, or resulting data, at any time prior to, during or following the closing of the study. Providing such options is inevitably important so as to avoid any infringements on privacy or other related impacts. In line with the requirements of research, the ethics committee of the University of Southampton accepted that all studies within this research adhered to the ethical requirements of doctoral research.

3.9 Methodological Summary

This chapter included the details of the methodology, the philosophical and methodological approaches conducted within, the research design that is followed, the methods that are performed and the respective research questions each method relates to. It detailed the justifications for each of the methodological decisions and the literature to define each of the particular concepts, in order to provide further theoretical grounding to the research process. Consequently, each method is detailed in turn with a description on how it relates to the overall methodology, what role it plays in the development of responses to the research questions, and how it relates to other methods within the methodology. Additional details about how each method was conducted, the samples, the data collection techniques, and analyses are provided in chapter 4 of this document. In summary, the methodology chapter detailed above provides all key information regarding the research, providing a justification, context and scope for the studies that were conducted.

4 Cases of Social Innovation Competitions

4.1 Introduction

This chapter outlines the two cases that are studied in this doctoral study, namely the PORT social innovation competition and the Microworkers online social innovation competition. Supporting these cases, data is collected from an Expert Delphi study, whereby opinions of experts in social and open innovation are taken and compared against the perspectives of the individuals within each case. The primary focus of this chapter is to describe and analyse the cases in detail, combining the descriptions of the cases with analyses from various statistical tests. This produces a mixed methodology in that cases are examined for their qualitative merit and distinction, and numerical data is collected from surveys conducted during the cases to add supporting quantitative data. Combining the two sets of data enables the research in the thesis to draw more insightful conclusions into the success factors of social innovation competitions in an online and offline environment.

4.1.1 Background and Justification

The sheer diversity and multiplicity of the Web, arguably, has led to the increasing maturity of both innovation, and how it supports the development of international business and the economy. Building upon this statement, it is widely claimed that the Web facilitates the production and maintenance of a series of networks associated with innovation that revolutionise collaboration, maximise innovation velocity and increase innovation quality. It is also noted that that the Web has facilitated a plethora of innovations through Open Innovation processes (Chesbrough et al. 2006). Prandelli et al. (2006) also add that the Web has the ability to create new opportunities for consumer integration, and appears to contribute to the rapidly increasing diversity and level of innovation. Although this may the case in some instances, this claim is stated based upon the assumptions that the Web provides these inbuilt

capabilities and that innovators have preference within these types of innovation scenarios. However, it should be noted that utilising the Web for such innovation practices requires a certain level of digital literacies, such as Internet literacy, hyper-literacy and information literacy (Bawden 2001), in order to innovate effectively, but also a reliance upon the technology itself in being fully operational. It may be noted that such 'digital literacies' are not required in particular offline scenarios, due to a decreased reliance on digital tools and technologies.

Fichter (2009) notifies the concept that innovation competitions' successes are based upon the prominence of the communities and lead users in creating, shaping and developing innovations both within the system and externally. This suggests that it is the collaborative nature of communities and the leadership of individuals within these respective groups that contribute to successful innovation practices, suggesting that the Web-based social innovation competitions are more effective because of the scale of community that can be developed around the innovation competition. This factor is mirrored in much of the collective intelligence literature that details the idea that collaborative teams can cover many aspects of the innovation through a collective vision enabled by collaborative tools, (e.g. the Web) (Paulus & Nijstad 2003; Carbone et al. 2012). Such innovation marketplaces and intermediaries provide a platform to which such a collective vision can be leveraged more effectively through learning processes, transaction mechanisms and communication tools (Hossain 2012). Abiding by this notion, Antikainen et al. (2010) adds that collaborative communities tend to output more market applicable, appropriable and complete innovations. However, Boudreau & Lakhani (2012) note however that such large-scale community-based collaborative networks are somewhat difficult to manage, due to the inability to produce a structure, and motivate personnel, through which innovation can flourish. This may present limitations for running and managing online social innovation competitions.

It appears that the vast majority of literature advocate for the Web, noting it as a more effective platform for leveraging innovation. Nevertheless, little is done with regards to whether there are compromises and gains associated with running an online social innovation competition as opposed to an offline competition, and vice versa. As such, two cases are analysed in order to better understand the success factors of social innovation competitions and how they differ online and offline. This comparison is drawn from data collected from two cases: the PORT social innovation competition in CERN (Offline Innovation Experiment), and an online social innovation competition operated through Microworkers (Online Innovation Experiment). Comparisons are drawn between the two cases, and data is also merged to uncover alignments in the responses to the surveys between the respondent groups.

4.1.2 Defining Social Innovation Competitions

In order to better justify the reasoning behind the case choices, it is first understood that defining social innovation competitions is required. Although, the definition of social innovation appears to be identified in the literature as rather fluid, complex and constituting of many social and qualitative elements that limit ones ability to determine the concept definitively. Nevertheless, as a result of a review of the literature, it is widely recognised as the necessary function for the development of humanity through the production of social goods and products that affect the status quo (McKeown 2008; Pol & Ville 2009; Young 2011). Baregheh et al. (2009) add that the definition is bound by social contexts, means, stages, types and the aims of the overall innovation, demonstrating that innovation is contextual, subjective and not discipline-specific. This suggests that innovation as a wider concept has difficulties in this form, due to the variability of processes, practices, and outputs of innovation. Along this line of theory, this chapter understands that social innovation can be defined as it is already placed within the necessary 'social' context. This chapter extends the preliminary theoretical viewpoints of social innovation from the literature to an understanding of social innovation competitions, and furthermore how such practices can be measured.

Goswami & Mathew (2005) claim that the lack of definition of innovation, and indeed social innovation, is largely due to the fundamental absence of meaningful measurement techniques, justifying this study. Even so it is detailed in the literature review, innovation, in many areas, is immensely difficult to quantify, due to its nature of combining a variety of social and quantitative factors (Smith 2005). Furthermore, methods to measure such outputs become necessarily complex or out-dated (McAdam & Keogh 2004) due to changes in the macro and micro environments that reduce the requirement for certain measurement practices and increase the requirement for others. As such, specific metrics remain outside of the scope of this thesis, as they are heavily context-dependent and subjective, even more specifically within social innovation. In accordance with the requirement of success factors, however, West et al. (2014) notes that there is a sincere lack of novel measurement methods for the quantifying of innovation practices and outputs, lacking in a benchmark for establishing the success factors of the innovation competition. Even so, it appears that there is a wide array of sectors in which innovation can be measured, whether by output, management processes (Adams et al. 2006), effectiveness or production (Guan & Chen 2010). Thus, it is notable that the definition and measurement practices within the social context are determined under the innovation competitions format.

Innovation competitions, with regards to the literature, are detailed as being time-finite, enabling empirical research to be conducted in a timely fashion, with speed and efficiency (Bullinger & Neyer 2010). As such, they can be conducted in an online or offline environment, being adaptable to the objectives of the research and the researcher (Hallerstede & Bullinger 2010). In this format, a wide range of innovation outputs can be collected such as innovation concepts, ideas, sketches, prototypes, elaborated concepts and fully functional solutions depending upon the length of the innovation competition (Ebner et al. 2009). With this variability in outputs, one may suggest that the complexity of measurement practices is increased: outputs are not necessarily comparable. Antikainen & Vaataja (2010) add that innovation competitions support communities of innovators to source and develop their own rewards, through fame, altruism, increased knowledge or reputation in any given network: they are not provided with rewards, whether pecuniary or non-pecuniary. Combining the understanding of social innovation, as a means through which to develop social products or services (Pol & Ville 2009), and the format of innovation competitions, it is understood that social contexts and means are determined prior to the performance of this study. As a result, a set of core success factors can be established to better determine social innovation competitions and provide an initial understanding of their success. With this understanding, the study detailed in this chapter firstly, contextualises social innovation, not only in developing social products and services etc., but also with regards to its application in innovation competitions, determined here, and throughout this thesis, as social innovation competitions.

4.1.3 Success Factors of Social Innovation Competitions

It is understood that there is a requirement for a core set of agreed success factors to determine the success of a social innovation competition – agreement in this section is determined through statistical analyses of data from the three respective respondent groups. Such a core set of success factors could have implications for how social innovation competitions are managed in an online and offline environment for the foreseeable future. Furthermore, providing a key set of success factors enables the subsequent studies in this thesis to be provided with a foundation for postulating what other aspects will affect the core factors. As such, this chapter provides details of a study conducted regarding how the primary stakeholders (online innovators, offline innovators and organisers/management (deemed in this study as Experts)) may determine the success of a social innovation competition. In order to gather the data across these three key stakeholders, three separate methods are utilised.

These methods consist of two case studies and an Expert Delphi Study. The first is study of the PORT social innovation competition from the perspectives of the offline innovators, and the second is a study of the social innovation competition ran through microworkers, representing the online innovators' perspectives on the success factors. Finally, the Delphi study represents the expert/organiser stakeholder opinions on success factors. Combining the data from all three methods enables agreements to be noted across all respective stakeholder groups, and subsequent conclusions to be drawn with regards to the success factors of social innovation competitions.

It is understood that it is vital that certain success factors are justified in their inclusion within this study. Through conducting the literature review above, a series of practitioner and academic papers were reviewed to source and test the success factors. Combining conclusions from academic theory and practical application, in similar scenarios, one may suggest that the results of this study will indeed be applicable to a wider set of stakeholders. The tested success factors, and their respective source(s) are detailed in Table 2.

Success factor	**Source**
Novelty	(Nieto & Santamaría 2007)
Quality	(Lanjouw & Schankerman 1999)
Quantity	Morris and InnovationLabs, *Innovation Success factors*.
Volume	(Cohen & Levinthal 1990)
Response to Call	Morris and InnovationLabs, *Innovation Success factors*. (Cohen & Levinthal 1990)
Value	(Adams et al. 2006)
Input	Morris and InnovationLabs, *Innovation Success factors*. (Reinganum 1989)
Output	Morris and InnovationLabs, *Innovation Success factors*. (Adams et al. 2006) (Davila et al. 2013)
Process	Morris and InnovationLabs, *Innovation Success factors*. (Guan & Chen 2010)
Profitability	(Guan & Chen 2012) (Rogers 1998)
Scalability	Morris and InnovationLabs, *Innovation Success factors*. (Rogers 2010)
Collaboration Potential	(Ya & Rui 2006)

Social Impact	(McLoughlin et al. 2009) (Hall & Martin 2005)
Production Time	(Guan & Chen 2012)
Risk	(Howell & Higgins 1990b)
Source	(Morris & InnovationLabs 2008)
Quantity of Beneficiaries	(Hall & Martin 2005)
Return On Investment	Morris and InnovationLabs, *Innovation Success factors*.
Sales	(Morris & InnovationLabs 2008)
Market Impact	(Chesbrough 2003a) (Rogers 1962)
Disruption	Delphi study round 1
Licensing Revenues	Delphi study round 1

Table 2 Success factors Being Tested and Sources

4.1.4 Summary of the Cases

Two cases were used to collect the data for this study in order to add insight into the success factors associated with online and offline social innovation competitions, and whether each type of competition has compromises and gains associated with that specific type. The first case is an offline social innovation competition ran by the PORT at CERN and Campus Biotech in Switzerland. Meanwhile the second case analysed in this thesis is the Microworkers online social innovation competition ran through the microworkers system. Each of the cases were focused primarily upon social and health-based challenges, which supported the comparison of results. Each case consists of qualitative analyses of the success factors within them, followed by surveys conducted following each case. This enables the research detailed in this thesis to draw upon both observations in the case studies and numerical data gathered from the surveys. The mixed methods approach lends itself to further comprehension of this unchartered area of study. Both social innovation competitions and surveys were conducted over a period of 2 months between 1st October 2015 and 30th November 2015. The surveys presented were of a similar format and structure asking alike questions to the participants based upon their experiences with online and offline social innovation competitions, and some demographic data in order to provide comparisons between groups of different categories and

experiences. The offline and online innovators were presented with a very similar structured survey in order for data to be collected and analysed accordingly using statistical tests.

4.2 The PORT Offline Social Innovation Competition

4.2.1 Background and Justification

The offline social innovation competition was conducted at the PORT, located at CERN and Campus Biotech in Switzerland, which occurred between the 2nd and 4th of October 2015. This event included 13 teams of between 8 and 12 members, in each team, innovating for a period of 2 days over the given time period previously mentioned. The innovators were asked ahead of the competition to submit their primary and secondary areas of expertise. There was a large range of choice, ranging from marketing to robotics engineering, all of which were equally valued in the innovation process. Ahead of the event, the teams were separated according to their noted expertise and specialism in a given field and placed into a group dedicated and focused on a specific challenge. Notification of which group each innovator would be in was disseminated 2 weeks before the event took place in CERN, enabling the innovators 2 weeks to discuss, research and plan their innovation ideas ahead of attending the event. Communication in advance of the event took place via online means such as Facebook, Skype and Whatsapp with discussions formulating around researching the specific topic that they are focused upon. Examples of topics were navigation in hospitals, visualising poverty data, and cost-effective shelter solutions for refugee camps to name a few.

Prior to the event taking place, each team was set a task by an honorary expert team member, who provided specific insight into the challenge, both previous to and during the event. This person was deemed a key player in that particular topic and provided the necessary insights into the challenge and reasoning behind it. They were also working in the organisation that was looking to benefit from the innovation outputs.

During the course of the two days, innovators were able to work around the clock to ensure that the innovation prototype, blueprint, or general idea was better formalised. There was no expectation for the quality, depth or type of innovation output that came out of the social

innovation competition, but a large quantity of the groups produced prototypes of their ideas within the 48 hour window. At the end of the 48 hours, innovation ideas were presented to the rest of the teams and organisers of the event following the days' of innovation. A winning team was chosen by a panel of judges working for the PORT at CERN and presented with a small cash prize. Following this, an online survey was sent to all participants of the PORT in order to collect some supporting quantitative data for this study. This was completed in order to collect perceptions and experiences of innovators in an offline social innovation competition. The survey was conducted online through the iSurvey system, which enables the collection of all data in a datasheet for analysis at a later date.

The PORT at CERN social innovation competition was chosen primarily because of the access the researcher had to the data, as he became one of the organisers, and the idea that the topics were heavily targeted towards health and social challenges – of which is the primary challenge focus of this thesis. Nevertheless, there were alternative choices that could have been made. For example, the European Social Innovation Competition could have been used as a case, however the sheer scale of the competition in terms of geographic spread would not make it feasible to study the case in great detail or collect valuable data. In essence, the ability to collect the data at the social innovation competition at CERN, and to observe the group activities during the course of the competition enabled more useful data to be collected.

Although the innovations outputted form the competitions tended to be of high quality, it was noted that there was a relatively low yield. This seemed to emerge from their being a low level attendance at the event (121) and only a handful of teams collaborating to create the innovations. This indeed may present a problem that unless the innovation is ideal for the organisation it is being created for, the 'benefitting' organisation will not necessarily receive any benefit. Having only 1 innovation idea to tackle an issue appears to restrict the potential for the benefitting organisation to actually tackle the issue they have internally. As such, the survey data collected across both studies reflects this potential issue and align with the observations made at the event.

4.2.2 Recruitment, Samples and Data Collection

This study initiated the line of enquiry utilising a respondent group whom previously participated in the offline social innovation competition. This respondent group represented the dataset of the PORT case study. The PORT social innovation competition advertised

online to students, affiliated organisations, and partner companies using a mixture of digital and traditional advertising. This supported the recruitment of the innovators to the social innovation competition. This meant that there was a total of 121 innovators whom attended the event in person. Some innovators had been accepted to the competition, but were not able to attend for those few days. All participants were selected to participate in the study, as each individual from the offline social innovation competition met the requirement of previously participating in an offline social innovation competition. Participants were invited by the iSurvey system, which enables researchers' to send invitations and track responses anonymously. All those that responded to the survey were selected due to the restrictive nature of the sample frame (N=121). The total invitations sent through the iSurvey system totalled 121, representing the sample frame of this study. Subsequently, a total of 70 (above the recommended minimum requirement to constitute a large sample (Field 2013)) innovators responded to the survey, constituting a respondent rate of 57.85%. This method was used, as the event constituted a wide range of demographics within the sample frame and the event was relatively large for an event of this type.

4.2.3 Participant Demography

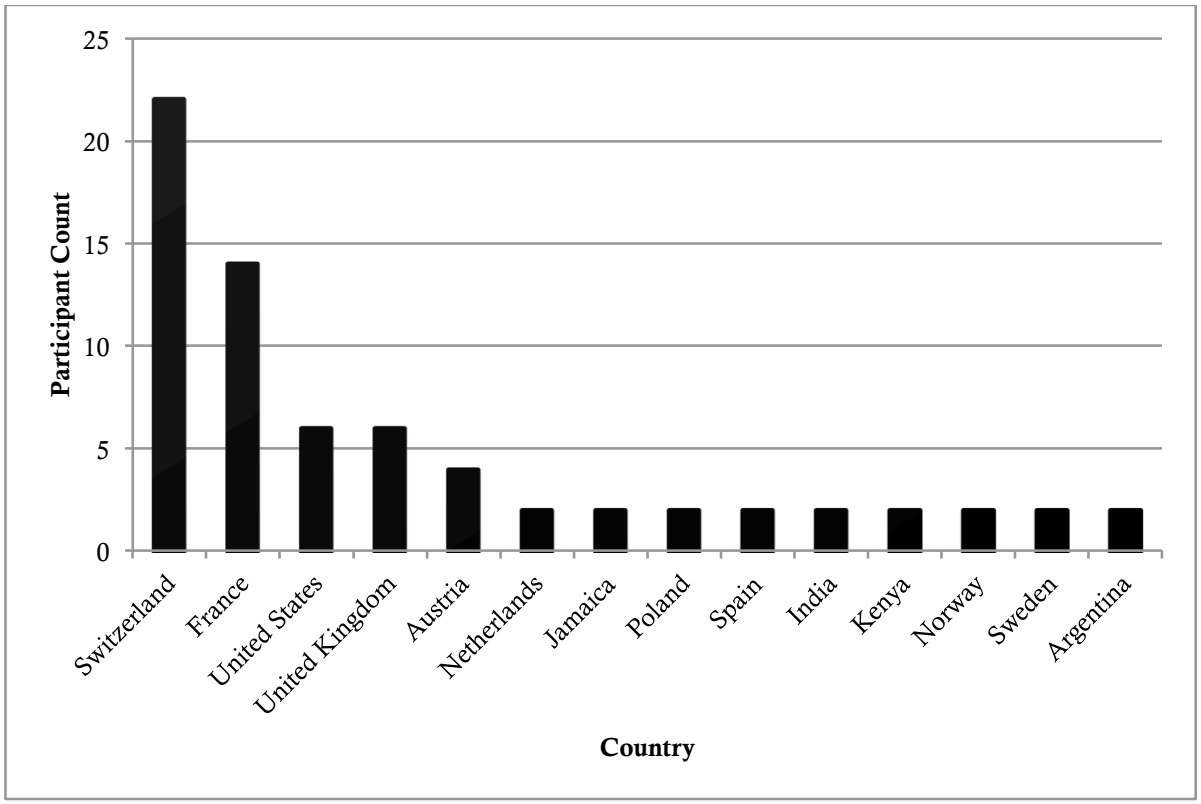

Figure 2 Geographic Spread of Offline Innovators

It is notable that the majority of respondents from the offline social innovation competition were located in Switzerland (31.42% (N = 22)) and France (20% (N = 14)). This is primarily due to the location of the event and the hosting institutions of CERN and Campus Biotech, both being located in Geneva, Switzerland, and also CERN being located partly in France, which is where the majority of participants worked. Nevertheless, the respondent group represents a wide range of countries spanning 5 continents, including Africa, Asia, Europe, North America, and South America. Even so, it must be stated that 56/70 (80%)) of all participants resided in Europe at the time of data collection. Nevertheless, 20% (N = 14) of respondents noted that they reside outside of Europe, namely Asia, South America, North America and Africa, representing a wide set of demographic data within the respondent group.

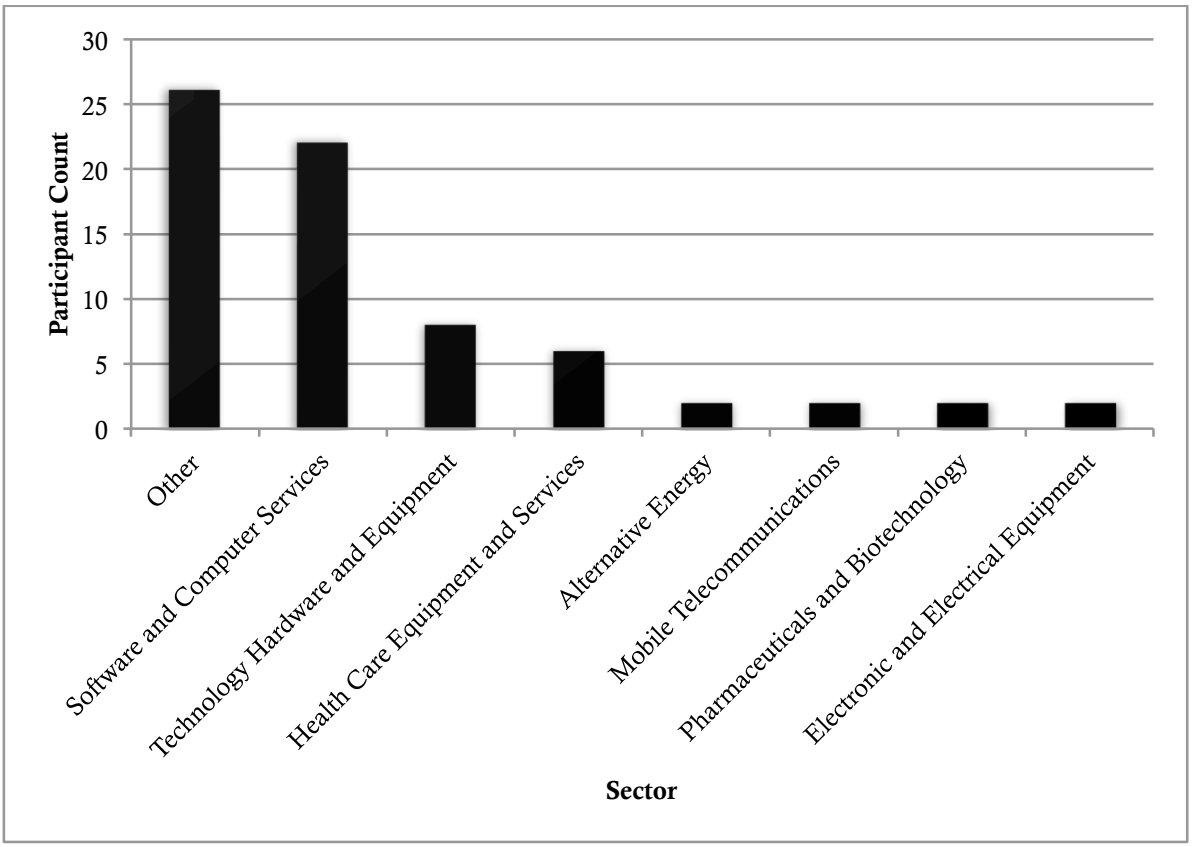

Figure 3 Sector Spread of Offline Innovators

The respondent group also spanned a wide array of industry sectors with the majority of respondents being in "Other" (37.41% (N = 26)) or "Software and Computer Services" (31.42% (N = 22)). However, other notable industry sectors included technology and engineering based industries, and health-related industries. It was understood that these industry sectors would uphold the majority due to the nature and topic of the offline social innovation competition, being focused on solving health and social related challenges with software and/or hardware based innovations. It is also understood that these particular industries are covered due to the nature of the job roles of participants as identified in Figure 4.

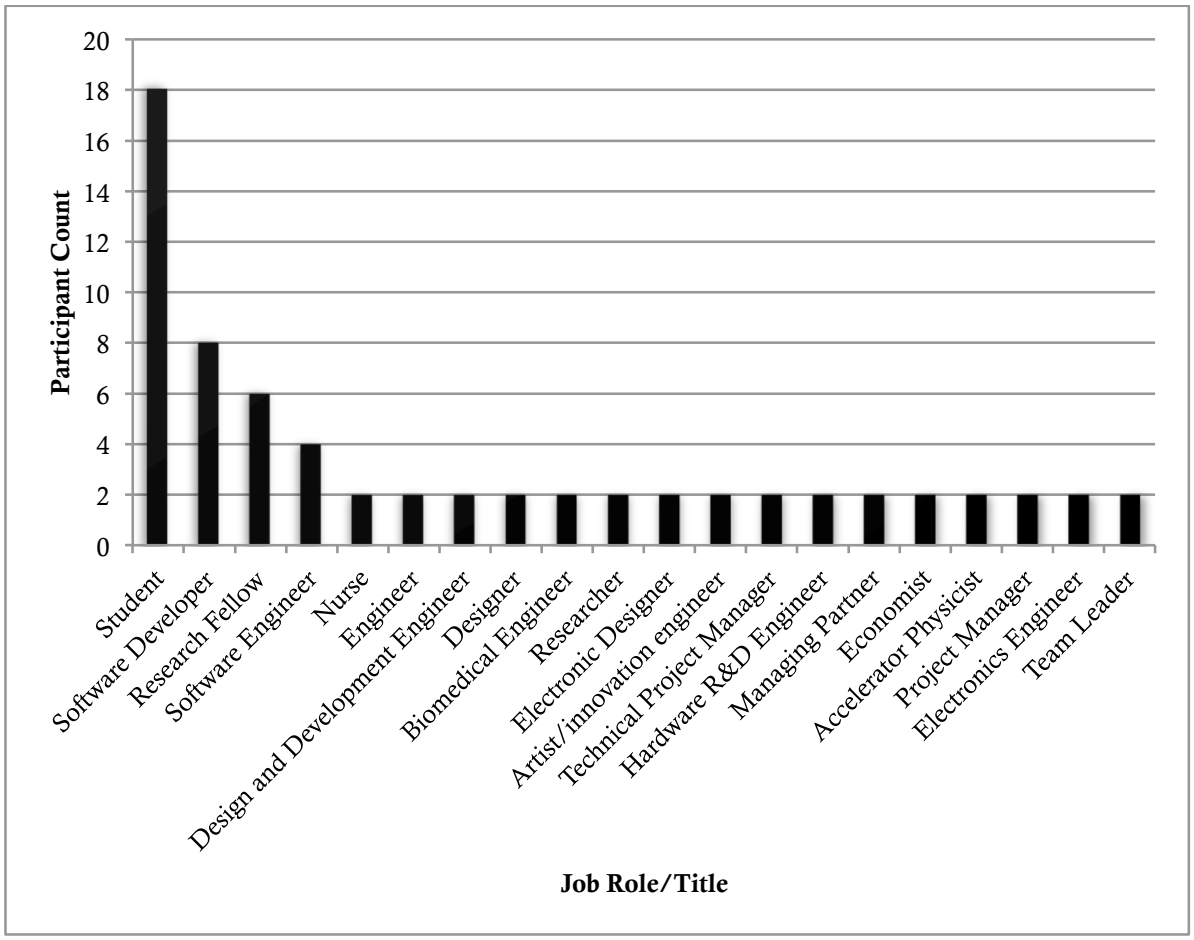

Figure 4 Job Roles/Titles of Offline Innovators

A wide range of job roles was also represented in the dataset, with Student representing 25.71% (N = 18) of the sample. The majority being students may be due to the fact that the PORT was advertised, primarily through academic and research channels available to the organisers. Even so, a wide range of job roles is representative within the dataset. For instance, a number of participants attributed themselves to being an engineer, being a health practitioner, or a businessperson. This also is due to the design of the social innovation competition, and indeed the interdisciplinary nature of the challenges being presented.

4.2.4 Success Factors

The survey schedule, shown in Appendices, was sent to all participants who participated in the offline social innovation competition. The group was asked the following question:

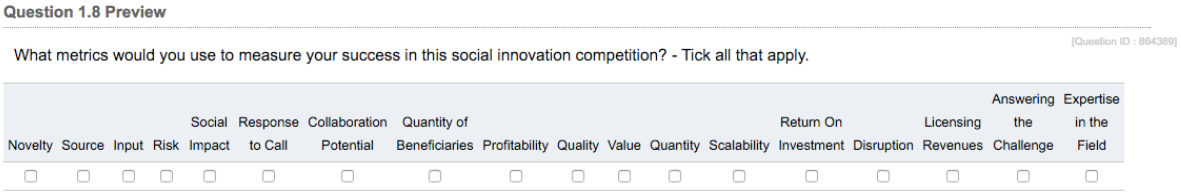

Figure 5 Offline Innovator Success factor Question

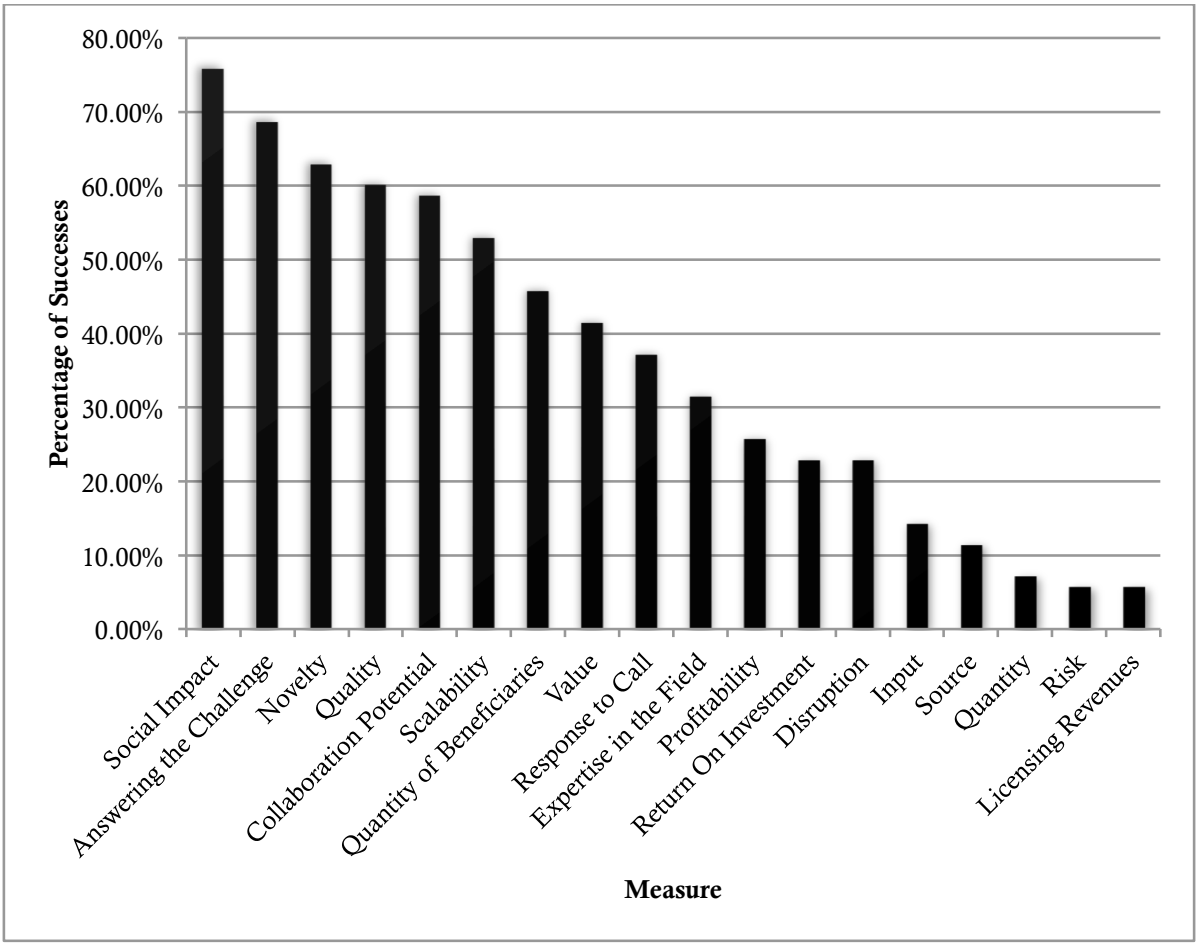

Figure 6 Offline Innovator Success factor Successes by Percentage

Figure 6 shows that Social Impact was the most utilised Success factor amongst the two questions in this respondent group, at 75% of the total sample. Other success factors with both responses appearing above a 50% agreement level were Answering the Challenge (68%), Novelty (63%), Quality (60%), Collaboration Potential (59%), and Scalability (53%). Thus, it is perceived that; collaboration, output feasibility and social impact are important factors in the success of social innovation competitions. The particular measurement methods of each of these aforementioned success factors are detailed in the Success Factors of Social Innovation Competitions section of this paper. Surprisingly, the Quantity of innovations was not detailed as an important Success factor receiving only 7.1%. Unsurprisingly however Return on Investment and Profitability were both deemed as unimportant success factors of an innovation sourced from a social innovation competition. This appears as unsurprising as it is widely identified that social innovation and open social innovation practices should refrain from profit-making activities and focus primarily on the social impact of the innovation in question (Chesbrough et al. 2014).

The survey schedule depicted in Appendix B was sent to each of the participants of the offline social innovation competition. It has been observed that the offline respondent group noted a general higher rating of offline social innovation competitions in response to Figure 7.

Question 1.15 Preview

Which type of hackathon/innovation competition do you think enables...:

	Offline	Same	Online
Q15.1 More Useful Collaboration Methods	○	○	○
Q15.2 Increased Ability to Collaborate	○	○	○
Q15.3 More Scalability (More Participants)	○	○	○
Q15.4 More Scalability (More Innovations)	○	○	○
Q15.5 Higher Quality Innovations	○	○	○
Q15.6 Better Idea Feasibility	○	○	○
Q15.7 Better Social Impact	○	○	○
Q15.8 Faster Innovation Production	○	○	○
Q15.9 Faster Innovation Receipt	○	○	○
Q15.10 More Innovation Responses	○	○	○
Q15.11 Higher Risk	○	○	○
Q15.12 More Potential to Answer the Challenge	○	○	○

Figure 7 Factors Question

Offline innovators noted offline social innovation competitions as providing Better Idea Feasibility (61%), More Collaboration Potential (59%), Better Methods of Collaboration

(57%), Higher Quality Innovations (56%), and More Potential to Answer the Challenge (51%) (See Figure 8). Furthermore, there is a distinct bias towards offline innovation competitions, this may indeed stem from the increased mean amount of years experience that the Offline Innovator respondent group has in offline (M = 3.143) than in online (M = 2.343).

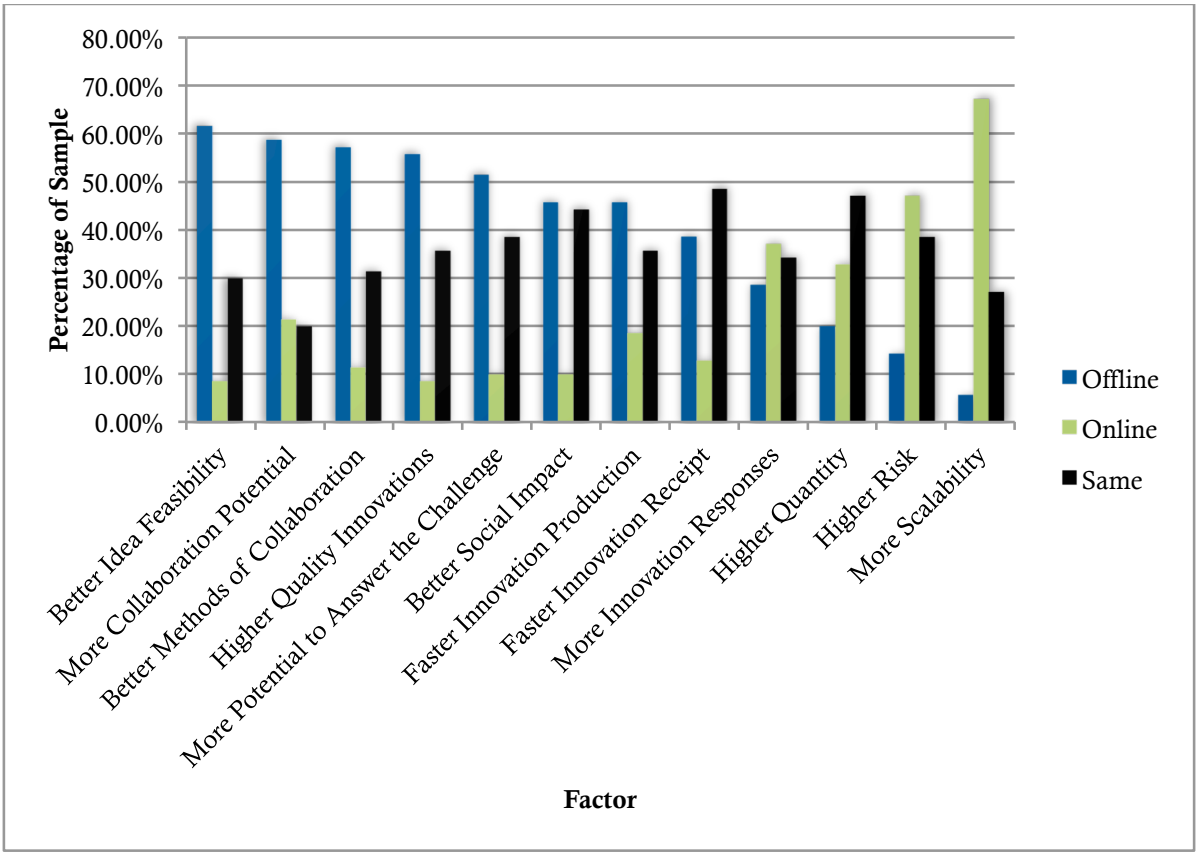

Figure 8 Offline Innovators' Factors Rating by Percentage

In support of the percentages in favour of offline social innovation competitions, it was stated that: "offline collaboration allows for more synergies and creative interactions" (Participant ID: 1586012), "offline discussions have more potential/quality" (Participant ID: 1588515), "people tend to be more active [offline]" (Participant ID: 1587457), and "Ideas comes up more easily offline, discussions naturally go on in parallel" (Participant ID: 1585675). A number of others in the respondent group suggested that online collaboration, or conducting the social innovation competition online would be stagnant, slow, difficult to collaborate, and impractical, particularly when innovating a physical item or product. This suggests that there

is a certain distinction between innovations that can emerge from online social innovation competitions as opposed to offline methods.

Although offline social innovation competitions had more gains in a higher number of factors in this study, there were a series of factors that were rated higher in online social innovation competitions. For instance, the offline innovators respondent group noted online social innovation competitions as having More Scalability (67%) and Higher Risk (47%) (See Figure 8). It was also stated that "if the solution was purely digital, it could be done online" (Participant ID: 1600569) and the "actual planned work could have been done online" (Participant ID: 1585751). This suggests that there are certain uses and applications for operating an online social innovation competition as opposed to an offline social innovation competition. Even with these notifications, there were a series of factors that were represented in the dataset as having an equal ability. This is denoted in the dataset as "Same" should a participant think that there is no discernable difference between online and offline competitions on this particular variable. Higher Quantity (47%) and Faster Innovation Receipt (49%) had Same as receiving the highest score (mode) (Figure 8). Overall it appears that the offline social innovation competition respondent group thought that offline communications are simpler and more effective, with "online communications being stale and slow" (Participant ID: 1586053). Furthermore, offline social innovation competitions provide a physical meeting event whereby innovators can collaborate more effectively, discuss ideas easier, and test physical prototypes in a real-world environment (Participant ID: 1600446, Participant ID: 1587688).

4.3 Microworker Online Social Innovation Competition

4.3.1 Background and Justification

In addition to the PORT social innovation competition case, an online case was also sought to bring about exploratory findings in understanding the success factors of online social innovation competitions. The online social innovation competition was performed utilizing a bank of innovators from www.microworkers.com, being conducted on the 15th October 2015.

This system was chosen as it could leverage innovators from all over the world to tackle specific issue in social and health that is aligned with the challenges presented in the offline social innovation competition case. The online social innovation competition ran through the Microworkers system ran for 1 day with innovators having the option to collaborate if they so wished. Nevertheless, it was noted that the collaboration somewhat lacked in the online version, whereas with the offline version collaboration was key to being productive and outputting quality results. The event only ran for 1 day because the researcher stopped the event once 70 submissions had taken place. This was so that the sample size in both cases was identical and able to be analysed statistically.

The event included a series of innovators recruited from the bank of "Best Rated Countries" within the microworkers system. Each participant was presented with a health challenge, namely "What innovations could be developed that encourage ageing populations to be more active and healthy?". This challenge was utilised based upon the focus of the *Horizon2020* call for research and innovation on this topic, and alignment with the health challenges in the PORT social innovation competition noted above. Only one challenge was chosen, as this enabled the innovators within the system to maintain focus. Providing more challenges would inevitably increase the complexity of the competition. Thus, the online innovators were asked to submit an innovation idea to tackle this challenge, select the innovation type and answer questions comparing online and offline social innovation across a number of points of reference. The www.microworkers.com platform was chosen due to its ability to gather data over a short period of time, its ability to target specific banks of innovators e.g. "Best Rated Countries", and the advantage of drawing the data out of the system. Furthermore, the www.microworkers.com platform enabled a wide spread of geographical and industrial demographics to respond to the survey, akin to those that responded to the offline survey. As with the offline social innovation competition, the online social innovation competition survey was also completed through iSurvey. This enabled the researcher to collect both datasets and store them in a secure location.

From observation of this case, it seemed that although there was a high yield of innovations outputted form the competition, they tended to be simplistic, one-line ideas about how to tackle the challenge. The did not produce prototypes or blueprints to the particular innovations, instead they provided a brief description of the innovation itself. In gathering this information, it was understood that the quality of innovations lacked in comparison to the offline version. This appeared to be as a result of a lack of urge to collaborate with other innovators and potentially the difficulty in collaborating at a distance. As such, it is understood

that the data collected form the survey following the social innovation competition may indeed provide some insight into this phenomenon.

Each of the competitions in this study were conducted without the provision of a reward. This remains in line with the structure of innovation competitions in that they are designed with the aim of collecting a series of early-stage innovation concepts and ideas, such as sketches, prototypes, elaborated concepts, and depending upon the timescale provided, fully functional solutions (Ebner et al. 2009), without a focus on reward. Furthermore, that they are deemed as being as a result of altruism or an attempt for status within the community (Bullinger & Neyer 2010), conducive to fame (Antikainen et al. 2010). The lack of provision of a reward retracts the potential for competition between innovators in the system, supporting a more collaborative and social approach to innovation. It may be noted that this is also aligned with the philanthropic notion of charity, but instead of providing funding, solutions and ideas are provided.

4.3.2 Recruitment, Samples and Data Collection

The data collection and selection process of the Microworkers social innovation competition case followed a comparable process to that of the PORT social innovation competition case detailed above. The data consists of observations of the case itself and survey respondents to collect both qualitative and quantitative data respectively. The survey sample collected utilised a probability sampling method with those responding to the survey being the representative cluster of online innovators in a similar social context. The survey was sent to all members of the "Best Rated Countries" cluster through the microworkers system. This cluster constituted a total sample frame of 5,103. This particular cluster was utilized because it allows for a wide demographic and industrial spread of respondents, akin to those from the offline social innovation competition method. Access to the survey was provided to all innovators within this cluster, and as such the number of participants recruited as part of the study were selected based upon a first-response basis. As such, a total of 71 responded to the survey within the allotted 24-hour timeframe. The low respondent rate of 1.4%, in comparison to the larger sample frame, was due to the requirement for the same sample size between the two comparable methods. This requirement is based upon reducing the biases associated potentially with having more innovators in one particular respondent group than the other. Of these 71 respondents, 70 were randomly selected to form the dataset of the online innovators. 70 respondents were chosen out of the total of 71 due to the need to compare and analyse the

two survey datasets, comparing the perceptions of the survey respondents to the observations made by the researcher. Having both types of data enables exploratory research to have supporting quantitative data, to see the degree to which the observations are true.

4.3.3 Participant Demography

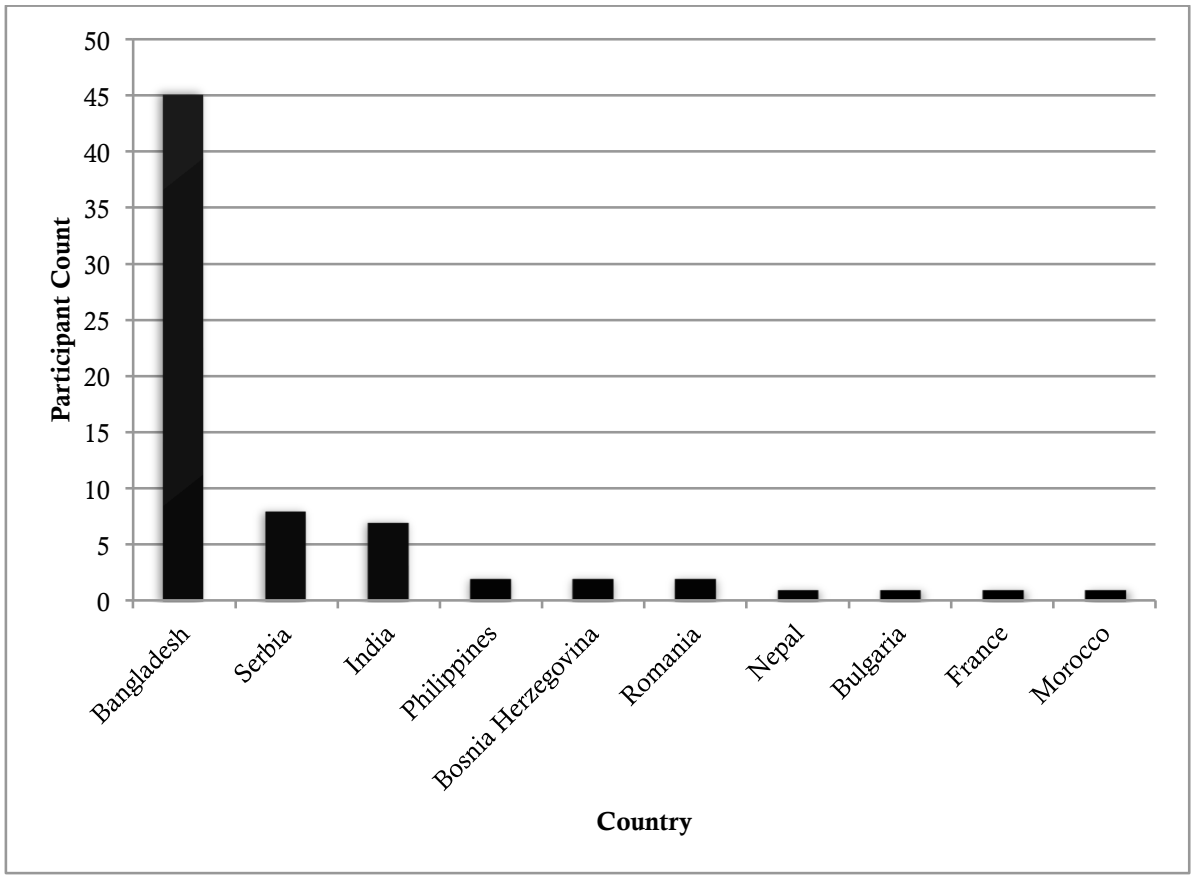

Figure 9 Geographic Spread of Online Innovators

As evidenced in Figure 9, the overwhelming majority of respondents were from Bangladesh ($N = 45$). It is assumed that this is largely due to the size of the www.microworkers.com user base in that particular country. This is likely as a result of utilising the "Best Rated Countries" sample frame, and may indeed have an impact on the results developed as a result. Nevertheless, due to the anonymity of the microworkers innovation challenge platform, and

the research not being targeted towards to a specific geographical region, the geographical spread of the participants is out of the control of the researcher.

It was also found that in the online innovator respondent group, a wider spread of industry sectors is covered. This is due to the wider coverage of the invitation, to the competition and the survey, amongst the sample frame (N = 5,103). Nevertheless, it reveals that, as with the PORT case study, both "Software and Computer Services" (15.2% (N = 13)) and "Other" (11.11% (N = 8)) are the most prominent industry sectors in the respondent groups. In addition to this, however, within the online social innovation competition, "Banks" were highly represented, being at 13.89% (N = 10) of the total sample.

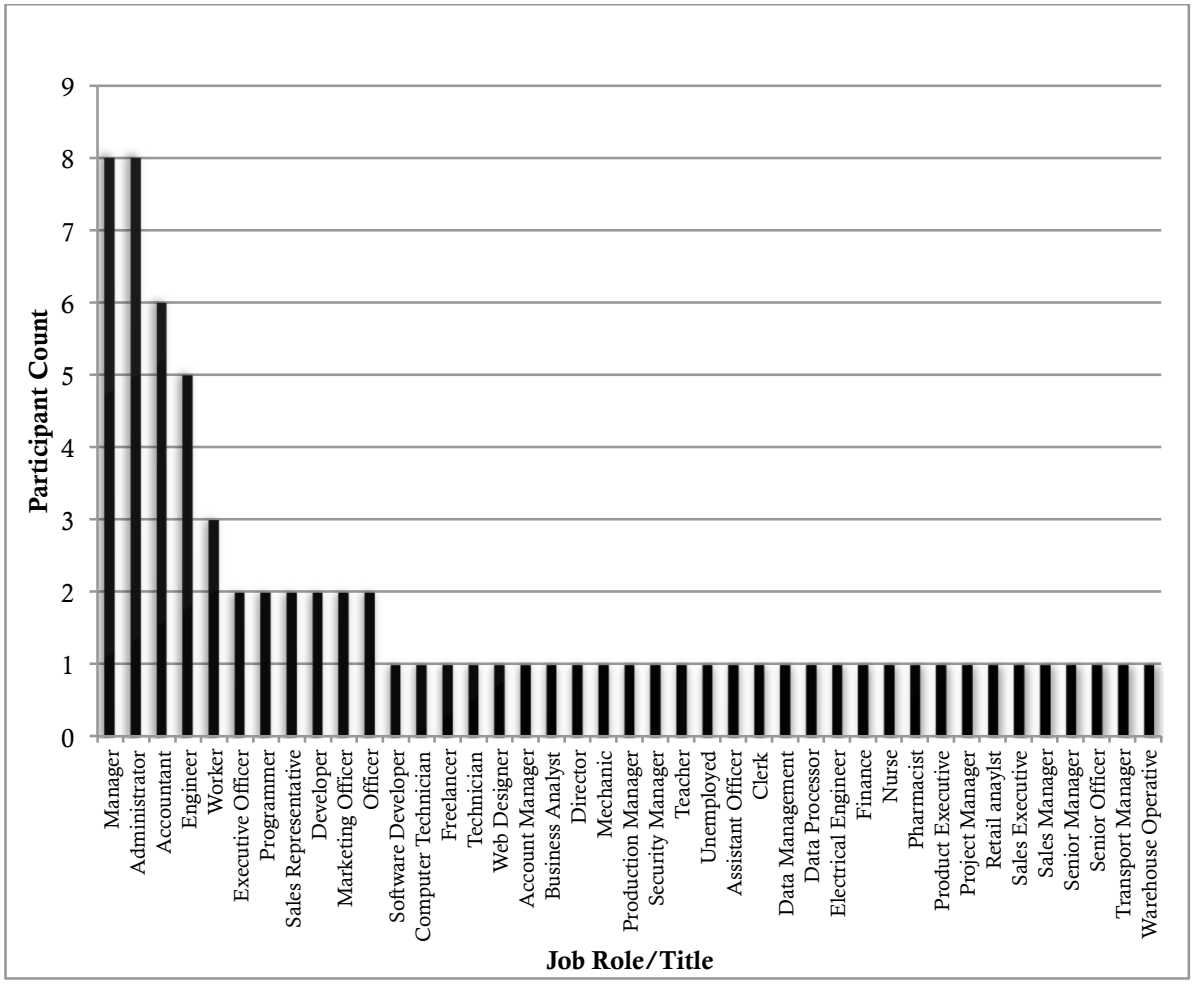

Figure 10 Job Roles/Titles of Online Innovators

Again, there is a distinct wide array of job roles represented in the dataset, with Managers (N = 8) and Administrators being at 11.11% (N = 8) each of the total sample (See Figure 10). One primary difference between the two respondent groups is that the PORT case study respondents tended to be within a research or student-based role, whereas the Microworkers social innovation competition case respondent group tended to have managers, administrators and office-based job roles represented. This appears largely as a result of the methods and channels utilised to promote each of the competitions, which consequently would affect the demography of the participants in each of the respondent groups.

4.3.4 Success Factors

The question posed to the online innovator respondent group (Figure 11) followed the same structure as question 1.8 detailed above in the PORT case study Summary:

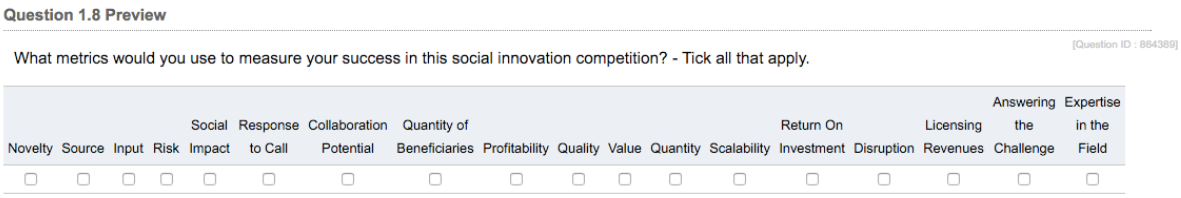

Figure 11 Online Innovator Success factor Question

Participants within this respondent group were asked to "Tick all that apply" with regards to what success factors they would utilise to Success factor their own success in developing a social innovation output as a result of the social innovation competition. Consequently, respondents within this group only perceived Quality (54%) as a Success factor that returned a proportion above the 50% threshold (Figure 12). Again, Social Impact emerges as a highly rated Success factor for determining a social innovation output in comparison to other success factors, but not above the 50% threshold. With regards to this respondent group, it appears also that the Quality of the social innovation is an important factor in measuring a social innovation output, as it is understood that this can indeed mean the difference between a viable and useless social innovation.

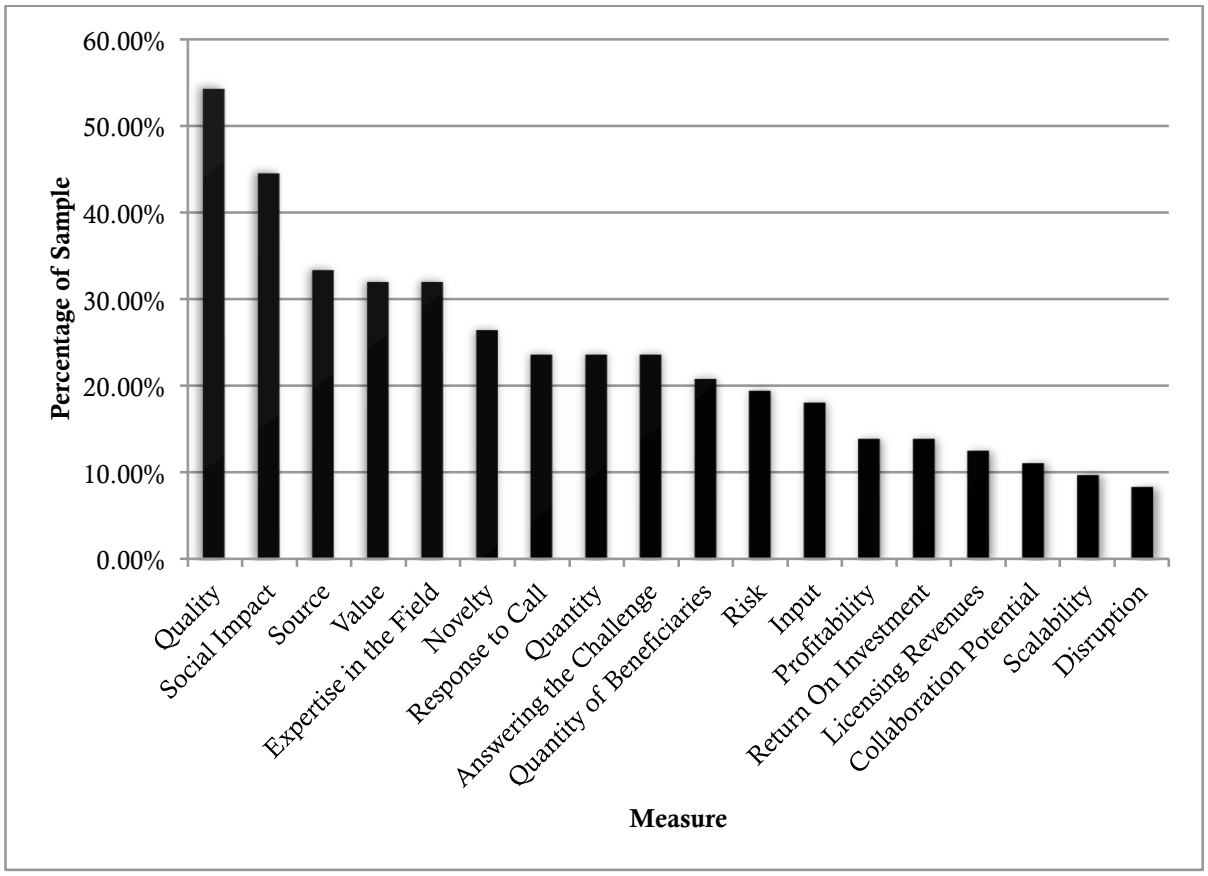

Figure 12 Online Innovator Success factor Successes by Percentage

Surprisingly, Novelty was determined as being a less useful Success factor in social innovation competitions. It must also be noted that Collaboration Potential achieved a comparatively weak percentage in this respondent group (Figure 12). This suggests that collaboration amongst online innovators is perhaps a less prominent factor in online social innovation competitions. It is noted, with regards to this data, that there was a more even spread amongst the responses of the participants from this group, having a smaller variance between the lowest-rated Success factor and highest-rated. The more even spread of ratings, may indeed suggest that there is a level of uncertainty amongst this particular respondent group. This justifies the reasoning behind comparing and merging the datasets in the analysis.

In order to perform statistical analyses the same set of questions were posed to the online innovator respondent group, and as such, the question noted in the previous section applies to this respondent group also. Conversely to the offline innovator respondent group in a larger amount of factors, the online innovator respondent group rated online innovation competitions

as having More Innovation Responses (51%), Higher Quantity (53%), More Collaboration Potential (44%) and Better Social Impact (41%) (See Figure 13). In this particular case, the bias was skewed towards online social innovation competitions. Again, this may largely be due to the comparative difference in years experience that the online respondent group has in offline innovation competitions ($M = 5.671$) and online innovation competitions ($M = 6.557$).

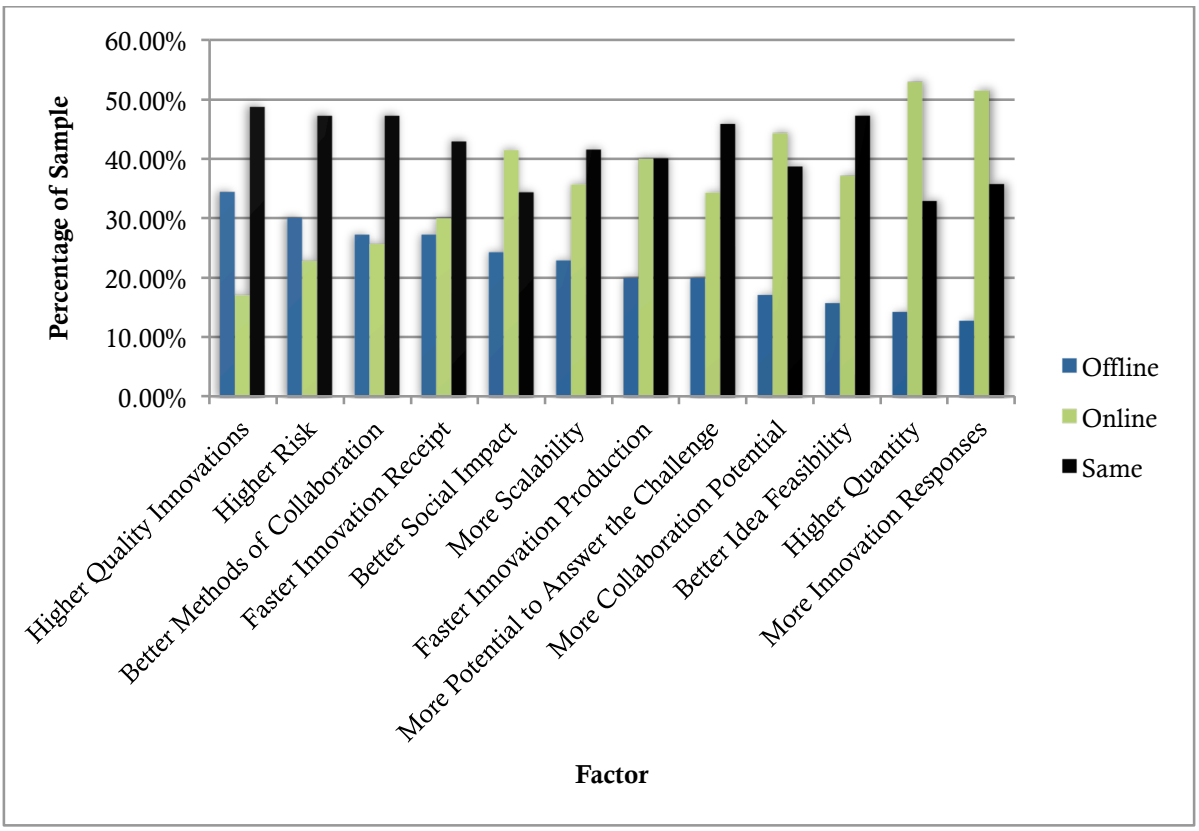

Figure 13 Online Innovators' Factors Rating by Percentage

With reference to Figure 13, the online innovator respondent group rated offline innovation competitions as having Higher Quality Innovations (34%) and Higher Risk (30%). Interestingly, the Higher Risk rating was determined as being higher amongst the opposite innovation competition type. It must be noted however that there were many factors that were detailed as having no difference between the types of social innovation competition, being noted as "Same", as the above set of questions posed to the offline innovators.

4.4 Delphi Study

The final method, the Expert Delphi study, was completed in order to obtain insight into the current success factors that are being utilised amongst innovation managers, top-level business people, policy makers, and academia (deemed as experts). The Expert Delphi study was conducted online, utilising the same survey system (iSurvey) of the two previous methods in order for simpler analysis of the three sets of data in conjunction. The Expert Delphi study format was chosen due to the perceived difficulty in obtaining expert judgements on this particular topic, and thus the potential decrease in necessity for participants across a standard survey method. All rounds of the Delphi method were conducted over a period between December 1st 2014 and 30th November 2015. All three rounds were conducted in order to enable the respondents to change their mind if they so wished. This increased the validity of the data in that respondents answered in the same way three times, it is understood that their perceptions of that particular variable will remain unchanged.

4.4.1 Recruitment, Sample and Data Collection

The participants of the Delphi study were recruited according to years of experience in similar practices of Open Innovation, Innovation Networking, and/or Social Innovation. A three-year minimum criterion was applied to this respondent group as this method is subject to the requirement that all entries are deemed as 'experts'. This indeed reduces the requirement for a large sample as there is little empirical evidence regarding the increase in reliability and validity in a large sample (Murphy et al. 1998). Some also note that a variety of heterogeneous experts within a respective topic area are most important for the studies' validity and wider application of the studies' results (Delbecq et al. 1975; Rowe & Wright 1999). The three-year minimum criterion constituted the base level for being determined as an expert in this study. The Expert Delphi study consisted of a sample of 35 participants. The participants each had varying levels of expertise (3 to 15 years) working or researching in the fields of Open Innovation, social innovation and/or Innovation Networking. A total of 276 were invited to participate, returning a respondent rate of 12.6% (35 participants). A non-probability purposive sampling method was used for round one as it enabled the researcher to choose only those who fit the 'expert' criteria detailed above. Those that had responded to the survey, but

did not meet the minimum 3-year expert criteria were not selected for participation, taking the sample from 38 participants to 35.

4.4.2 Participant Demography

The Expert Delphi study received responses from a number of C-level professionals, top-level professors, associate professors, post-doctoral researchers, doctoral researchers, an assistant vice chancellor, and senior managers (See Figure 14). Obtaining primarily high-ranking experts in the respective fields enabled the data to be more representative of businesses strategies and overarching academic theory.

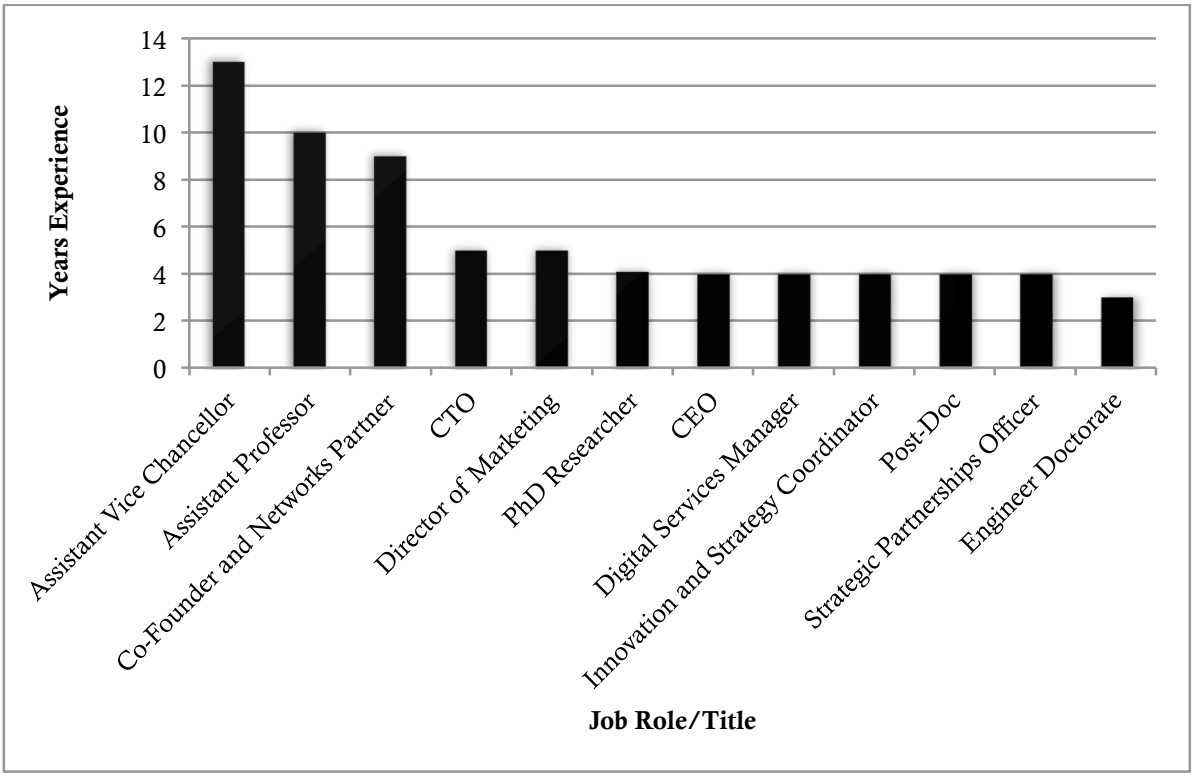

Figure 14 Job Roles/Titles and Years Experience of Experts

All participants whom the researcher qualified as experts for the study had a minimum of 3 years experience in any of the respective fields. The mean of years experience was 5.3, which resides above the 3-year 'expertise threshold'. Respondents represented a wide array of years

experience in their respective fields and a number of different roles within various organisations. It also shows a mix of practitioners and academia, which enables the application of the research in both academic and practitioner environments.

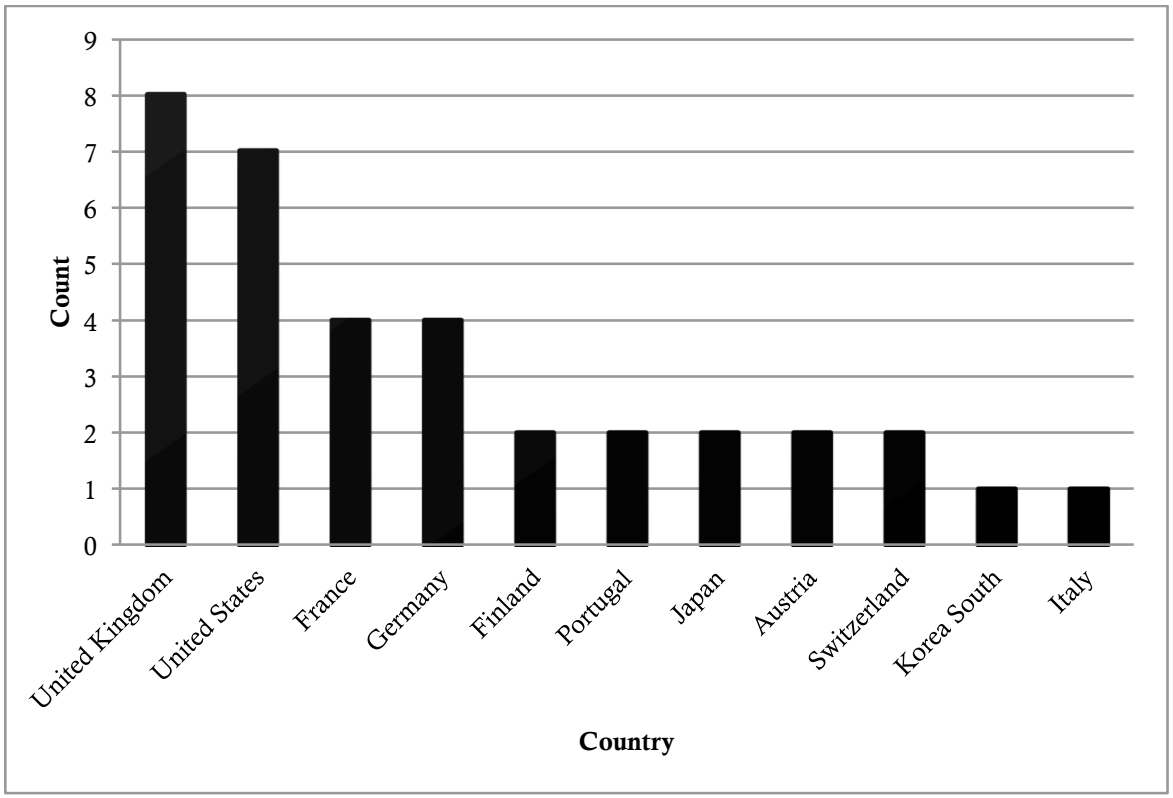

Figure 15 Geographic Spread of Experts

As show in Figure 15, there was a wide spread of countries that were represented in the data. However, one may note that the majority of the participants were from either UK or the United States of America (USA). This was due to the fact that the surveys and communications were written in English and thus may have made it difficult for others outside of English-speaking countries to participate wholly. Furthermore, the majority of research in this field primarily stems from USA or UK-based universities and firms and thus is shown in the demographic data above. Nevertheless, this may indeed present a limitation in the data, in that the surveys were only written in English, and may have discouraged others to not respond to the surveys upon viewing the language. It is identified that further research following this methodology could be run in a series of different languages in order to better understand the state of social innovation competitions in a wider array of geographic regions.

4.4.3 Success Factors

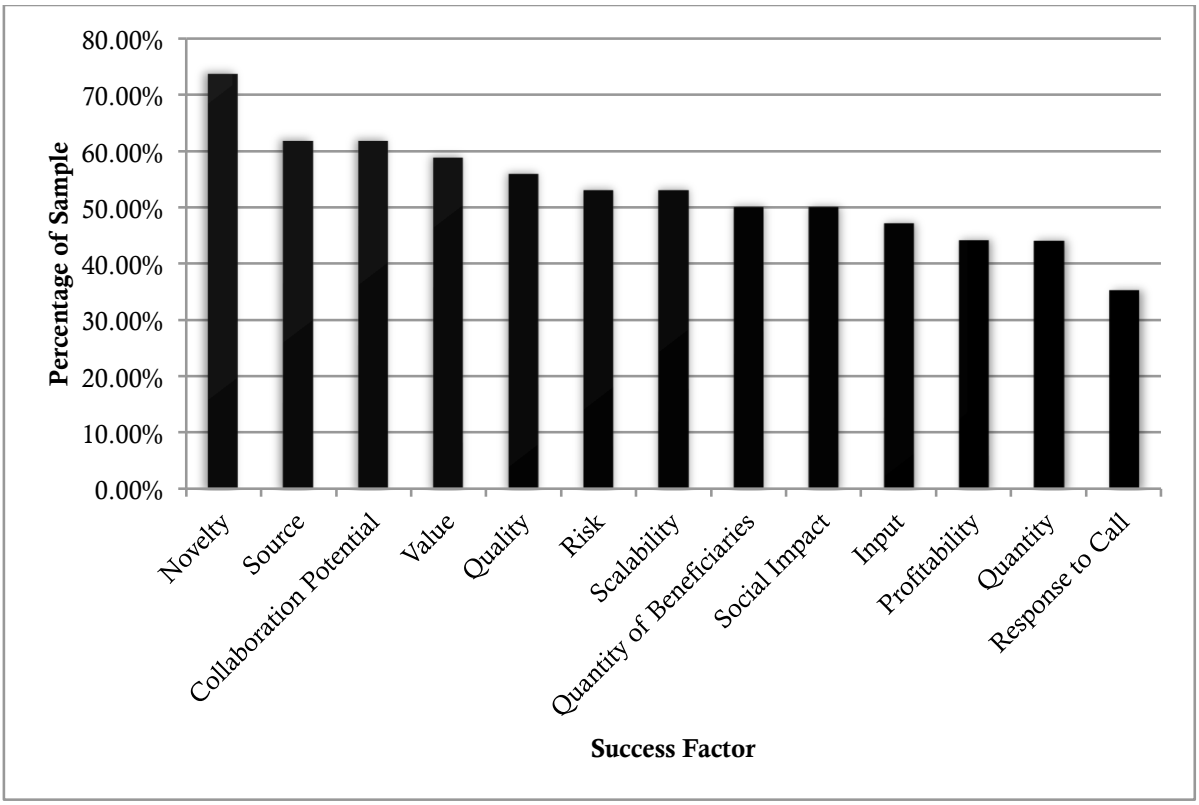

Figure 16 Expert Success factor Successes by Percentage

Success factors that achieved a high percentage, above the 50% threshold, are shown as: Novelty (74%), Source (63%), Collaboration Potential (63%), Value (57%), Risk, Quality and Scalability (54%) and Quantity of Beneficiaries (51%) (Figure 16). This particular respondent group had a higher overall rating for each of the Success factors with 8 out of 18 achieving a minimum of 50%. It is also noted that Social Impact was not detailed as an important Success factor amongst the expert respondent group, even though it may be argued that this is indeed one of the primary aims of conducting social innovation practices. Again, unsurprisingly, profit-seeking was not determined as being a relevant success factor of social innovation competitions.

4.5 Analysis: Success Factor Perceptions Amongst Experts, Online and Offline Innovators

4.5.1 Years Experience Across Respondent Groups

It must be noted that there was a distinct variation in the amount of experience in each respondent group. Firstly, the offline innovators had a mean years experience in Tackling Social Challenges of 3.5 and a mean experience in Social Innovation Competitions of 2.7 years. On the other hand, the online innovator respondent group had a mean experience of 7.7 and 6.1 years respectively. Furthermore, the respondent group participating in the Delphi study had a mean experience of 5.3 years in each (Table 3).

Respondent Group	N	Years of Experience	M	Std. Deviation
Offline Innovator Group	70	Tackling Social Challenges	3.543	4.4937
		Social Innovation Competitions	2.743	3.9898
Online Innovator Group	70	Tackling Social Challenges	7.700	5.2650
		Social Innovation Competitions	6.114	4.8836
Experts	35	Tackling Social Challenges	5.257	3.0326
		Social Innovation Competitions	5.257	3.0326

Table 3 Years of Experience in Social Innovation Competitions by Respondent Group

It is evident that the online innovator respondent group has more experience in the aforementioned criteria, with the Experts having less experience in this field. It may be noted however that the standard deviation (*SD*) is lowest amongst the expert respondent group suggesting that there is less variation from the mean than in the other two groups. Furthermore, the minimum years of experience in the Experts respondent group was three years, as filtered in the selection process. It is noted however, that although the offline respondent group possess a mean experience lower than 3 years in Social Innovation

Competitions, it must be stated that this respondent group is not subject to the minimum years experience criteria applied to the expert respondent group. This is because the offline and online respondent groups are not determined in this study as experts in the field; instead they provide insight into their current level of experience in the respective social innovation competitions. The years experience is then combined to calculate the overall mean across all respondent groups, M = 5.549 and SD = 4.920 for Tackling Social Challenges/Social Innovation, M = 4.594 and SD = 4.4681 for Social Innovation Competitions (Table 4).

	N	Mean	Std. Deviation
Tackling Social Challenges/Social Innovation	175	5.549	4.9290
Social Innovation Competitions	175	4.594	4.4681

Table 4 Years of Experience in Social Innovation Competitions Across Respondent Groups

To test whether there was a correlation between years of experience between the two variables a Pearson's correlation is used to find the correlation coefficient (r). The Pearson correlation coefficient revealed a significant strong correlation between the two variables, $r(173) = .760$, $p < 0.01$ (Figure 17). This means that for every year experience in Tackling Social Challenges, each respondent is likely to have a year experience in Social Innovation Competitions. This suggests that the majority of experience tackling social challenges was through social innovation competitions.

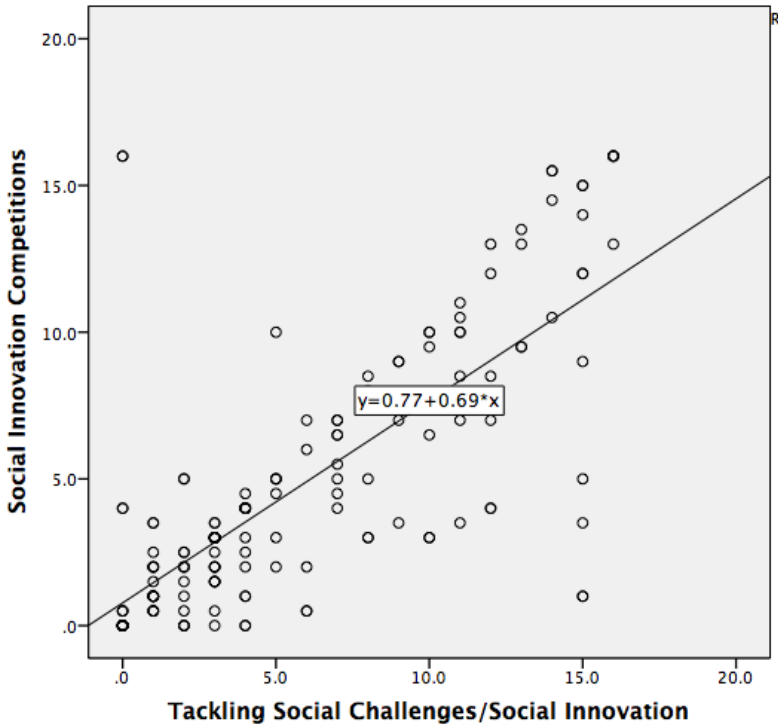

Figure 17 Years of Experience in Social Innovation Competitions and Tackling Social Challenges Correlation

Offline Innovators' Years Experience	**N**	**Mean**	**Std. Deviation**	**Variance**
Offline Innovation Competitions	70	3.143	4.0657	16.530
Online Innovation Competitions	70	2.343	4.0998	16.808
Online Innovators' Years Experience	**N**	**Mean**	**Std. Deviation**	**Variance**
Online Innovation Competitions	70	6.557	5.2049	27.091
Offline Innovation Competitions	70	5.671	4.9599	24.601

Table 5 Mean Experience in Online and Offline Competitions

The offline innovators' evidently have a lower mean of experience in both types of innovation competitions, but with a lower standard deviation (*SD*) and variance from the mean (Table 5). An independent samples *t*-test was conducted to compare the Years of Online and Offline Innovation Competition Experience amongst the respondent groups in this study. This returned a significant difference in the scores for Offline Innovation Competitions Experience between innovators (Offline Innovators: $M = 3.143$, $SD = 4.0657$ – Online Innovators: $M = 5.671$, $SD = 4.9599$) and Online Innovation Competitions Experience (Offline Innovators: $M = 2.342$, $SD = 4.0998$ – Online Innovators: $M = 6.557$, $SD = 5.2049$) between innovators (Table 5). For Offline Innovation Competition Experience $t(138)$, $p = 0.002$, and for Online Innovation Competition Experience $t(138)$, $p < 0.001$. This states that there is a statistical difference in the mean years experience between innovators in both online and offline innovation competitions, with the mean of years experience in both types being higher amongst the Online Innovator respondent group. Nevertheless, the collective mean experience for both groups combined was 4.4 years (4.450 for Online Innovation Competitions and 4.407 for Offline Innovation Competitions). As a collective group, the mean experience within each type of innovation competition is deemed as high enough for the participants to provide key insights into the comparisons between online and offline innovation competitions.

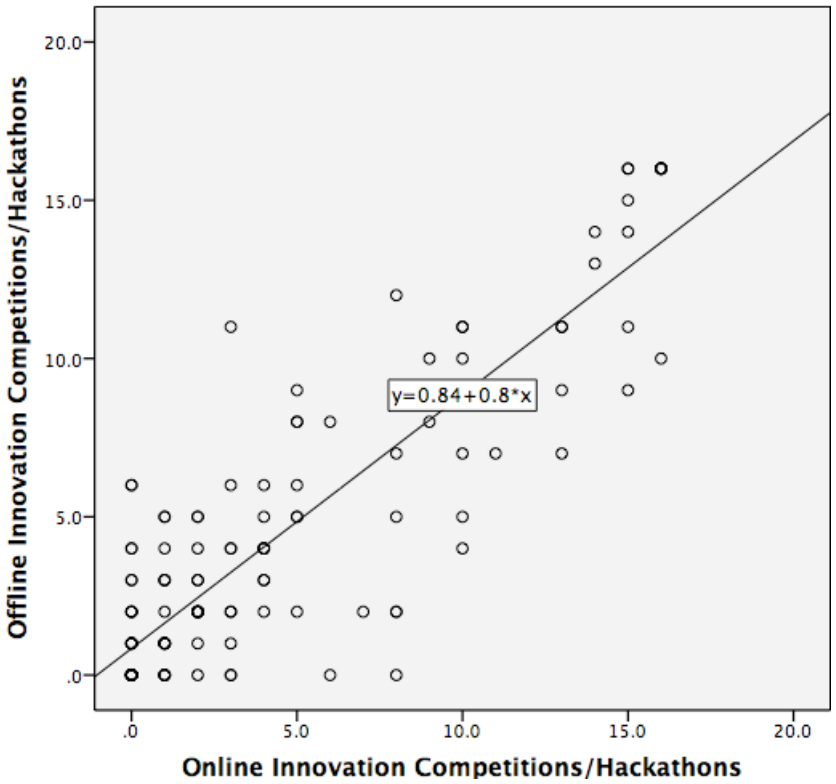

Figure 18 Offline and Online Innovation Competition Experience Correlation

To test whether there is a correlation between the years experience in each type of innovation competition a Pearson's correlation is used to find the correlation coefficient (r). The result of the Pearson's correlation showed a significant strong correlation between the experience of online and offline innovation competitions, r (140) = 0.876, $p < 0.001$ (Figure 18). This means that, as respondents obtain more experience in offline innovation competitions, they also obtain more experience in online innovation competitions. This suggests that each of the respondents in each of the groups has experience in both types of innovation competition, with very few outliers, most of which are within 1 *SD* from the mean.

4.5.2 Respondents Perception of Core Success Factors: Analysis of Unweighted Cases

Following the summaries of each individual set of results noted prior, this section analyses the data across all respondent groups in order to provide statistical rigour to this study, and present results that may be deemed as generalisable amongst the wider populations. As noted prior, the sample sizes are variable (N = 70, 70, 35) and as such, the data are first analysed with the existing standardised weighting for each respondent in each respondent group. The data are then analysed with a weighting of 2 associated with the expert respondent group. This is completed in order to normalise the data across respondent groups for equal testing, and is justified in that the expert respondent group were subject to a minimum years' experience threshold for establishing them as an expert in this study.

Due to the binomial distribution of the data, being Yes/No to each Success factor, Bernoulli trials are utilised. This type of trial depicts the responses to the question as a success or failure, where 1 = success = "Yes" (p), and 0 = failure = "No" (q). In order to calculate the probability that each trial would end in success the following equation is used: $p = 1 - q$. As Bernoulli trials are utilised in this study, the binary data thus is categorised as ordinal, having a success (1) ranking higher than a failure (0), with the success being a 'Yes' for that particular Success factor variable. Three success factors were rated above the binomial distribution of 0.5. These success factors were Quality (0.566), Social Impact (0.560) and Collaboration Potential (0.526) (Table 6), with all other success factors falling below the 0.5 success proportion of a random variable.

Through asserting that Bernoulli trials utilise ordinal data, the data meets the assumptions of a Kruskal-Wallis H test for independence, which assumes that 1) the Dependant Variable (DV) is ordinal or continuous, 2) the Independent Variable (IV) is categorical and 3) each observation is independent. Cleophas & Zwinderman (2016) state that Kruskal-Wallis H test can be used for three of more samples in a dataset. As the Success factor data are deemed as ordinal, and the respondent groups are categorical and independent, and the trials are independent from one another, one can conduct a Kruskal-Wallis H test on these data. A similar test, an ANOVA (ANalysis Of Variance), cannot be used in this instance because binary data does not follow a normal distribution, thus violating one of the primary assumptions of an ANOVA.

Success factor	N	Proportion
Quality	***175***	***.566***
Social Impact	***175***	***.560***
Collaboration Potential	***173***	***.526***
Answering the Challenge	140	.493
Novelty	174	.466
Value	175	.434
Quantity of Beneficiaries	175	.423
Scalability	175	.394
Profitability	175	.360
Response to Call	173	.329
Source	175	.303
Return On Investment	153	.301
Expertise in the Field	140	.264
Risk	175	.240
Quantity	175	.229
Input	175	.229
Disruption	153	.203
Licensing Revenues	153	.170

Table 6 Success factor Proportions

A Kruskal-Wallis H test is utilised to determine if there is a significant difference between the respondent groups in the successes of each Success factor. The Kruskal-Wallis H statistic will be calculated to test the following hypotheses:

H_0: The distribution of [Success factor] is the same across Respondent Group categories

H_1: The distribution of [Success factor] is different across Respondent Group categories

The Kruskal-Wallis H test showed that there was a statistically significant difference in successes across respondent groups for 11/18 of the success factors tested, but not statistically significant for 7/18 (See Table 7). The statistically significant results ($p < 0.05$) mean that there is a significant difference between the successes across respondent groups. Alternatively,

the lack of a significant value details that there is no significant difference in the mean ranks across respondent groups, suggesting agreement upon the given Success factor.

Success factor	**N**	**Sig. (*p*)**	χ^2	**Mean Rank (Respondent Group)**		
				Offline	Online	Expert
Quality	175	0.758	0.555	91	86	86
Response to Call	173	0.409	1.789	90.63	81.98	89.95
Return On Investment	153	0.201	3.207	71.49	81.32	83.42
Quantity of Beneficiaries	175	0.187	3.352	91	81	96
Expertise in the Field	140	0.181	1.787	74	67	N/A
Value	175	0.179	3.446	86.25	83.75	100
Profitability	175	0.064	5.511	79	92.71	96.5
Collaboration Potential	*173*	*0.018*	*8.031*	92.16	76.1	99.17
Licensing Revenues	*153*	*0.003*	*11.689*	68.37	84.76	10.8.58
Social Impact	*175*	*< 0.01*	*18.989*	105.25	74	81.5
Answering the Challenge	*140*	*< 0.01*	*20.684*	84	57	N/A
Novelty	*174*	*< 0.01*	*46.199*	101.69	60.67	113.53
Scalability	*175*	*< 0.01*	*21.149*	99.75	69.75	101
Source	*175*	*< 0.01*	*29.426*	71.5	90.25	116.5
Risk	*175*	*< 0.01*	*30.635*	72	84.25	110.5
Quantity	*175*	*< 0.01*	*18.931*	74.25	83.75	100
Input	*175*	*< 0.01*	*16.675*	80.5	90.25	116.5
Disruption	*153*	*< 0.01*	*18.442*	78.99	69.15	108.58

Table 7 Kruskal-Wallis Success factor Test Results

The null hypothesis is rejected for the following success factors: Social Impact ($p < 0.01$), Answering the Challenge ($p < 0.01$), Novelty ($p < 0.01$), Scalability ($p < 0.01$), Source ($p < 0.01$), Risk ($p < 0.01$), Quantity ($p < 0.01$), Input ($p < 0.01$), Disruption ($p = 0.03$), Licensing Revenues ($p < 0.01$), and Collaboration Potential ($p = 0.018$). Therefore, the success factors have a statistically significant difference in the mean ranks across respondent group. For example, Social Impact returned a difference of mean rank of 31.25, across the respondent groups, representing a statically significant variance of mean ranks. On the other hand, Quality ($p = .758$), Value ($p = .179$), Quantity of Beneficiaries ($p = .187$), Profitability ($p = .0.064$),

Response To Call ($p = .409$), Return on Investment ($p = .201$), and Expertise in the Field ($p = .181$) resulted in $p > 0.05$ (Table 7). For these success factors the null hypothesis is asserted, noting that there is no significant difference in the mean ranks between Respondent Groups in choosing these success factors. As detailed, this represents an agreement of Success factor choice according to the Kruskal-Wallis H test. In this instance, the null result is favourable due to the objective of obtaining an agreement amongst respondent groups with minimal variance in the mean rank and proportion. Quality is the only Success factor which achieves both a proportion (p) > 0.05, in the Bernoulli distribution comparison, and insignificant variance in the mean ranks, according to the Kruskal-Wallis H test.

The Kruskal-Wallis test includes a χ^2 test of independence, results of which are shown in Table 7. The χ^2 test of independence details whether the observed count of ratings for or against a Success factor differed significantly from the expected count. Combining the Kruskal-Wallis H test and χ^2 statistic, p is calculated in order to determine the significance of the variance across respondent groups. However, the Kruskal-Wallis H test does not provide figures with regards to observed against expected count, and as such a χ^2 test of independence was conducted to obtain the expected and observed values associated with p above.

In the χ^2 test of independence, the categorical variables are the respondent group (IV) and the Success factor chosen (DV), with each of the success factors being tested separately so as to avoid violating the primary assumptions of the χ^2 test: that each entity contributes to only one cell of the contingency table, and that fewer than 20% of expected values are < 5 (Field 2013). The data meets these assumptions and thus, the χ^2 test of independence is used.

For this test, further hypotheses are presented:

H_0: There is no significant relationship between [Success factor] and Respondent Group

H_2: There is a significant relationship between [Success factor] and Respondent Group

As the primary aim of this study is to determine agreed success factors over the binomial threshold, the researcher seeks those success factors that do not return a significant value - $p < 0.05$. This is because those that meet this significance level are determined as having a relationship between Respondent Group and Success factor i.e. the rating changes according to the respective respondent group.

	Offline Obs.	Offline Exp.	Online Obs.	Online Exp.	Expert Obs.	Expert Exp.	χ^2	Sig. (p)
Quality	42	39.6	38	39.6	19	19.8	0.555	0.758
Response to Call	26	23.1	19	23.1	12	10.9	1.789	0.409
Return On Investment	16	21	25	21	5	3.9	3.207	0.201
Quantity of Beneficiaries	32	29.6	24	29.6	18	14.8	3.352	0.187
Expertise in the Field	22	18.5	15	18.5	0	0	1.787	0.181
Value	29	30.4	27	30.4	20	15.2	3.446	0.179
Profitability	18	25.2	29	25.2	16	12.6	5.511	0.064
Collaboration Potential	41	36.8	28	36.8	22	17.4	*8.031*	*0.018*
Licensing Revenues	4	11.9	19	11.9	3	2.2	*11.689*	*0.003*
Social Impact	53	39.2	28	39.2	17	19.6	*18.989*	***P<0.01***
Answering the Challenge	48	34.5	21	34.5	0	0	*20.684*	*P<0.01*
Novelty	44	32.6	11	32.6	26	15.8	*46.199*	*P<0.01*
Scalability	37	27.6	13	27.6	19	13.8	*21.149*	*P<0.01*
Source	8	21.2	23	21.2	22	10.6	*29.426*	*P<0.01*
Risk	4	16.8	19	16.8	19	8.4	*30.635*	*P<0.01*
Quantity	5	16	20	16	15	8	*18.931*	*P<0.01*
Input	10	16	13	16	17	8	*16.675*	*P<0.01*
Disruption	16	14.2	7	14.2	8	2.6	*18.442*	*P<0.01*

Table 8 Success factor χ^2 Results

As shown in Table 8, Quality returned values closest to the expected counts, having only a maximum value between observed and expected counts of 2.4. This is the reason for the lack of significance in the χ^2 test of independence and Kruskal-Wallis H test, proving that the successes in this variable are not independent from the set of respondent groups. All χ^2 tests' results are shown in Table 8, with their respective χ^2 statistic (χ^2) and significance (p). Social Impact returned a significant value, $\chi^2\ (2, N = 170) = 18.989$, $p < .01$. Thus, Social Impact is dependent upon respondent group. This result matches the Kruskal-Wallis H test, however in

the χ^2 test of independence, it shows that the observed value for the Offline Innovators was significantly higher than the expected count (observed: 53, expected: 39.2), whereas the observed count for the Online Innovator group was significantly lower than the expected count (observed: 28, expected: 39.2) and the Expert respondent group met the expected χ^2 test count (observed: 17, expected: 19.6). Collaboration Potential is also reported as significant, χ^2 (2, N = 175) = 8.031, p = 0.018. Again, the observed counts in the Offline respondent group were significantly higher than expected (observed: 41, expected: 36.8), the observed counts in the Online respondent group were significantly lower than expected (observed: 28, expected: 36.8), and the observed counts in the Experts group were significantly higher than the expected count (observed: 22, expected: 17.4). This shows that both Offline Innovators and Experts value Collaboration Potential as a Success factor of social innovation competitions, but Online Innovators do not.

In addition to analysing the respondent groups against the Success factor data, it appears important to analyse the years of experience in Social Innovation Competitions against the set of success factors. For this, a logistic regression is used to determine the probability that a Success factor will receive a success, based upon a unit increase in years' experience. A logistic regression assumes that: 1) there is not a linear relationship between the DV and IV, 2) the DV is dichotomous (having two opposing values), 3) the IV need not be interval, nor normally distributed, nor linearly related, nor of equal variance within each group, 4) a case must only be in one group and every case must be a member of one of the groups, and 5) larger samples are required for predictive value (a minimum of 50 cases per predictor is recommended) (Field 2013). Abiding by these assumptions, a logistic regression is deemed appropriate for testing the following hypotheses:

H_0: As years of social innovation competition experience increases by 1 unit (a year), the probability of the Success factor receiving a success does not change

H_3: As years of social innovation competition experience increases by 1 unit (a year), the probability of the Success factor receiving a success does change

From running the logistic regression, seven success factors returned a significant value as shown in Table 9.

	df	SE	*b*	Wald	Sig. (*p*)	Exp(B)
Quality	1	0.035	-0.07	4.084	0.043	0.932
Quantity of Beneficiaries	1	0.04	-0.114	8.354	0.004	0.892
Novelty	1	0.037	-0.085	5.443	0.02	0.918
Quantity	1	0.038	0.078	4.224	0.04	1.081
Expertise in the Field	1	0.052	-0.123	5.495	0.019	0.884
Licensing Revenues	1	0.043	0.119	7.762	0.005	1.127
Answering the Challenge	1	0.039	-0.099	6.437	0.011	0.906

Table 9 Success factor Logistic Regression Results

All success factors that returned a significant value also returned a negative beta coefficient (*b*), except for Licensing Revenues and Quantity (See Table 9). The negative beta coefficients suggest that as a participant obtains 1 more year experience in social innovation competitions, the likelihood of a success in the Bernoulli trial reduces. This is also evident in the majority of the Exponential Beta Coefficients (Exp(B)) being < 1. For example, Quality returned b = -0.07, Exp(B) = 0.932 (1, $N = 175$), Wald = 4.084, $p = 0.043$. This means that a 1-year increase in experience in Social Innovation Competitions reduced the likelihood that Quality will receive a success by .07 (7%). The significance value is calculated from the Wald statistic being over the respective critical value for 0.05 (*p*). On the other hand, Licensing Revenues returned b = 0.043, Exp(B) = 1.127 (1, $N = 153$), Wald = 7.762, $p < 0.01$, and Quantity returned b = 0.078, Exp(B) = 1.081 (1, $N = 175$), Wald = 4.224, $p = 0.04$. These mean that with a 1-year increase of experience in social innovation competitions, the likelihood that the Success factor will receive a success is increased by *b*. On all these variables, the null hypothesis can be rejected, stating that there is a significant change in the probability that [Success factor] will receive a success/"Yes". All variables that did not receive a significant value are extracted from Table 9 in order to increase the clarity of the explanation of significant results.

4.5.3 Respondents Perceptions of Core Success Factors: Analysis of Weighted Cases

With the PORT case study constituting a sample size of 70, the Microworkers social innovation competition case containing a sample size of 70, and the Delphi study consisting of a sample of 35, it is calculated that the total sample size across all datasets for this study is 175. This includes a mixture of offline and online innovators, industry professionals, innovation managers and academic personnel in online and offline social innovation. It is understood that the sample size reflects the current niche size of the industry, research and practices using the model thus far. Nevertheless, it contains data from each of the key stakeholders, which is indeed the primary aim of this study. All methods within this study gather data with regards to the success factors of social innovation competitions and as such it is understood that a number of analyses can be performed on the data both as individual methods, and as collective data. However, one may note that the comparatively small sample size in the Delphi method restricts the weighting of the Delphi participants in the statistical analyses. Nevertheless, statistical analyses are conducted both through utilising the 35 respondents and then by weighting them with a power of 2, which normalised the data across all three respondent groups. As two sets of analyses are completed, the results of each are compared to conclude whether the variation in Delphi study sample size affects the statistical significance of the results.

It was considered that weighting the expert cases would enable further results to be obtained, and analyses to be cross validated against the results of the un-weighted cases detailed prior. It is understood that weighting of the Expert's respondent group is ideal in this case as the sample size was half that of the other two respondent groups ($N = 35, 70, 70$), thus providing equal weight, and normalisation, to each respondent in the samples. This weighting is justified in that the Expert's are deemed in this research as the primary personnel to Success factor innovation practices and were subject to a minimum years experience criteria unlike the other two respondent groups. Thus, a weighting of '2' instead of the original '1' was applied to complete this section of the analysis. This analysis is conducted to then compare the results with that of the non-weighted analysis.

As evident in Table 10, a similar result is shown, with the three top success factors receiving a similar proportion above the binomial distribution threshold. However, in this case, there is another Success factor that appears above the binomial distribution threshold (0.5): Novelty (.514). This Success factor was detailed as a secondary Success factor in the previous analysis.

One may note that the order of the success factors is relatively similar to the previous analysis, and thus it is understood that there is minimal discernable difference in the proportions when cases are weighted.

At this point a χ^2 test for independence and a Kruskal-Wallis H test are not necessary as they would provide the same significance values as before. This is because *p* is calculated based upon calculating whether there is a significant difference in the observed count against the expected count – the expected count would simply be doubled and the variation from the expected would be at the same ratio. This is also evident in the Kruskal-Wallis H test in that the mean ranks would be calculated as the same, providing the same results as note prior. Nevertheless, logistic regression can be used to determine if there is a difference between the results of the previous analyses and the results utilising weighted cases in the Expert respondent group.

	N	**Proportion (*p*)**	**Std. Deviation**
Quality	210	.562	.4973
Collaboration Potential	206	.549	.4989
Social Impact	210	.548	.4989
Novelty	208	.514	.5010
Answering the Challenge	140	.493	.5017
Value	210	.457	.4994
Quantity of Beneficiaries	210	.438	.4973
Scalability	210	.419	.4946
Profitability	210	.376	.4856
Source	210	.357	.4803
Response to Call	206	.335	.4731
Return On Investment	166	.307	.4627
Risk	210	.290	.4551

Input	210	.271	.4458
Expertise in the Field	140	.264	.4425
Quantity	210	.262	.4407
Disruption	166	.235	.4252
Licensing Revenues	166	.175	.3809

Table 10 Weighted Cases Proportions

The same hypotheses are utilised:

H_0: As years of social innovation competition experience increases by 1 unit (a year), the probability of the Success factor receiving a success does not change

H_4: As years of social innovation competition experience increases by 1 unit (a year), the probability of the Success factor receiving a success does change

There is a marginal change in *SE, b,* Exp(B), and *p* across all variables that returned a $p < 0.05$. Across all variables a marginal reduction in *SE* is calculated and an increase in *b* is calculated. For example, Quality returned $b = -0.07$, Exp(B) = 0.933, (1, $N = 201$), Wald = 4.295, $p = 0.038$ (Table 11), whilst previously being calculated as: b = -0.07, Exp(B) = 0.932 (1, $N = 175$), Wald = 4.084, $p = 0.043$ (Table 9). All changes, noted prior, and in the Wald statistic and *p* are marginal, and as such do not effect the significance of the results. Nevertheless, from conducting this analysis, there is an additional Success factor that returned a significant value: Response to Call. This variable resulted in $b = 0.048$, Exp(B) = 1.069 (1, $N = 206$), Wald = 3.898, $p = 0.048$. Even so, it is understood that including weighted cases, specifically in calculating the proportions and logistic regression analyses, only produces marginal changes in the results.

	df	SE	*b*	Wald	Sig. (p)	Exp(B)
Quality	1	0.033	-0.071	4.559	0.033	0.931
Quantity of Beneficiaries	1	0.036	-0.099	7.508	0.006	0.906
Novelty	1	0.034	-0.7	4.295	0.038	0.933
Quantity	1	0.035	0.09	6.534	0.011	1.094
Expertise in the Field	1	0.052	-0.123	5.495	0.019	0.884
Licensing Revenues	1	0.042	0.118	7.86	0.005	1.125
Answering the Challenge	1	0.039	-0.099	6.437	0.011	0.906
Response to Call	1	0.048	0.067	3.898	0.048	1.069

Table 11 Weighted Cases Success factors Logistic Regression Results

4.5.4 Success Factor Findings

Quality, Social Impact and Collaboration Potential had the highest proportions across both unweighted and weighted analyses (See Table 12). Quality met the expected values of all respondent groups, whereas Social Impact and Collaboration Potential were voted for most amongst experts and offline innovators. Quality had a significant value in the regression analyses, and was very marginally voted for less amongst those with more experience. From the analyses conducted on the Success factor data, it is evident the Quality is the primary Success factor of social innovation competitions, with Social Impact, Collaboration and Novelty measuring the secondary. It must be noted that although the above success factors are detailed as such, they are not significant for each of the tests completed in this analysis. Thus, one may infer that developing a core set of success factors for defining social innovation competitions is not a simple process, and potentially is not possible in this case due to the subjective and context-dependent nature of social innovation. Instead the results of these analyses provide an insight into the development of factors from which social innovation competitions can be successful.

Success factor	**Proportion (Unweighted)**	**Proportion (Weighted)**	χ^2	***b*** **(Unweighted)**	***b*** **(Weighted)**
Quality	***.566***	**.562**	**0.555**	-0.07, *p* 0.043	-0.071, *p 0.033*
Social Impact	***.560***	**.548**	18.989	*P > 0.05*	*P > 0.05*
Collaboration Potential	***.526***	**.549**	8.031	*P > 0.05*	*P > 0.05*
Novelty	.466	**.514**	46.199	-0.085, *p* 0.02	-0.7, *p 0.038*
Answering the Challenge	.493	.493	20.684	-0.099, *p* 0.011	-0.099, *p 0.011*
Value	.434	.457	3.446	*P > 0.05*	*P > 0.05*
Quantity of Beneficiaries	.423	.438	3.352	-0.114, *p* 0.004	-0.099, *p 0.006*
Scalability	.394	.419	21.149	*P > 0.05*	*P > 0.05*
Profitability	.360	.376	5.511	*P > 0.05*	*P > 0.05*
Response to Call	.329	.335	1.789	*P > 0.05*	0.067, *p 0.048*
Source	.303	.357	29.426	*P > 0.05*	*P > 0.05*
Return On Investment	.301	.307	3.207	*P > 0.05*	*P > 0.05*
Expertise in the Field	.264	.264	1.787	-0.123 *p* 0.019	-0.123, *p 0.019*
Risk	.240	.290	30.635	*P > 0.05*	*P > 0.05*
Quantity	.229	.262	18.931	**0.078, *p* 0.04**	**0.09, *p 0.011***
Input	.229	.271	16.675	*P > 0.05*	*P > 0.05*
Disruption	.203	.235	18.442	*P > 0.05*	*P > 0.05*
Licensing Revenues	.170	.175	11.689	**0.119, *p* 0.005**	0.118, *p 0.005*

Table 12 Success factors Findings

4.6 Analysis: Success Factor Compromise and Gain in Online and Offline Social Innovation Competitions

This section analyses the data across the two innovator respondent groups in order to provide the results of the statistical analyses of the data. From the data, it is evident that there are a series of disagreements between the two respondent groups. However, conclusions are drawn from comparing and merging the datasets. Firstly, there are a number of factors that are compromised and gained in each of the innovation competition types, collaboration is disparate amongst the two types, the types of innovations that are outputted vary according to whether the social innovation competition is conducted online or offline, and there is a difference in the rated effectiveness of the competitions as a whole.

4.6.1 Compromises and Gains

In this section of the study, the data are coded as "-1", "0", and "1", representing offline innovation competitions, same, and online innovation competitions respectively. It is understand that the coding format of these data matches the related responses, with the social innovation competitions representing equal and opposite scores, and "same" representing an unweighted or centrist score of 0 weighting either way. As a result of this coding method, the data are presented as ordinal. The table demonstrates the means of each score amongst the sample, with those with a negative mean tending in favour of offline social innovation competitions and the positive tending in favour of the online methods (Table 13). The data show that there is a general preference towards offline innovation competitions in this dataset as 8 means are presented with a negative figure (offline), and 4 means are presented with a positive figure (online).

	N	Mean
More Scalability	140	.371
Higher Quantity	140	.257
More Innovation Responses	140	.236
Higher Risk	140	.129
Faster Innovation Production	140	-.036
More Collaboration Potential	140	-.050
Better Social Impact	140	-.093
Faster Innovation Receipt	140	-.114
More Potential to Answer the Challenge	140	-.136
Better Idea Feasibility	140	-.157
Better Methods of Collaboration	140	-.236
Higher Quality Innovations	140	-.321

Table 13 Factor Proportions

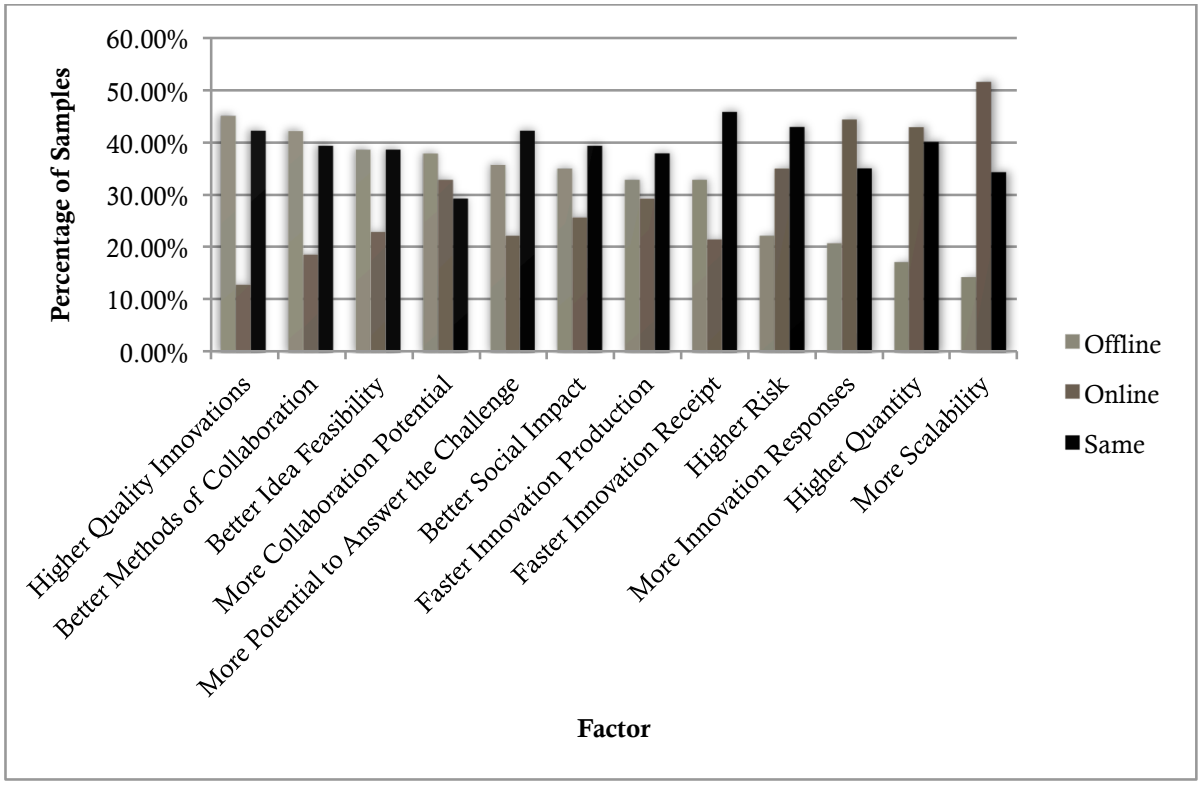

Figure 19 Factor Percentages

As shown in Figure 19, a dichotomy is presented with Higher Quality Innovations (45%) being at the offline innovation competition end and More Scalability (51%). Nevertheless it is evident that there is a distinct lack of clarity in this result.

A Mann-Whitney U test was performed in order to test whether there was a significant difference in the means between respondent groups. A Mann-Whitney U test is used as the assumptions of the *t*-test for independent samples cannot be met (Field 2013). For example, it cannot be asserted that the data is parametric (meeting the expectations of a normal distribution). Thus, the Mann-Whitney U test is a non-parametric alternative of the *t*-test for two independent samples. Thus, the following hypotheses are used to test this:

H_0: The means of each factor are not significantly different across the respondent groups

H_5: The means of each factor are significantly different across the respondent groups

The Mann-Whitney U test indicated that there is a significant difference in the mean of each of the factors by respondent group. For example, More Collaboration Potential varied dramatically between respondent groups, M_1: -.371, M_2: .271, $U = 3905$, $p < 0.01$ (Table 14). This means that there is a significant difference in the means across respondent groups. The closest means amongst the respondent groups were Higher Quantity, which tended towards online social innovation competitions. Nevertheless, there were a series of means that tended towards a particular type of online competition ($\neq 0$): Better Methods of Collaboration, More Scalability, Higher Quality Innovations, Higher Quantity, and More Innovation Responses. Interestingly, More Scalability and Higher Quality Innovations, which were deemed as the most extreme factors in the means, received a mean further away from the central point (0) from the opposite respondent group (Table 14). For example, the Online Innovators had a higher mean for Higher Quality Innovations in offline innovation competitions, and the reverse was true for More Scalability.

As is evident from calculating the Grand Mean *a*, the offline innovators' respondent group had a skewed preference for the offline innovation competition, and the reverse was true for the online innovators, meaning that the data was positively skewed and negatively skewed respectively. Taking into account these skews, Grand Mean *b* calculates a -0.025 mean across all responses in the dataset (Table 14), constituting only a very marginal (2.5%) preference towards offline innovation competitions across the whole dataset. Thus, it is understood that the data is equally representative of both types of social innovation competition types.

	Offline Innovators' Mean (M_1)	**Online Innovators' Mean (M_2)**	**Mann-Whitney U**	**Asymp. Sig. (2-tailed)**
Better Methods of Collaboration	-.457	-.014	1649	.000
More Collaboration Potential	-.371	.271	1420.5	.000
More Scalability	**.614**	**.129**	1586	.000
Higher Quantity	.129	.386	1964	0.028
Higher Quality Innovations	**-.171**	**-.471**	1877	0.009
Better Idea Feasibility	-.529	.214	1156	.000
Better Social Impact	-.357	.171	1559.5	.000
Faster Innovation Production	-.271	.200	1652	.000
Faster Innovation Receipt	-.257	.029	1948	0.024
More Innovation Responses	.086	.386	1958	0.027
Higher Risk	.329	-.071	1736.5	0.001
More Potential to Answer the Challenge	-.414	.143	1468	.000
Grand Mean *a*	-0.139	.114	N/A	N/A
Grand Mean *b*	-0.025		N/A	N/A

Table 14 Mann-Whitney U Test Factor Results

4.6.2 Collaboration

Collaboration, namely Collaboration Potential, was detailed as a primary Success factor for social innovation competitions. Thus, this section of the study details aspects of collaboration within social innovation competitions, and at what stage of the process it is most useful for innovators for these types of collaborations to take place. The questions were conducted on a Likert-scale of 'Usefulness' ranging form 'Not Useful' to 'Very Useful', coded as 1 to 5 respectively.

The data was first tested for normality utilising the Kolmogorov-Smirnov and Shapiro-Wilk tests, as it is a primary assumption of the independent samples *t*-test that the data follow a normal distribution (Field 2013). Nevertheless, these tests returned a significant result, stating that the data does not follow a normal distribution, K-S: $p < 0.00$, S-W: $p < 0.00$. As such, the

non-parametric alternative to the independent samples *t*-test is conducted. The Mann-Whitney U test is utilised to conclude if there is a significant difference in the mean between each of the respondent groups.

Thus, the hypotheses are presented below:

H_0: There is no significant difference between the mean rating of [collaboration factor] across respondent groups

H_6: There is a significant difference between the mean rating of [collaboration factor] across respondent groups

The Mann-Whitney U test indicated that there is a significant difference in the mean amongst the respondent groups for three out of the four collaboration variables (Table 15).

	Offline Collaboration (Prior to Event)	Online Collaboration (Prior to Event)	Offline Collaboration (At Event)	Online Collaboration (At Event)
Mann-Whitney U	1960.500	1648.500	1295.000	2033.000
Offline Innovators' Mean (M_1)	3.826	4.150	4.404	4.076
Online Innovators' Mean (M_2)	3.457	3.757	3.786	3.943
Grand Mean (GM)	3.6415	3.953535	4.095	4.0095	4.0095
Asymp. Sig. (2-tailed)	.047	.026	.000	.203

Table 15 Mann-Whitney U Test Collaboration Results

Offline Collaboration (Prior to Event) had a significant difference among the means, M_1: 3.826, M_2: 3.457, U = 1960.5, p = .047, as did Offline Collaboration (At Event), M_1: 4.404, M_2: 3.786, U = 1295, p < 0.01 (Table 15). Also, Online Collaboration (Prior to Event) had a significant difference in the means, M_1: 4.150, M_2: 3.757, U = 1648.5, p = 0.26, but Online

Collaboration (At Event) did not, M_1: 4.076, M_2: 3.943, $U = 2033$, $p > 0.05$ (Table 15). This shows that both respondent groups had a significant difference in perceptions of the former three collaboration variables' usefulness, with online innovators tending to perceive online collaboration as more useful, and offline innovators tending to think offline collaboration as more useful. Nevertheless, Online Collaboration (At Event) returned an insignificant result, meaning that there was agreement amongst the respondent groups of its' level of usefulness ($GM = 4.0095$ = 'Useful'). Utilising the Grand Mean (GM) calculation, it is identified that both types of collaboration at the event ($M > 4$) are deemed more useful than prior to the event ($M < 4$) (Table 15). Even so, all means return a result above the central point (3) of the five-point Likert-scale and, thus, are determined as useful.

4.6.3 Innovation Competition Effectiveness

A comparison drawn between the two primary methods of social innovation competitions was general effectiveness. It was generally regarded that a combined social innovation competition would prove to be Very Effective (77.14%) in comparison to a similar social innovation competition performed purely online (11.42%) or offline (37.14%) (Figure 20). Nevertheless, one may state, that an offline social innovation competition was regarded as generally more effective than a similar online one, in being rated as Very Effective (37.14%) and Effective (48.57%). Meanwhile, online social innovation competitions were noted as being primarily Moderately Effective (54.28%). The questions were conducted on a Likert-scale of 'Effectiveness' ranging form 'Not Effective' to 'Very Effective, coded from 1 to 5 respectively. Thus, the data utilised for the statistical tests are of an interval/ratio format.

As with the previous analysis, the data was first tested for normality utilising the Kolmogorov-Smirnov and Shapiro-Wilk tests. These tests also returned a result stating that the data does not follow a normal distribution (K-S: $p < 0.00$, S-W: $p < 0.00$). As a result of the lack of normality in the distribution, the Mann-Whitney U test is utilised to conclude if there is a significant difference in the mean between each the respondent groups.

The hypotheses for this test are as follows:

H_0: There is no significant difference between the mean rating of effectiveness across respondent groups

H_7: There is a significant difference between the mean rating of effectiveness across respondent groups

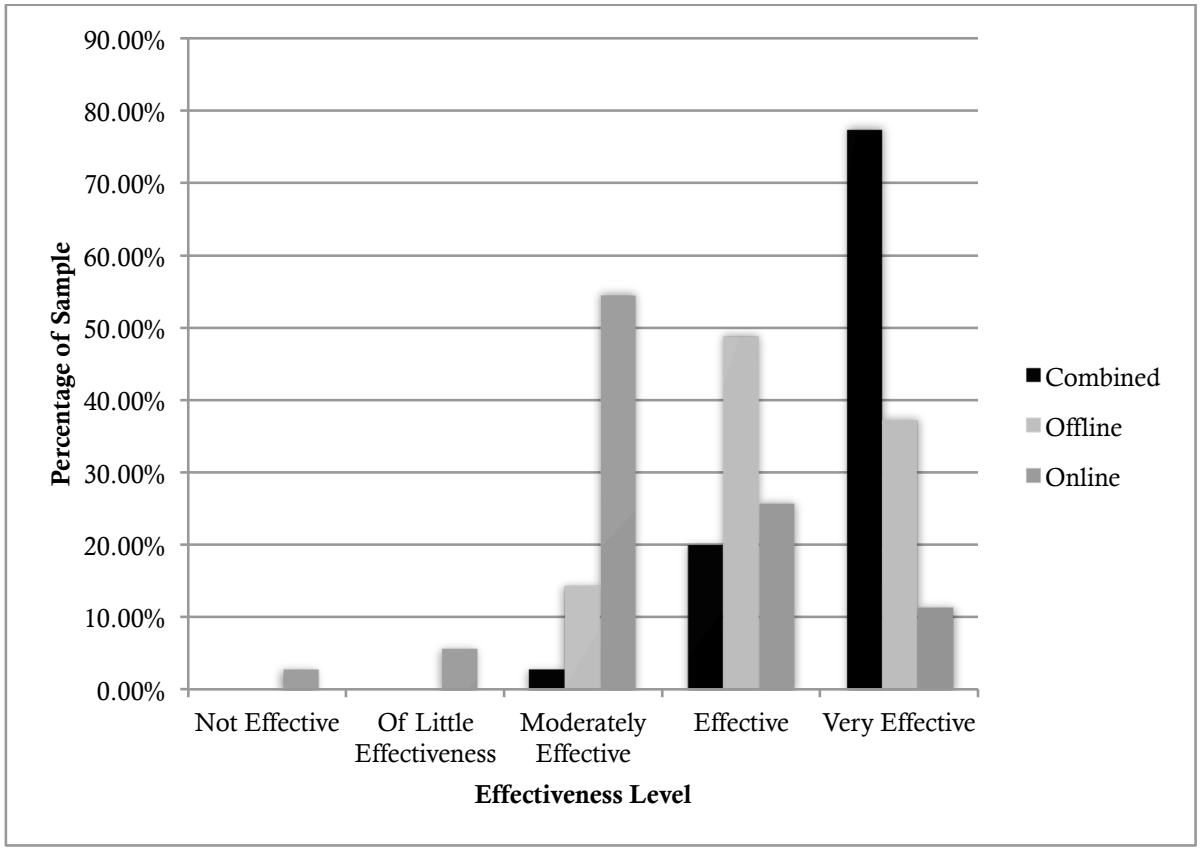

Figure 20 Ratings of Competition Effectiveness

The Mann-Whitney U test showed that there is a significant difference in the mean amongst the respondent groups on all effectiveness variables (Online Competition Effectiveness M_1: 3.371 M_2: 4.043, $U = 1463$, $p < 0.00$ - Offline Competition Effectiveness M_1: 4.229, M_2: 3.400, $U = 1393$, $p < 0.00$ - Combined Competition Effectiveness M_1: 4.743, M_2: 4.143, $U = 1460$, $p < 0.00$) (Table 16).

	Online Competition Effectiveness	Offline Competition Effectiveness	Combined Competition Effectiveness
Mann-Whitney U	1463	1393	1460
Offline Innovators' Mean (M_1)	3.371	4.229	4.743
Online Innovators' Mean (M_2)	4.043	3.400	4.143
Grand Mean (GM)	3.707	3.8145	4.443
Asymp. Sig. (2-tailed)	.000	.000	.000

Table 16 Mann-Whitney U Test Effectiveness Result

This shows that the level of effectiveness is rated significantly different between respondent groups, with the Offline Innovators rating offline innovation competitions as more effective and Online Innovators rating online innovation competitions more effective. However, Combined Competition Effectiveness mean ratings were amongst the highest of all ratings of effectiveness (M_1: 4.743, M_2: 4.143, GM = 4.443) (Table 16). This shows that although there is a tendency to rate their own innovation competition type as generally more effective, both respondent groups note that an innovation competition having elements of both would be most effective.

To test whether there is a correlation between the years experience in each type of innovation competition and the rating of effectiveness, a Pearson's correlation is used to find the correlation coefficient (r). The Pearson's correlation showed a significant moderate correlation between the experience of social innovation competitions and the effectiveness ratings of online innovation competitions, $r(139) = .292$, $p < 0.01$ (Table 17 and Figure 21).

		Online	Offline	Combined
Social Innovation Competitions	Pearson Correlation	**.292**	.137	-.070
	Sig (2-tailed)	**.000**	.108	.412
	N	**140**	140	140

Table 17 Effectiveness Correlation Result

This means that, as respondents obtain more experience in social innovation competitions in general, the rating of effectiveness of online social innovation competitions is higher.

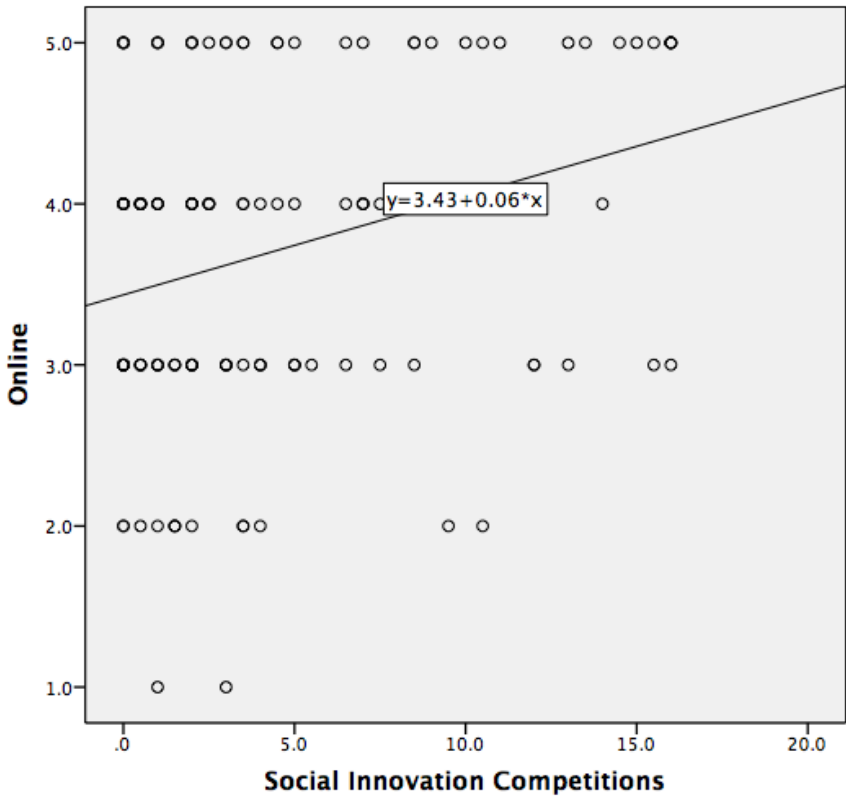

Figure 21 Years Experience in Social Innovation Competition and Online Competition Effectiveness Ratings Correlation

4.6.4 Innovation Outputs

A Fisher's Exact test is used to determine if there is a significant relationship between the type of innovation competition participated in (Online Innovator or Offline Innovator) and the type of innovation that was output.

The following hypotheses are tested by means of the Fisher's Exact test:

H_0: There is no significant relationship between the type of innovation competition and the type of innovation outputted

H_8: There is a significant relationship between the type of innovation competition and the type of innovation outputted

A χ^2 test of independence assumes that each entity contributes to only one cell of the contingency table, and that fewer than 20% of expected values are < 5 (Field 2013). In this case, the second assumption of the χ^2 test of independence is violated, in that 6 cells have an expected count of < 5 (50%) (Table 18). Therefore, the Fisher's Exact test is used to calculate the Exact statistic instead.

		Offline Innovators		Online Innovators	
		Count	Expected Count	Count	Expected Count
Innovation Type	**Blank**	2	1	0	1
	Other	0	8	16	8
	Process	0	2.5	5	2.5
	Product	40	29	18	29
	Service	28	25	22	25
	Software/ Application	0	4.5	9	4.5
a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is 1.00.					

Table 18 Innovation Type Fisher's Exact Test Result

The Fisher's Exact test resulted in a significant relationship being identified between Offline Innovators and outputting a Product (Fisher's Exact Test Statistic: 44.409, $p < 0.00$). Furthermore, Online Innovators tended to output Software/Applications, Processes and Other types of innovations (Fisher's Exact Test Statistic: 44.409, $p < 0.00$), with Offline Innovators not outputting any of these innovation types as a result of the offline social innovation competition. This means that it is likely that an offline social innovation competition will output a higher yield of Products, whereas an online method will likely output a higher yield of Software/Applications, Processes and Other.

4.7 Success Factors of Social Innovation Competitions

The success factors analysed within this study are collected from the literature and tested for their application to social innovation competitions, in both supporting the formalisation of a the model, and contributing to the development of success factors for social innovation competitions. As such, it was identified that empirical studies, through conducting social innovation competitions prior to each of the data collection methods, were required for the collection and analysis of the Success factor data. As stated, outputs of an innovation competition are detailed as being any innovation ideas, sketches, prototypes, and full solutions to the challenge being presented (Ebner et al. 2009). As such, it was deemed necessary to run a series of methods related to the perception of such success factors to a social innovation competition. Consequently, social innovation competitions are determined as being time-finite, non-profit social innovation processes that are determined successful with high quality, collaboration potential, social impact and novelty. From this study, it seems that there was a high amount of experience amongst the respondent groups with regards to participating or managing social innovation competitions, with a mean of experience amongst all respondents in the three methods having a mean of 4.594 years experience. From this data, it is understood that the respondents within this study were experienced enough to provide insight into their perceptions of the success of social innovation competitions.

Firstly, Quality was understood to be a Success factor that is applicable to both offline and online social innovation competitions, retrieving the highest proportion above the binomial distribution (0.566 in the unweighted test and 0.562 in the weighted test), when utilising Bernoulli trials. These proportions detail Quality as being a central Success factor of social innovation competitions and its respective outputs. Additionally, Quality returned the least significant result (p = 0.758) when conducting the Kruskal-Wallis H test, which meant that there was minimal variance in the mean ranks across respondent groups. With regards to this statistical result, Quality returned values closest to the expected counts, having only a maximum value between observed and expected counts of 2.4 between Respondent Groups. The logistic regression resulted in a significant statistic, although the change in likelihood, as a result in a 1-year increase in experience, reduced by 7% (b = -0.07), detailed in this study as a marginal reduction. Comments gathered from the study revealed that Quality can be measured by an analysis of innovator “expertise” (Participant ID: 1310254), the “market and suppliers” (Participant ID: 1347885), “provisional pricing” (Participant ID: 1334415), “confirm the problem that the idea solves and consider what you would pay for that solution” (Participant

ID: 1306091). Others also stated that providing benchmarks within a "quality assurance process" (Participant ID: 1231171) would indeed enable Quality to be measured.

A second potential Success factor for social innovation competitions, Social Impact, received the second highest proportion in the unweighted proportion calculation (.56) and the third highest in the weighted proportion calculation (.548), each of which are evidently above the 0.5 threshold of the Bernoulli trial. This means that it is likely that it is a worthy Success factor of social innovation competitions. Social Impact was detailed as being significantly dependent upon respondent group in the Kruskal-Wallis H test and χ^2 test for independence ($p<0.01$), with offline innovators' (observed: 28, expected: 39.2) and experts' data returning an observed count significantly higher than the expected count (observed: 17, expected: 19.6). This shows that these two respondent groups found Social Impact to be of particular importance, but online innovators did not. The results of the logistic regression, in both unweighted and weighted case analyses, did not return a significant result and thus the null hypothesis was not rejected. It was understood that Social Impact was detailed as being measured by measuring the "number of people [whose] life is improved" (Participant ID: 1228858) and whether it provides "new solutions to the community" (Participant ID: 1225801).

Another Success factor, Collaboration Potential, returned a reasonably strong set of results from the analyses conducted above. Collaboration Potential returned two proportions above the 0.5 threshold: .526 and .549 in the first and second analyses respectively and was also noted as significant in the χ^2 test for independence ($2, N = 175) = 8.031, p = 0.018$. The observed counts in the Offline respondent group were significantly higher than the expected, the observed counts in the online respondent group were significantly lower than expected, and the observed counts in the Experts group were significantly higher than the expected count. This shows that both Offline Innovators and Experts value Collaboration Potential as a Success factor of social innovation outputs, but not Online Innovators whom potentially are not provided with the same collaboration opportunities as offline innovators (tested in the following study). Nevertheless, Collaboration Potential could be measured by quantifying the level of "expertise" (Participant ID: 1310254), the capabilities of the "network", through network analyses, (Participant ID: 1334415) and the "complexity of the idea… and the competencies needed to carry out the idea" (Participant ID: 1306091).

Finally, Novelty was perceived in this study as a secondary Success factor due to it returning a low proportion in the first calculation (.466) and a proportion above the threshold in the weighted cases proportion calculation (.514). This produced a tentative result, as it only appeared marginally above the binomial threshold when weighting the cases. This change in

proportion is due to the high value that Experts associated with the Novelty Success factor (0.75 amongst the expert respondent group). The χ^2 test for independence and Kruskal-Wallis H test each returned a significant result that determines this metric as being dependant upon respondent group, due to the relatively high proportion of successes amongst the Expert respondent group. Comments gathered throughout the study revealed that Novelty and Collaboration Potential are "probably the most important at determining success of the product/service" (Participant ID: 1334415), but "difficult to Success factor at the early stage... [so] they should be estimated" (Participant ID: 1334415, 1310254). As such, participants of the methods in this study detailed that Novelty can be measured by a "review of the Intellectual Property" (Participant ID: 1310254, 1347885, 1306091) or "benchmarking" against existing innovation ideas (Participant ID: 1347885). Although, it is clear that further work is required to utilise these success factors in practice in social innovation competitions, it is understood that the study provides an indication of what factors contribute to the success of social innovation competitions. It is understood that further empirical testing of such success factors are required in practice in order to confirm or deny their value in social innovation competitions, but one may state that innovation managers should bear these factors in mind in order to operate a successful social innovation competition.

4.8 Online and Offline Social Innovation Competitions

From this study, it has been identified that there are many differences between the perceived gains and compromises of offline and online competitions, with two of the differences being two of the factors from the first study: quality and collaboration. Furthermore, online social innovation competitions were identified, by both respondent groups, as being having more scalability, having a higher quantity of innovations, and having more innovation responses. On the other hand, offline social innovation competitions were identified as receiving higher quality innovations, having better idea feasibility, and producing better methods of collaboration. This presents a potential trade-off with larger, more scalable, online innovation competitions receiving lower quality innovations, and offline competitions running with less scalability, but with higher quality. This finding partly contradicts much of the literature that advocates the Web, and collaborative networks, as providing more effective and efficient innovation production (e.g. Tuomi 2002). This may be the case with regards to its potential scale, however does not focus on the particular quality of the innovation outputted as a result. It is suggested that the implications involved with the scale and quality trade-off is that managers and organisers of such social innovation competitions would be required to select

the format based on their intentions and objectives of the output, whether they are pursuing market research outputs, or looking to develop feasible and implementable innovations.

Furthering this, it has been described that the higher the scalability of a social innovation competition the more difficult it is to manage (Boudreau & Lakhani 2012), and as such, collaboration is reduced or diminished. Aligned with this notification, participants stated that "offline collaboration allows for more synergies and creative interactions" (Participant ID: 1586012), "offline discussions have more potential/quality" (Participant ID: 1588515), "people tend to be more active [offline]" (Participant ID: 1587457), and "Ideas comes up more easily offline, discussions naturally go on in parallel" (Participant ID: 1585675). In contrast, respondents stated that online collaboration, or conducting the social innovation competition online would be stagnant, slow, difficult to collaborate, and impractical, particularly when innovating a physical item or product. Thus, it is understood that not only is an online collaborative innovation practice difficult to manage, it is also somewhat difficult for participants to collaborate. As identified in the literature, collaboration is fundamental for achieving optimum innovation outputs (Paulus & Nijstad 2003), particularly in the social sector.

It was also evident that certain types of innovations are outputted as a result of each of the types of innovation competition. For example, it was found that Products tended to be output from offline innovation competitions due to the requirement for testing physical prototypes in a real-world environment (Participant ID: 1600446, Participant ID: 1587688) – there was a significant relationship between the offline innovation competition and the output of Products (Fisher's Exact test: 44.409, $p < 0.00$). On the other hand, online social innovation competitions tended to output Software and Applications significantly higher than expected. In addition to this, comments stated that "if the solution was purely digital, it could be done online" (Participant ID: 1600569) and that the "actual planned work could have been done online" (Participant ID: 1585751). As such, again we see a trade-off amongst either leveraging online or offline innovation competitions: physical product or digital product/software.

In conclusion, there appear to be a number of trade-offs that are understood to be at stake with regards to either running an offline innovation competition or an online innovation competition: offline innovation competitions are found to encourage higher quality innovations, through better collaboration, and with a primary output being in a Product category, whereas online innovation competitions are found to encourage more scalability, have more innovation responses, and are likely to output software and application innovations instead of products. Due to the nature of these findings, it is understood that the study detailed

in this chapter informs management decisions in the type of social innovation competition format to use, based upon the objectives of the organisation or management. On this point, it is understood that more scalable online social innovation competitions may be more useful in performing market research for new innovations to be created within the organisation, whereas higher quality and increasingly collaborative offline social innovation competitions are more dedicated to encouraging a few viable product-based social innovations that have the potential to be implemented. Furthermore, it is understood that although collaboration potential, quality and social impact were all understood to be the success factors for contributing to the success of a social innovation competition, management decisions must be made with regards to the additional compromises and gains found within this study. With regards to the core factors, however, social impact is the only factor that is not largely affected by whether the social innovation competition is operated online or offline, establishing it as an essential component of social innovation competitions on the whole.

4.9 Hybrid Social Innovation Competition: Proposed Solution to the Success Factor Trade-Off

As presented above, there is a potential trade-off in the success factors across each type of social innovation competition with the offline version obtaining higher quality, targeted innovations that enable better collaboration amongst innovators, but lacking the scalability. Whereas the Web-based version enabling higher scalability, with a high quantity of innovations, but lacking in the quality, targeted innovation ideas that may be required in some scenarios. Although innovation managers may choose which type of social innovation competition they may run based upon the respective objectives of the organisation and the innovation model, it is important to note that some scenarios would require ideas at scale, whilst also needing the quality as outputted in an offline social innovation competition. Thus, it is understood that a proposal is required to understand how innovation managers may leverage the success factors of each type of social innovation competition and lessen the potential trade-offs at play.

From the results of the study we see a comparative difference between the overall effectiveness of online and offline innovation competitions. It was identified that there was a significant difference in the mean ratings between respondent groups, however offline social innovation competitions were rated higher (3.8145 on a 5-point Likert-scale, in comparison to

the 3.707 of online competitions). Nevertheless, it was widely understood that a combined social innovation competition, utilising aspects of both is essentially the most effective with a rating of 4.443 on the 5-point Likert scale. Cross-referencing this data with the experience of the two respondent groups, having a combined mean experience in offline innovation competitions of 4.407 years and online innovation competitions of 4.45 years, it is understood that there is a particular requirement for a combined online and offline competition for most effective innovation output. This derives from the ability to leverage each of the aforementioned benefits of each competition for more scalability, higher quality and better collaboration amongst the innovation process, but also encouraging a wider spread of innovations from the respective innovators themselves.

As such, it is proposed that a hybrid version of Web-based and offline social innovation competition may be required in this particular scenario. This hybrid model would indeed reduce the potential trade-offs at play and support the leveraging of the success factors. Open Ideo, a social innovation competition platform that leverages innovation meetups, is one example of this model in practice. Sponsoring organisations, such as Oxfam, present the challenges that they face in their organisation. Open Ideo provides the platform through which innovation ideas can be submitted to the particular challenge, managing the whole process and providing support in the further development of ideas. Open Ideo then provides meetup scenarios whereby innovators can meet in person to discuss and strengthen their innovation ideas and increasing the overall quality. Innovation managers and representatives of the sponsoring organisations are also in attendance to provide mentoring support to the innovators. Challenges presented cover many areas of social and educational development including: how might we provide educational outcomes for children and youth in emergency situations? Or how might we get products to people without generating plastic waste?

Open Ideo is a key example of how a hybrid social innovation competition can be used in practice. The scalability is leveraged through utilising a widely popular submission portal, which is managed by the Open Ideo team. Quality is maintained through ensuring that mentoring possibilities are put in place all throughout the process. Collaboration is supported through enabling and encouraging innovators to meet each other in person, and meet with experts in the challenge and experts in social innovation practices. With each challenge being of a social or educational nature, aimed at improving society, social impact is the primary objective. Furthermore social impacts are measured through understanding how many people are affected positively by the outcome innovation. The measurement process is conducted by the sponsoring organisation. As such, all success factors of each type of social innovation competition are maintained throughout, supporting the production of viable social innovations

that have a measurable impact on society. It also indicates that it is a working solution to the potential trade-offs. Nevertheless, innovation managers may only require certain aspects of a social innovation competition and it must also be noted that a hybrid social innovation competition would be more costly and complex to operate and manage.

5 Conclusions

This chapter details the final discussions and wider conclusions based upon the cases studied within this thesis. Firstly a discussion regarding the defining of social innovation competitions is shown in order to provide necessary contexts to the wider conclusions of this thesis. Following this, a discussion of the perceived success factors is presented with particular focus on their relative significance then their potential trade-off between the two types of social innovation competition. Finally the conclusions are presented with a means to apply the findings to wider contexts in order to show how management, academia, and social organisations may incorporate the findings in a practical way. The findings within this thesis contribute to the literature streams of social innovation, and collaboration - in particular the debates around the application of social innovation practices in an open innovation model (Chesbrough et al. 2014). As such, the primary objective of this thesis was to determine which success factors were perceived as being the most prominent in social innovation competitions. This exploratory study is understood to be one of the first studies in the field of social innovation competitions and as such can provide a foundation for further studies in this increasingly important area.

The perceived success factors are determined in the first study, by way of merging and analysing data from case studies and accompanying survey data. This inductive study enabled the foundations to be laid for the second study: the agreed trade-offs of success factors between online and offline social innovation competitions. This particular study places itself within the Web Science and Management literature in order to understand the constraints and benefits of the Web in operating such practices and to provide conclusions for management on how to implement these practices for optimum effectiveness, respectively. Additionally, it was understood that the formalisation of how organisations could conduct social innovation was somewhat lacking (e.g. Taylor 1970). Furthermore, an analysis of the compromises and gains of social innovation was a distinct gap in the literature that this thesis contributes to. This chapter discusses each of the contributions in the order that they were uncovered, initiating the conclusions with a better understanding of what social innovation competitions are.

5.1 Contextualising Social Innovation Competitions

The thesis demonstrated that there was a lack in the literature of a definition of social innovation competitions, even though a series of definitions for social innovation and innovation competitions were evident (e.g. Taylor 1970; Wilber & Fairweather 1968; Bullinger & Neyer 2010). Firstly, the definition of social innovation appears to be widely recognised as the necessary function for the development of humanity through the production of social goods and products that affect the status quo (McKeown 2008; Pol & Ville 2009; Young 2011). Innovation competitions, were detailed as being time-finite, being able to be conducted in timely fashion, with speed and efficiency (Bullinger & Neyer 2010). The literature up until this point had not previously merged the concepts from each into innovation competitions with a social output; instead the literature primarily focused on for-profit outcomes within this and similar models. In the social innovation competition format, a wide range of innovation outputs can be collected such as innovation concepts, ideas, sketches, prototypes, elaborated concepts and fully functional solutions depending upon the length of the innovation competition (Ebner et al. 2009), but maintaining a focus on social output rather than for-profit, as directed by Chesbrough et al.'s (2014) open social innovation model. Antikainen & Vaataja (2010) add that innovation competitions support communities of innovators to source and develop their own rewards, through fame, altruism, increased knowledge or reputation in any given network: they are not provided with rewards, whether pecuniary or non-pecuniary. As such, the social innovation competitions ran within this research was operated without the offer of a reward. Primarily because it was dictated by the literature in order to remain a ‘competition’ rather than a ‘contest’, but also due to the limitations with regards to measuring the output at that particular point.

Although the lack in definition is apparent, it is understood that one is required in order to contextualise the subsequent research and differentiate this type of innovation practice from other social innovation practices. Thus, for contextualisation reasons, this thesis merges the conceptual theories surrounding the above concepts of social innovation and innovation competitions, stating that social innovation competitions are time-finite and philanthropic innovation practices conducted to source products and services that challenge the status quo. The contextualisation of this term enables subsequent research to be conducted based upon this primary formalisation of the concept, and furthermore, enables organisations to better formalise and construct innovation competitions that have a social output. As described, social innovation competitions are aimed at providing solutions to social challenges, through

collaborative methods, and detract from the offering of pecuniary rewards, as the incentive should primarily be based from philanthropic motivations. This conceptualisation stems from the theoretical definitions currently available in similar concepts in the literature. In order to contribute further to this new field, Goswami & Mathew (2005) claim that in order to strengthen an innovation concept, one must endeavor to provide a series of success factors. As such, from the methods and studies conducted in this thesis, a series of perceived success factors applicable to social innovation competitions are identified. These factors are social impact, quality, and collaboration potential, outlined and determined in the following section.

5.2 Success Factors of Social Innovation Competitions

In this thesis, perceived success factors are identified that may contribute to the success of a social innovation competition. With reference to the success factors study, it was understood by the participants that there are three primary success factors within such competitions: Quality, Collaboration Potential and Social Impact. Firstly, Quality returned the least significant result (p = 0.758) when conducting the Kruskal-Wallis H test, which meant that there was agreement amongst all three respondent groups on this Success factor being appropriate for this stage of the social innovation process. In order to determine the level of Quality within a social innovation completion, it can be measured by an analysis of innovator "expertise" (Participant ID: 1310254), the "market and suppliers" (Participant ID: 1347885), "provisional pricing" (Participant ID: 1334415), "confirm the problem that the idea solves and consider what you would pay for that solution" (Participant ID: 1306091). Others also stated that providing benchmarks within a "quality assurance process" (Participant ID: 1231171) may indeed enable innovation managers to understand the level of quality within the competition.

Collaboration Potential was also noted as significant in the χ^2 test for independence (2, N = 175) = 8.031, p = 0.018. The observed counts in the Offline respondent group were significantly higher than the expected, the observed counts in the online respondent group were significantly lower than expected, and the observed counts in the Experts group were significantly higher than the expected count. It was added that Collaboration Potential could be determined by understanding the level of "expertise" (Participant ID: 1310254), the capabilities of the "network", through network analyses, (Participant ID: 1334415) and the "complexity of the idea… and the competencies needed to carry out the idea" (Participant ID: 1306091). It was largely found that the collaboration within the PORT case was much higher

than the Microworkers case. This may be due to the ability for the innovators to discuss their ideas in person. Some of the innovators mentioned that collaboration can be difficult online, as there tends to be a distancing effect by the delays in the communications technology, differences in timezones, and lack of ability to get 'hands-on' with the innovation itself. This seems to indicate why a higher proportion of product-based innovations were outputted from the PORT case than the Microworkers case too.

Social Impact also appeared to be a very poignant and important success factor of social innovation competitions. Competitions that are aimed at tackling social issues must output innovations that have a focus on non-profit, social efforts – resulting in some form of social impact. In support of this notion, social impact was detailed as being significantly dependent upon respondent group in the Kruskal-Wallis H test and χ^2 test for independence ($p<0.01$), with offline innovators' (observed: 28, expected: 39.2) and experts' data returning an observed count significantly higher than the expected count (observed: 17, expected: 19.6). This shows that these two respondent groups found Social Impact to be of particular importance, but online innovators did not. It was understood that determining the level of Social Impact can be done by quantifying the "number of people [whose] life is improved" (Participant ID: 1228858) and whether it provides "new solutions to the community" (Participant ID: 1225801). This abides by Taylor's (1970) notion that social innovation has to affect the status quo. Figure 22 shows the three success factors resulting form the first study, with Quality being at the top representing the primary factor and the others being at the bottom of the figure representing a decreased amount of importance. Nevertheless, each of the success factors detailed are deemed as required in order to determine the success of a social innovation competition and its respective outputs. This contributes to the literature in providing an exploratory approach to understanding the success factors within the context of social innovation competitions. Furthermore, it strengthens the definition and formalisation of social innovation competitions, supporting the development and organisation of such innovation practices both for subsequent empirical research and organisational activity.

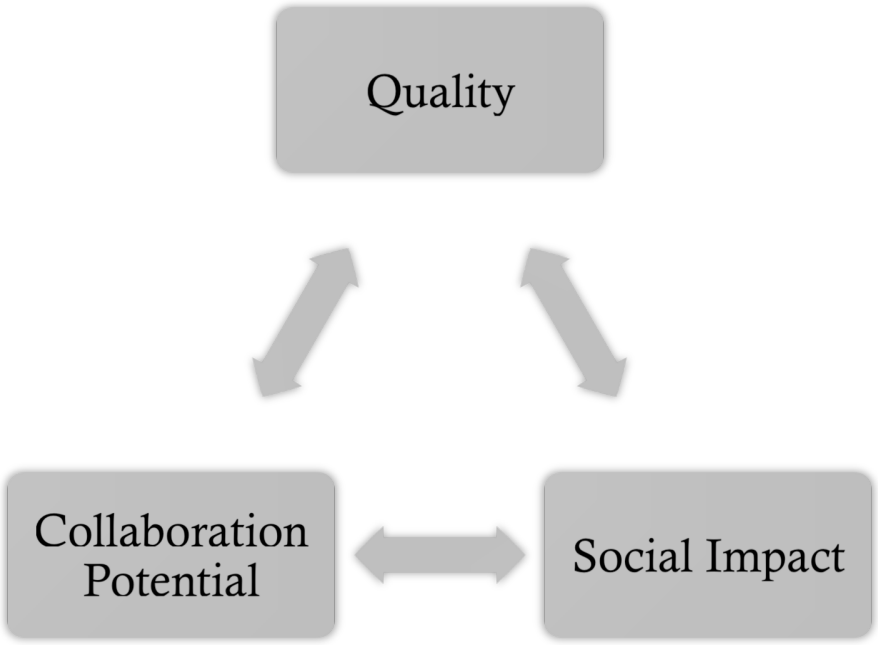

Figure 22 Success Factors in Social Innovation Competitions

5.3 Success Factor Trade-Off in Social Innovation Competitions

It is widely regarded that the Web has increased the maturity of innovation practices, supporting the development of international collaborative business and the global economy (Dini & Tiropanis 2013; Chesbrough 2003a). Prandelli et al. (2006) added that the Web has the capacity to create new opportunities for consumer integration, and contribute to the diversity of innovation. Furthermore, within the collective intelligence literature, collaborative teams are detailed as being able to cover many aspects of the innovation through a collective vision facilitated by collaborative tools, (e.g. the Web) (Paulus & Nijstad 2003; Carbone et al. 2012). In congruence, Antikainen et al. (2010) noted that collaborative communities tend to output more market applicable, appropriable and complete innovations. This has been found to be evident also in social innovation competitions, but leaves the question of whether social innovation practices, primarily social innovation competitions, support collaboration better in

an online or an offline context. In general, literature stemming back to the 1960's detailed the importance of technology in innovation processes (Allen & Cohen 1969), with the majority of literature in this topic tending to suggest that Web-based innovation is much more fruitful than innovation practices that do not use technology. Although this is the case for some factors of innovation practices, this thesis found that it is not the case for all, namely collaboration and innovation quality.

On this point, offline social innovation competitions were perceived in these cases as having better idea feasibility, and producing better methods of collaboration. Participants stated that "offline collaboration allows for more synergies and creative interactions" (Participant ID: 1586012), "offline discussions have more potential/quality" (Participant ID: 1588515), "people tend to be more active [offline]" (Participant ID: 1587457), and "Ideas comes up more easily offline, discussions naturally go on in parallel" (Participant ID: 1585675). In contrast, respondents stated that online collaboration, or conducting the social innovation competition online is stagnant, slow, difficult to collaborate, and impractical, and even more so when innovating a physical item or product. Collaboration is fundamental for achieving quality innovation outputs (Paulus & Nijstad 2003), which supports the result in finding that higher quality innovations tend to be output from offline social innovation competitions. This assertion is backed up in comparing two cases with the PORT having lots of collaboration and the Microworkers competition having very little. Even with these pitfalls of collaboration and quality, online social innovation competitions were understood as having more scalability, having a higher quantity of innovations, and having more innovation responses. This may indeed support those organisations looking to perform market research at a fraction of the cost of more traditional forms of market research. However, it has been described that the higher the scalability the more difficult it is to manage (Boudreau & Lakhani 2012), and as such, collaboration is potentially reduced.

Akin to the collaboration and quality findings, Products tended to be output from offline innovation competitions due to the requirement for testing physical prototypes in a real-world environment (Participant ID: 1600446, Participant ID: 1587688) – there was a significant relationship between the offline innovation competition and the output of Products (Fisher's Exact test: 44.409, $p < 0.00$). On the other hand, online social innovation competitions tended to output Software and Applications significantly higher than expected. In addition to this, comments stated that "if the solution was purely digital, it could be done online" (Participant ID: 1600569) and that the "actual planned work could have been done online" (Participant ID: 1585751). As such, again there seems to be a trade-off amongst either leveraging online or offline innovation competitions: physical product or digital product/software. It is suggested

that the trade-offs evident in the findings support the theory that managers and organisers of social innovation competitions should select either an online or an offline social innovation competition based upon their intentions and objectives - whether they are pursuing market research outputs, or looking to develop feasible and implementable innovations.

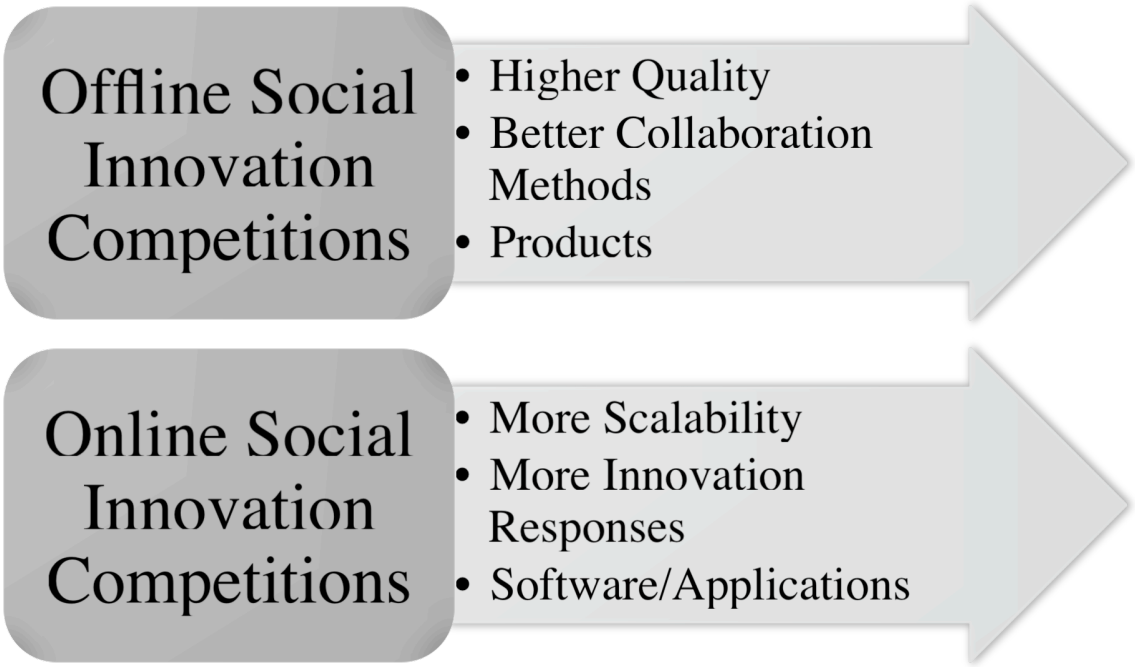

Figure 23 Factors in the Methods of Social Innovation Competitions

5.4 Further Conclusions

From the conclusions of the studies detailed above, it appears that a number of factors have emerged that can be cross-referenced across the studies' conclusions. By bridging together conclusions within each of the studies' it is understood that further conclusions can be drawn for wider applications to industry and academia.

Collaboration was a factor that has consistently drawn a significant value from the results of the various studies detailed in this thesis. From the literature review, collaboration is understood as a being particularly important in social innovation competitions, and supports the development of more innovative outputs (Paulus & Nijstad 2003; Chesbrough 2003a). As

such, Collaboration Potential was detailed as being a potential Success factor of social innovation competitions that specifically was significant amongst offline innovation competitions and innovators. This understanding may indeed stem from the finding that offline social innovation competitions appear to support better methods of collaboration and contain more useful methods of collaboration. Finding that offline social innovation competitions provide better collaboration potential as a whole, further confirms the importance of collaboration in social innovation competitions.

It was also found that there was a trend in perception with regards to what particular outputs were outputted as a result of online social innovation competitions and offline social innovation competitions. Using Fisher's Exact tests, it was deemed significant that products tended to be output from offline social innovation competitions. In addition to this, there was an understanding that higher quality innovations tended to be output from the innovators who participated in an offline social innovation competition. Through understanding these particular outputs, and how to attain them, it is understood that innovation managers and organisers can leverage the appropriate type of competition in order to encourage the appropriate type of innovation output.

5.5 Limitations and Future Recommendations

Although conclusions are presented that contribute to the field of social innovation and demonstrate an exploratory analyses of the data associated with each of the key stakeholders, there are a number of limitations of the work within this thesis. Firstly, it may be noted that the data collected from the innovator respondent groups was collected following their participation in a representative social innovation competition format, however, one may suggest that it would also be beneficial to collect data during or before the process. This would enable further conclusions to be drawn comparing the data between the two or three stages of the social innovation competitions and also enable control data to be collected for more substantial findings. Furthermore, it may be suggested that one could collect practical data on the innovation processes associated with team size, innovation time etc. Although this would be beneficial data, it would indeed add to the complexity of the methodology. On a similar point, it is also notable that some of the data collected is in a binary format, which could have been collected in an alternative continuous format for other types of statistical testing. Thus, it is advised that further research in this field attempt to follow these recommendations associated with data collection and data type in order to draw extended conclusions.

It may also be notable that the datasets are of a moderate sample size ($N = 70, 70, 35$), with the Expert Delphi study returning the smallest sample size. Although this meets the recommendations of Field (2013), it is understood that larger sample sizes may enable more rigorous statistical significance to be obtained. Nevertheless, due to the small size of the sample population, and the very limited cases of social innovation competitions, increasing the sample sizes may indeed be difficult and very time-consuming. With regards to data, it may also be understood that the collection of qualitative data would indeed provide further insight into the statistically significant figures presented in the studies. Interviews and focus groups may all be conducted to add to the portfolio of data in this field, but remains outside the scope of this thesis.

It is understood that further testing of the success factors is crucial. Empirical testing of such success factors would enable innovation managers and professionals to evaluate the practical application of these success factors. Should further experiments be conducted in this field, it is recommended that each Success factor be taken as an individual and tested for its practical application in social innovation competition, utilising it in a number of different online and offline social innovation competitions. This would indeed enable the confirmation of the success factors in practice. Through providing comparisons of such data with a set of 'control data' would inevitably enable further conclusions to be drawn on the applicability and usefulness of such datasets. A study such as this requires numerous experiments to be conducted with numerous types and formats of data within a number of different social innovation competitions, which indeed remains outside the scope of this thesis.

5.6 Wider Applications

This section details how the research provides researchers, industry professional and the third sector with a foundation for further research and application of the conclusions into social innovation competitions. Although this research recognises the fact that each particular social innovation competition will have different aims, objectives and challenges applied to it, it is understood that the conclusions presented above provide a set of key insights into the social innovation competition topic, and supports industry professionals to develop a more effective social innovation competition, with a potentially optimum output.

5.6.1 Academia

The definition of social innovation competitions has thus far been largely lacking in the literature stream, and as such, this thesis presents a primary contextualisation of the innovation practice. From presenting this initial contextualisation of the concept, success factors are presented that could indeed be tested and utilised in subsequent studies to build upon the existing research detailed in this thesis. Additionally, the comparison between offline and online social innovation competitions provides a basis for further investigation into either or both of these types of innovation competitions from a Web Science perspective, looking at other aspects of the competitions that are not studied here. The methodology presented in this thesis is detailed as a novel alternative to other studies previously presented in the innovation and social innovation fields, determining a blueprint through which other studies can be performed in this field. Understanding these contributions to the field in academia, and from the publication of results, it is understood that the conclusions of this thesis are grounded in and applied to academic theory.

5.6.2 Innovation Management and Industry

It is important in innovation, and wider management studies to determine the potential wider implications this can have on managers and professionals in any given department. As such, this thesis presents three primary factors to encourage the success of a social innovation competition: quality, collaboration, and social impact. It has been identified that, if social innovation competitions are to be operated in practice, these success factors are required as part of the operation of the process. These success factors have to be understood as the key components of a social innovation competition when choosing the metrics, the methods and the resources which to place within the social innovation competition. Akin to this, recommendations regarding how social innovation competition outputs may be measured are detailed to encourage the quantification of seemingly intangible practices and outputs. It is noted that recommendations are made with regards to the leveraging and utilisation of appropriate social innovation competitions and resources depending upon the aims and objectives of the management staff.

For example, it is deemed necessary to conduct an offline social innovation competition should you wish to receive fewer innovations, that are potentially of higher quality and

implementable. Alternatively, should an innovation manager wish to research or better understand a particular market, setting an online social innovation competition and gathering a wealth of innovations submitted to the challenge, would be deemed more appropriate. Thus, it is understood that the conclusions and contributions made towards industry are valuable for the performance and optimisation of social innovation competitions in the future, reducing the potential for resource wastage, and supporting the development of innovations appropriate for the objectives of management.

From this, and the related research conducted to form this thesis, many types and models of social innovation competitions can be developed in accordance with the research findings. One such model would be that of the online model, built leveraging an existing network of innovators whom are presented with a short-term social challenge that they can submit ideas to. This model, may indeed support a higher quantity of innovations, but may lack in the ability for collaboration, and so quality is potentially sacrificed. This model could either be run on an existing network, such as Open Ideo, or organisations could set-up their own bespoke network that would be fit for the particular challenge presented in the social innovation competition. An alternative method would be to run a hybrid online and offline social innovation competition that enables innovators to work together both offline and online so as to retain the collaboration required for optimum quality innovation output, but also support the scalability of the innovation competition. It is understood that such a social innovation competition would indeed be costly, but may indeed be the model of which to follow should the organisation wish to receive a large array of innovations that have a high level of quality.

5.6.3 The Third Sector

It is identified that the sector as a whole may indeed benefit from the application of the conclusions and contributions outlined in this thesis. For example, NPOs, charities and other organisations in the third sector may have limited information with regards to how innovation practices, and more specifically social innovation practices are conducted. Instead the majority appear to have objectives centred on fundraising and gathering donations associated with their particular cause. Although these practices have worked for decades, it is understood that the collaborative effort of innovators and entrepreneurs may indeed support the development of innovations that provide solutions to the issues, rather than simply providing financial support to potentially appease the issue. Utilising this framework of social innovation competitions, it is understood that organisations within the third sector can expand their focus and encourage

innovators to tackle the challenge directly: instead of donating finances, people can donate solutions to the challenge. NPOs, charities and other organisations within the third sector may wish to embark on incorporating social innovation competitions into their promotional and developmental repertoire, and as such, these organisations are advised to think about their core social challenges as an organisation and pose it as a question on the Web. This could either be done through their website or an alternative innovation network. It is important to set a deadline for innovation submissions, and encourage collaboration in all stages of the innovation production cycle, in order to encourage the development of the most effective innovations for the presented challenge.

5.7 Final Remarks

The tackling of social challenges is undoubtedly a complex and intricate matter that needs addressing from a number of varied theoretical and practical perspectives. As an increasing number of organisations look to utilise and leverage external personnel in an internal innovation process through paradigms such as the open innovation framework, it is understood that the third sector can also benefit from such strategies to accelerate their innovation potential. Although these benefits are evident on the surface level, more research and practice is required with regards to the true impact of such innovation practices on the development of social innovations – conducting more research will support both the academic and industrial sectors through expanding the academic knowledge in this field and directly benefitting those affected by social challenges such as neurogenetic disorders, viral outbreaks, poverty etc. Such challenges are always evident in society and will continue to be so, but utilising the Web, and formalised innovation practices, social challenges may be overcome with greater ease.

6 Workshops, Conferences and Publications

6.1.1 A Proximal Analysis of Chinese Posts on Sina Weibo in Reaction to the Salt Panic of March 2011

WWW Conference, Seoul Republic of Korea, April 2014

This paper presents an analysis of humour use in Sina Weibo in reaction to the Chinese salt panic, which occurred as a result of the Fukushima disaster in March 2011. Basing the investigation on the humour Proximal Distancing Theory (PDT), and utilising a dataset from Sina Weibo in 2011, an examination of humour reactions is performed to identify the proximal spread of humourous Weibo posts in relation to the consequent salt panic in China. As a result of this method, we present a novel methodology for understanding humour reactions in social media, and provide recommendations on how such a method could be applied to a variety of other social media, crises, cultural and spatial settings.

6.1.2 Establishing Expert Consensuses on the Value of Open Data in Open Social Innovation Ideation

World Open Innovation Conference, Silicon Valley, United States of America, November 2015

There is little conclusive evidence as to whether open data provides value to social innovation ideation scenarios. Furthermore, open data as a resource is severely contested as to its openness, availability, quality, importance, and usefulness within innovation ideation. Therefore, understanding how open data can be leveraged for innovation ideation practices has become a topic at the mainstream of management literature. However much of the effort thus far has been focused on ideation and innovation for-profit, specifically when in papers examining Open Innovation, even though open data has been depicted as a resource for providing social, economical and entrepreneurial benefit. Therefore this paper presents an

initial study of the perceived value of open data, in research phase Open Social Innovation (OSI), amongst academic and professional experts in open innovation, Innovation Networking and open data. Consequently, a Delphi Study is conducted, aimed at forming a convergence of opinion amongst academic and professional experts. From converging expert opinions from both academic and professional perspectives, optimal managerial practices within this field can be shaped. Furthermore, management processes and practices can be justified in collecting and targeting particular datasets that are opportune for a social innovation context. In addition to the primary objectives, and with respect to the paper's findings, barriers of utilizing and leveraging open data for this purpose are duly noted with proposed methods of overcoming such challenges.

6.1.3 Data-Driven Innovation Workshop, DDI

Web Science 2016, Hannover, Germany, May 2016

The workshop is proposed in order to align objectives of academic research with those detailed in the Horizon2020 European Commission funding which looks to develop new models of innovation, utilize data in an innovation context for economic effect, and utilize technologies, such as the Web, to co-create and co-innovate. With this alignment, it is proposed by the workshop organizing committee that the Web Science perspective enables research in this field to break new ground, combining research techniques from different academic disciplines and theoretical perspectives in order to better understand and formulate data-driven innovation processes, and encourage optimized innovation outputs.

6.1.4 Getting Ready for a Data Economy: The Potential, Skills and Expertise

Research World, 2016

Data collected by industry, growing at a rate of 2.5 Exabytes a day (IBM, 2012), offers an enormous potential for evidence-based business insight and economic value. However only 12% of the data in industry is leveraged to its maximum potential – we are faced with a major disparity between the growth of data and the industry capacity to derive significant value from it.

7 Appendices

A Offline Innovator Survey Schedule

Question 1.

Where are you based?

Question 2.

What industry sector do you work/research in?

Question 3.

What is your role/job title?

Question 4.

Please indicate your years of experience as an innovator/participant with regard to the following:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 +
Offline Innovation Competitions/Hackathons	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Online Innovation Competitions/Hackathons	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tackling Social Challenges/Social Innovation	○	○	○	○	○	○	○	○	○	○	○	○	○	○		○	

The following questions are related specifically to the hackathon at CERN.

Question 5.

What was the challenge you were tackling at CERN/Campus Biotech? - If you were an organiser, please select this from the drop-down menu.

Question 6.

Please indicate how useful the following was in achieving your goals

	Not Useful	Of Little Use	Moderately Useful	Useful	Very Useful	Did Not Use
Preparation Time	○	○	○	○	○	○
Online Collaboration (Prior to Event)	○	○	○	○	○	○
Offline Collaboration (Prior to Event)	○	○	○	○	○	○
Online Collaboration (At Event)	○	○	○	○	○	○
Offline Collaboration (At Event)	○	○	○	○	○	○
Collaboration Between Disciplines/Expertise	○	○	○	○	○	○
Expert Advice/Mentorship	○	○	○	○	○	○
Data Open to the Public	○	○	○	○	○	○
Data Supplied By External Organisations That is Not Open to the Public	○	○	○	○	○	○

Question 7.

What metrics would you use to Success factor your success in this social innovation competition? - Tick all that apply.

ov lty	Sou rce	In put	Ri sk	Soc ial Imp act	Resp onse to Call	Collabo ration Potentia l	Quantit y of Benefic iaries	Profita bility	Qua lity	Val ue	Qua ntity	Scala bility	Retur n On Invest ment	Disru ption	Licen sing Reve nues	Answ ering the Challe nge	Expe rtise in the Field
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Question 8.

Please rate the success of your project outcome.

Organisers need not answer this question.

	Not Successful	Of Little Success	Moderately Successful	Successful	Very Successful
Your Results	○	○	○	○	○

Question 9.

Do you think an increased availability of open data would have increased your success with regards to:

Note: Open Data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.

	No	Yes	I Don't Know
Enhancing Innovation Quality	○	○	○
Increasing Social Impact	○	○	○
Increasing Collaboration Potential	○	○	○

Question 10.

If the hackathon/innovation competition was performed purely online, how successful do you think it would have been?

Not Successful	Of Little Success	Moderately Successful	Successful	Very Successful
○	○	○	○	○

Question 11.

Why?

The following questions relate to hackathon/innovation competitions in general

Question 12.

Tick all metrics you would use if you were to Success factor your own success from an online social challenge hackathon/innovation competition? - Tick all that apply.

Novelty	Source	Input	Risk	Social Impact	Response to Call	Collaboration Potential	Quantity of Beneficiaries	Profitability	Quality	Value	Quantity	Scalability	Return On Investment	Disruption	Licensing Revenues	Answering the Challenge	Expertise in the Field
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Question 13.

Which type of hackathon/innovation competition do you think enables...:

	Offline	Same	Online
More Useful Collaboration Methods	○	○	○
Increased Ability to Collaborate	○	○	○
More Scalability (More Participants)	○	○	○
More Scalability (More	○	○	○

Innovations)			
Higher Quality Innovations	○	○	○
Better Idea Feasibility	○	○	○
Better Social Impact	○	○	○
Faster Innovation Production	○	○	○
Faster Innovation Receipt	○	○	○
More Innovation Responses	○	○	○
Higher Risk	○	○	○
More Potential to Answer the Challenge	○	○	○

Question 14.

Please indicate how important the following is to have in hackathons/innovation competitions aiming to tackle social challenges.

	Not Important	Of Little Importance	Moderately Important	Important	Very Important
Preparation Time	○	○	○	○	○
Offline Collaboration (Prior to Event)	○	○	○	○	○
Online Collaboration (Prior to Event)	○	○	○	○	○
Offline Collaboration (At Event)	○	○	○	○	○
Online Collaboration (At Event)	○	○	○	○	○
Use of Numerous Disciplines	○	○	○	○	○
Expert Advice/Mentorship	○	○	○	○	○

Data Open to the Public	○	○	○	○	○
Data Supplied By External Organisations That is Not Open to the Public	○	○	○	○	○

Question 15.

How effective is each type of hackathon/innovation competition in producing innovations that tackle social challenges?

	Not Effective	Of Little Effectiveness	Moderately Effective	Effective	Very Effective
Online	○	○	○	○	○
Offline	○	○	○	○	○
Combined	○	○	○	○	○

B Online Innovator Survey Schedule

Question 1.

Where are you based?

Question 2.

What industry sector do you work/research in?

Question 3.

What is your role/job title?

Question 4.

Please indicate your years of experience as an innovator/participant with regard to the following:

Note: Open Data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 +
Offline Innovation Competitions/Hackathons	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Online Innovation Competitions/Hackathons	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Tackling Social Challenges/Social Innovation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Using Open Data in an Innovation Context	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Challenge Question:

What innovations could be developed that encourage ageing populations to be more active and healthy?

Note: Feel free to use a number of resources online to gain insight into this innovation challenge.

Question 5.

Innovation idea to solve the challenge question above (1 sentence description)

This could be any idea that could help to tackle the above challenge.

Question 6.

What type of innovation did you create?

Question 7.

Do you think an increased availability of open data would have increased your success with regards to:

Note: Open Data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and sharealike.

	No	Yes	I Dont Know
Enhancing the Innovation Process	○	○	○
Increasing	○	○	○

Social Impact	
Increasing Market Appropriability (Making it Appropriate for Current Markets)	

Question 8.

If you were to Success factor your innovation idea, what metrics would you use? - Tick all that apply.

Novelty	Source	Input	Risk	Social Impact	Response to Call	Collaboration Potential	Quantity of Beneficiaries	Profitability	Quality	Value	Quantity	Scalability	Return On Investment	Disruption	Licensing Revenues	Answering the Challenge	Expertise in the Field
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Question 9.

If this innovation competition was performed purely offline, how successful do you think it would have been?

Not Successful	Of Little Success	Moderately Successful	Successful	Very Successful
○	○	○	○	○

Question 10.

Why?

Question 11.

Which type of hackathon/innovation competition do you think enables...:

	Offline	Same	Online
More Useful Collaboration Methods	○	○	○
Increased Ability to Collaborate	○	○	○
More Scalability (More Participants)	○	○	○
More Scalability (More Innovations)	○	○	○
Higher Quality Innovations	○	○	○
Better Idea Feasibility	○	○	○
Better Social Impact	○	○	○

Faster Innovation Production	○	○	○
Faster Innovation Receipt	○	○	○
More Innovation Responses	○	○	○
Higher Risk	○	○	○
More Potential to Answer the Challenge	○	○	○

Question 12.

Please indicate how important the following is to have in innovation competitions aiming to tackle social challenges.

	Not Important	Of Little Importance	Moderately Important	Important	Very Important
Preparation Time	○	○	○	○	○
Offline Collaboration (Prior to Event)	○	○	○	○	○
Online Collaboration (Prior to Event)	○	○	○	○	○

Offline Collaboration (At Event)					
Online Collaboration (At Event)					
Use of Numerous Disciplines					
Expert Advice/Mentorship					
Data Open to the Public					
Data Supplied By External Organisations That is Not Open to the Public					

Question 13.

How effective is each type of hackathon/innovation competition in producing innovations that tackle social challenges?

	Not Effective	Of Little Effectiveness	Moderately Effective	Effective	Very Effective
Online					
Offline					
Combined					

C - Initial Expert Delphi Study Email Request

Dear…..,

My name is Gareth Beeston and I am a doctoral student at the University of Southampton studying the way social enterprises and Non-Profit Organisations (NPOs) can utilise readily available datasources for the development of innovations to tackle social challenges. Utilising the Open Innovation paradigm as a primary strategy, this study aims at providing best practice to such enterprises in leveraging innovations from their customers/affiliates/partners to tackle social challenges.

It has been noted that are internationally renowned and recognised as an expert in open and/or social innovation practices or theory, possessing a wealth of extremely valuable ideas, expertise and experience in these fields. In this instance, your opinion is hugely appreciated as it can contribute to the primary and secondary aims of the study and the wider potential impact of this doctoral research.

It is projected that the outputs of this study will be directed towards contributing to the development of open innovation practices in social enterprises, learning from yourself as a current expert in the field of open innovation and/or social innovation. Additionally, research outputs will be developed in order to contribute to the wider economic plan of Horizon2020 and RCUK Digital Economy to drive and enhance innovation in the UK and Europe against social challenges that we are currently facing.

It is initially projected that the study will consist of three stages within the Delphi format, each of which are detailed below. The first stage (Stage 1) will take around 15 minutes to complete, with the subsequent stages taking 5-10 minutes to complete.

The respective stages are planned as follows:

Stage 1) Gaining general opinion about datasets and measurement practices in open and social innovation (15-20minutes)

Stage 2) Reviewing the anonymous modal averages of the answers to stage 1, commenting on the outputs of this. Additionally, some questions will be asked to filter lesser-important topics within the study (5-10minutes)

Stage 3) Reviewing again with comments as before. Final questions confirming opinions for providing a consensus of best practice. All participants will be updated on the research outputs of stages 1 and 2. (5-10minutes)

In contributing your expert opinion to this study you are making an honest impact on innovation potential in the UK and Europe, and further contributing to the increasing social and economic impact that innovation is having on the European economy. This study can also help us to provide practical guidelines and potential opportunities for Open Innovation/Social Innovation professionals over the world, and specifically provide innovations to sectors, which inevitably would welcome such input.

If you would like to be part of this study, please endeavour to reply to this email saying that you would like to take part and what particular parts of the study most interest you. In this early stage I can foresee a lot of potential collaborations between your organisation and the University of Southampton in supporting innovation practices in this sector.

Thank you very much for your time and consideration.

Gareth Beeston

Doctoral Researcher in Web Science and Open Innovation

University of Southampton

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