Institutions and Economies
Vol. 5, No. 1, April 2013, pp. 71-90

A Generic Framework for Trust in the Innovation Process

Pauline Ratnasingam
Harmon College of Business and Professional Studies
Accountancy and Computer Information Systems Department
University of Central Missouri
Email: ratnasingam@ucmo.edu

Abstract: Trust among agents (or persons) involved in the process of innovation is intrinsic to successful innovation. An examination of the firm's trust in its agents at various stages of the innovation process will therefore contribute practical insights into best business practices, as well as policy implications for competitive and strategic advancement. This paper focuses on the development of a framework for the evolution of trust in the firm's innovation process. The trust a firm has in its employees at the micro level, and in the agents who are part of a sectoral, regional and national innovation system consisting of firms (including multi-national corporations or MNCs at both the national and transnational/global levels), academic institutions, and government and non-government bodies with which the firm interacts, is crucial to the firm's successful innovation. Trust in the process of innovation is viewed as consisting of two components – concerns regarding how firms feel about being trusted and about having to trust others. Three types of trust are identified in the paper, namely, competence, predictability and goodwill trust. These are described in terms of their evolution at different stages of the firm's innovation process as the firm interacts with its micro, meso and macro level agents. By examining the role of the firm's trust at these different stages, the paper seeks to contribute to a better understanding of the role of trust in the innovation process.

Key words**:** competence, goodwill, innovation, input, organisational structure, output, predictability, process, trust

JEL classifications: B15, L22, O31, O43

1. Introduction

Economic growth is essential to sustained improvements in the standard of living which require not just hard work, but continuous accumulation of knowledge (Deming, 2000). Continuous accumulation of knowledge implies

continuous innovation, whether process or product, whether new or adapted. This gain in knowledge encompasses even the small changes that the firm makes in an effort to improve the quality of a product or service. However, it is at the level of the firm that innovation is largely commercialised, that is, where innovation is developed and implemented, and therefore where the nation's strength in innovation is realised. Innovation is thus fundamental to a nation's success. Not surprisingly then, nations have been actively involved in efforts that aim to increase the innovation performance of their firms, specifically in addressing issues related to quality of human capital, technology, knowledge and finance.

The firm, however, does not innovate in isolation, but instead interacts with other firms and agents (institutions), within a sectoral, regional and national innovation system that includes multi-national corporations (MNCs) at both the national and transnational (global) levels, academic institutions and government and non-government bodies. The firm's interactions with these institutions (made up of human actors or agents) play a critical role in driving innovation across such systems. Indeed, North (1990: 4) defines an institution as "a framework within which human interaction takes place". Ultimately, the individuals (agents) involved at the various stages of the firm's innovation process are responsible for its success, and central to their success is the ability to collaborate effectively.

Williamson (2000) places culture, norms and the informal institutions therein at the highest level of social analysis in the economics of institutions, a level which imposes constraints on the lower levels of the institutional environment, governance and resource allocation. Williamson (2000: 600) also refers to a zero level where "the mechanisms of the mind take shape", the level at which innovative ideas form. Viewed in this context, trust enables the controls within the firm, as well as between the firm and the network of agents involved in the innovation process. In Europe, for example, the commitment to the Lisbon strategy aims at collaborating and sharing information on innovation policy making tools, methodologies, benchmarking and evaluation (Ramachandran, 2009).

Furthermore, one can expect that for firms spanning the globe, the importance of trust in the innovation process across culture, space and time is even more significant. The proliferation of advanced internet technologies and mobile/wireless technologies used for global communications, transfer and access of information and knowledge 24/7, and demands of the agents who expect to be instantly gratified, accentuate the immediacy of trust in the globalised environment.

The purpose of this paper is to develop a framework for the study of trust in the firm's innovation process. It is important to examine the impact of trust

in the innovation process for at least two reasons. First, it allows the firm to be aware of the impact of trust on the quality of its interactions with its agents, which in turn impacts the success of the firm's innovation activities. Second, it assists the firm in developing best practices for managing successfully its intra-firm, inter-firm and global relationships during the innovation process. We adapt the following definition of trust to explain the impact of the firm's trust in their agents at the various stages of an innovation. Trust is

> the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.
>
> (Mayer *et al*., 1995:135)

Although the importance of trust is widely recognised in the literature, there is limited research about the nature of its impact on the firm's innovation process. This paper contributes to the theory of innovation in three ways. First, it identifies the types of trust the firm experiences with its network of agents at different stages of the innovation process. Second, it discusses the evolution of trust at different stages within the innovation process. Third, it determines the major type of trust for each type of agent at different stages of the innovation process. The rest of the paper is organised as follows. Section two provides a review of the literature on innovation and trust, and highlights works that have alluded to the importance of trust in the innovation process. Section three first examines the importance of trust at various stages of the innovation process, and subsequently discusses the evolution of trust within its innovation process. Section four discusses the framework of the firm's trust in its agents at the different stages in the innovation process. Finally, section five concludes the paper with directions for future research.

2. Definitions and Literature Review

In this section we provide definitions of innovation and trust, and highlight previous research on the importance of trust for successful innovation. We further discuss the agents' involvement and impact in the firm's innovation process, since the firm does not innovate in isolation. Based on this premise, we identify three broad levels – micro, meso and macro – of agents in the firm's innovation process. We refer to the micro level as the germination of an idea within the firm and meso level as agents who are external to the firm, with which the firm interacts on a regular basis. Finally, we refer to the market as the macro level agents representing government bodies who control the marketing of the end product/service of the innovation outcomes.

2.1 Innovation

Innovation is the creation and use of better or more effective products, processes, services, technologies, or ideas. It is thus much more than 'invention' which refers just to creation itself. The modern definition of innovation is based on Schumpeter's (1934: 65-66) classical concept of innovation as "carrying out of new combinations". These "new combinations" include: product innovation (the introduction of new or improved products); process innovation (the introduction of new or improved production processes); organisational innovation (refers to the implementation of a new organisation structure); market innovation (when opening a new market); and the adoption of new sources of production inputs. Innovation thus includes the adoption of a new or significantly improved production method such as making changes to the equipment or production/ manufacturing organisation, or both, improving the quality of performance, increasing revenue or producing new products which cannot be produced using conventional plants or production methods, or increasing the production efficiency of existing products. Rasiah (1996: 80) refers to "incremental engineering", which includes making minor improvements either formally or informally, and "learning by doing" efforts. Incremental engineering contributes to the benefits from automation such as costs and time savings, while improving the quality of the products and services.

Innovation has been investigated by some authors as the outputs or processes generated from Research and Development (R&D) or related activity, or more broadly as a process underlying an innovation. Lundvall (1992: 8) suggests that it involves "ongoing processes of learning, searching and exploring, which result in new products, new techniques, new forms of organisation and new markets", or more generally, "new combinations". This perspective is also shared by other writers (Edquist, 1997; Nelson and Rosenberg, 1993) who emphasise innovation as a process. Thus, from an activity perspective, the innovation process for a product or a process improvement (also known as non-technological organisational innovations or softer innovations) involves the initial idea, invention, development, pilot production, procurement, mass production, marketing, management and distribution (Edquist, 1997; Lundvall, 1992; OECD and Eurostat, 2005). We adapt this description of innovation as a process, whether for new or improved products, processes, services, technologies, or ideas in the study of trust in innovation presented in this paper.

Previous research on innovation suggests that the firm does not innovate in isolation but instead interacts with other firms and institutions. Rasiah (1996: 79) considers institutions to be "indirect or enabling agents often set[ing] the limits within which firms undertake innovative activities". He notes that the capacity of firms to innovate is dependent on institutional support. In a more recent

paper, Rasiah (2011) argues that institutions play a critical role in allocation of economic resources that generate learning and innovation. He explains that they govern human action, either individually or collectively (via a firm, organisation, or a partnership group). Similarly, North states that "when human beings come together and form an association, they jointly maximise" (1984: 8). The institutions, firms and other elements, are coordination mechanisms that link together to form a sectoral, regional and national innovation system. The national system can be viewed as embedded within the global system that allows for interactions between national systems via various channels including parent or subsidiary locations abroad. We refer to these actors as agents in the firm's innovation process.

We identify three broad levels – micro, meso and macro – of agents in the firm's innovation process. These are based on the firm's involvement and the impact of the agents on the firm's innovation process. The *micro level* is the level at which germination of an idea occurs as well as conduct of activities critical to success of the firm's innovation process. The firm is part of the institution since the transactions between divisions represent interactions across that separable interface. The firm requires and demands creative, talented, qualified and skilled employees in order to ensure successful performance of its innovation activities. Thus, the firm needs to recruit talented and skilled employees as well as provide continuous workplace training. The firm's trust in its employees is affected by the quality of training, recognition, promotion, communication styles and intentions (such as cooperative team problem solving style versus authoritative command and control styles), the culture, best business practices, standard operating procedures and of the benchmarking standards applied by the firm.

The *meso level* comprises agents who are external to the firm, with which the firm interacts on a regular basis (buyer-supplier relationships, partner firms, manufacturers, distributors, industry related firms and universities) within the innovation process. Factors such as quality of performance, critical success factors, industrial standards that the firm abides by, and prior experiences the firm had with these agents determine the success of its innovation process. Efficient processing of information, sending out acknowledgments, sharing information and knowledge, and providing services consistent with the firm's expectations all impact upon the firm's trust in its agents at this level. Similarly, Skytt and Winther (2011), suggest meso level includes inter-organisational and regional relationships.

Finally, the *macro level* comprises agents external to the firm including government and non-governmental bodies that monitor and implement regulations and industry standards. Their actions impact innovation effort at institutional, national and global levels and consequently the firm's trust in agents at this level. These three levels of agents correlate with Williamson's

(1985: 1) definition of institution as mechanisms which govern transactions and a transaction occurs "when a good or service is transferred across a technologically separable interface". He identified three principal institutions – the market, the firm and supply (or relational contracting). Similarly, North (1990) emphasised how institutions support cooperation needed for exchange and suggests a three stage process of institutional evolution from personalised, local exchange with informal contract enforcement to impersonal exchanges and state enforcement covering broader national territories (North, 1990: 33-35). We adopt this line of reasoning and correlate it with the three levels of agents the firm interacts with. We refer to the market as the macro level agents representing government bodies who control the marketing of the end product/service of the innovation outcomes, the supply as the meso level agents representing university/industries who advise and assist the firm and the firm as the micro level agent.

2.2 Trust

We adopted the definition of trust given by Mayer *et al*. (1995: 135) as the willingness of one party to be vulnerable to the actions of another in return for certain actions. These include taking actions that result in positive outcomes as well as appropriate actions that prevent negative outcomes (Anderson and Narus, 1990). The definition implies, as Moorman *et al*. (1993) note, that the other party is one in which the firm has confidence. Mishra (1996) ascribes the vulnerability to the firm's level of belief that the other party is competent, open, concerned and reliable. Similarly, Castaldo *et al*. (2010) define trust as the expectation that a subject, distinguished by some specific characteristics (e.g. honesty, benevolence, competence), will perform future actions aimed at producing positive results for the trustor in situations of consistent perceived risks and vulnerability. Trust has thus been viewed as (1) a belief, sentiment, or expectation; and as (2) a behavioural intention that reflects reliance on the other party and involves vulnerability and uncertainty on the part of the firm. Specifically, we define trust in the innovation process as

> the willingness of a party (the firm) to be vulnerable to the actions of another party (the agents the firm interacts with) based on the expectation that the other (the firm's agents) will perform a particular action important to the trustor (the firm), irrespective of the ability to monitor or control that other party.
>
> (Mayer *et al*., 1995: 135)

We identify three components of trust in an economic exchange namely – ability, integrity and benevolence (Mayer *et al*., 1995; Lee and Turban, 2001).

Competence trust is the firm's trust in the other party's *ability*, qualifications, infrastructure, talents, skills, knowledge, and expertise to provide the expected services, information and knowledge. Ettlinger (2003) refers to emotive or capacity trust as initially developed from inter-personal feelings in a work place environment among the employees, which refers to micro level trust. Similarly, Murphy (2002) suggests that creative innovations – those initiated by independent actions of employees/business persons – are positively related to experiential or micro level versions of trust. Likewise, Senguin (2010) suggests that competence trust indicates capability of the trustee to obtain a certain result, ranging from the creation of an initial idea to exhibiting competencies in problem solving to identification with an "other" inter-firm relationship where trust is manifested from an individual to a group, thereby honouring their expectation of behaviour and intent by others. Dovey (2009) suggests that trust as in "predictability trust" is built over time, as organisational practices (management behaviours, incentive systems, promotional schemes, etc.) are progressively experienced reliably.

Predictability trust is the firm's reliance on the other party's *integrity* in the consistency (or repeated interactions) of the quality of services provided, that permits the firm to make predictions and develop expectations about future services, typically based on its prior experiences. Thus, micro level or "earned" trust (Schmitz, 1999) can lead to strong ties or "bonding" (Gittell and Vidal, 1998). Competence trust overlaps with predictability trust through repeated interactions connected to a collaborative project (Skytt and Winther, 2011). Similarly, Maskell and Malmberg (1999) refer to predictability trust as actors who initiate dyadic relationships based on former interactions. They refer to shared trust as a "collective investment adding to the stock of social capital of the whole community". Brattström *et al*., (2012) suggest that systematic processes and structures that exist among business relationships decrease variation thereby creating predictability and fostering trust. Maskell (2000: 115). Predictability trust over time encourages cooperation, satisfaction and commitment thereby leading to *goodwill trust*.

Goodwill or relationship trust is the firm's reliance upon the care, concern, honesty, and benevolence shown by the other party. When expectations of reliability and dependability are met, trust moves to affective foundations illustrating emotional bonds such as care and concern. *Benevolence* is the extent to which the firm believes that the other party wants to do good rather than just maximise profits. Previous research referred to built trust (as in established trust) as a feeling gradually built up between economic actors (Maskell and Malberg, 1999). Actors have invested so much in their dyadic relationship that it would be very costly to break off the relationship. Similarly, goodwill trust is also referred to as personal trust, as "a feeling among individual actors

based upon former experiences and mutual confidence" (Skytt and Winther, 2011: 30). Goodwill trust is thus dependent on both competence trust and predictability trust, and it encourages both parties to share information and knowledge, cooperate, coordinate, create strong ties (bonding) and show commitment. Therefore, goodwill trust is important for what Gittell and Vidal (1998) called "bonding" or the building of connectors to persons outside one's primary community. Table 1 below illustrates the attributes of the three types of trust from previous studies.

3. Trust in the Innovation Process

Innovation includes product and process innovations, and the innovation process covers all activities from the initial stage of idea formation to output, whether process improvement or marketing and sales of product, that is under the purview of a firm. We focus on the impact of trust in economic exchange among the agents in the firm's innovation process. The new institutional economics (NIE) relies on transaction costs (economic focus) which are costs specifying what is being exchanged that enforces the subsequent agreement. NIE emphasises the importance of rational choice and economising behaviour. North refers to this as "transformation costs" (1990: 6). The firm is seen as an agent of an institution, as part of the bigger business and economic environment, referred to as the innovation environment, and having access to the support and services. Therefore, section 3.1 discusses the importance of trust as the firm is interdependent with its agents at the different stages in its innovation process. Mohnen and Roller (2005: 1432) observed that "the whole is more than the sum of its parts".

Then in section 3.2, we discuss the evolution of trust, since the firm's trust with its agents differs with each stage in the innovation process. We derived at three types of trust -- competence, predictability and goodwill trust. Competence trust contributes to the firm's input activities as its agents apply the relevant talents, ideas, skills, training, expertise, and ability required to enhance and complete the innovation activity at a micro level. In predictability trust the firm engages in repeated interactions with its agents thereby experiencing reliability, dependability and accuracy of information based on prior interactions at a meso level. Finally, we discuss goodwill trust at the macro level as it focuses on referred laws, contracts, legal system accountability and to responsiveness innovation by higher order formal government institutions.

3.1 The Importance of Trust

While the importance of trust in innovation has not been explicitly studied, several studies have pointed to the importance of relationships between the

Table 1: Three Types of Trust and its Attributes

Types of Trust	Attributes of Trust	Author
Competence Based on an economic foundation that focuses on and impacts *micro level* stakeholders' ability, competence, skills, talents, and expertise to perform the assigned task on a routine basis.	Ability Learning Competence Reliability Character Capacity Earned trust Effectiveness	Doney and Cannon (1997) Dyer and Chu (2000) Ettlinger (2003) Gabarro (1987) Mayer *et al*. (1995) Mishra (1996) Murphy (2002) Sako and Helper (1998) Senguin (2010) Schmitz (1999) Zucker (1986)
Predictability Based on a familiarity foundation that focuses on and impacts *meso level* stakeholders' characteristics based on prior experiences with the other party	Reliability Credibility Consistency Integrity Predictability Judgement Benevolence Repeated interactions	Brattström *et al*. (2012) Doney and Cannon (1997) Dovey (2009) Dyer and Chu (2000) Gabarro (1987) Humphrey and Schmitz (1998) Lewicki and Bunker (1996) Mayer *et al*. (1995) Maskell and Malmberg (1999) McAllister (1995) Mishra (1996) Murphy (2002) Sako and Helper (1998) Zaheer *et al*., (1998) Zucker (1986)
Goodwill Based on an empathic affective foundation that focuses on *macro level* stakeholders and institutionalised relationships	Benevolence Openness Care Concern Commitment Goodwill Reputation Motives Intentions Identification Satisfaction Cooperation	Barney and Hansen (1994) Doney and Cannon (1997) Dyer and Chu (2000) Gittell and Vidal (1998) Lewicki and Bunker (1996) Mayer *et al*. (1995) Mishra (1996) Sako and Helper (1998) Zucker (1986)

entities involved. Due to the complexity of the innovation process most firms interact with other firms (within the National Innovation Systems (NIS)) in a way that demands interdependent (not inter-personal) relationships in an effort to gain, develop, and exchange various kinds of information, knowledge and

other resources. Further, not all initial innovation activities are successfully converted from inputs to outputs. North (1990) argues that individuals behave rationally and can make choices, but that what is rational is conditioned by ideology and circumstance. In addition, while opportunism can be minimised through institutions so as to encourage exchange and investment, monitoring and enforcement costs will be unsustainable unless supported by a culture of trust and fairness – again, the need for trust. Negotiating, monitoring and enforcing those relationships are the key aspects of institutional analysis.

Rasiah *et al*. (2011) point to the importance of coordination relationships between markets and governments, where there is cooperation so as to foster a systematic effort and reduce institutional failures to stimulate innovation and learning in firms. Businesses operate in a dynamic environment and so the building of intra- and inter-firm trust requires broad relational vigilance, openness, commitment and respect – attributes that few firms are able to manage and endure. Therefore, trust serves as a buffer in overcoming these complexities and coordination relationships issues (such as opportunistic behaviours of stakeholders) as it encourages and enhances open communication, collaboration and information sharing. Similarly Williamson (1975) suggests transaction costs are affected by asset specificity, uncertainties, complexity of exchange, bounded rationality and behavioural factors such as opportunism.

He suggests that agents in any principal-agent relationship are not to be trusted and that the risk of opportunism is high. Williamson (1985: 47) defines opportunism as "self-interest seeking with guile". Trust is an ongoing, market oriented, economic calculation – its value is derived from results of creating and sustaining the relationship relative to the costs of maintaining or severing it. Hence, trust is critical, particularly when the economic value of trading relationships is in question. There is a need for interdependent relationships between government and firms, intermediary organisations such as chambers of commerce, training institutions and R&D labs that often help resolve collective action problems in innovation. These interdependent relationships are driven by the discipline of the market, and with government participation complementing through trust-loyalty relationships, social commitment will be extracted thereby enhancing the development of competitive clusters (Rasiah, 2011).

There are limited studies that point to the importance of the different types of trust in the innovation process. The innovation process focuses on the input, process and output activities conducted within the firm, and the extent of the firm's trust in its agents at the different stages in their innovation process. The firm's input activity is referred to as the germination of an idea leading to some form of innovation expenditure and support given by the firm's senior management to advance the idea to the next stage. Innovation expenditure also includes: costs in introducing a new product, or improved products;

conceptualisation of new services; training associated with the innovation activity; IT associated with innovation; software; patent, consultancy and other immaterial goods (OECD and Eurostat, 1997). The success and transformation of this idea is based on the frequency and consistency of the firm's interactions with their agents to transfer the idea into a successful output.

Trust in general arises because all parties need to believe each other are competent, predictable in commitment to completion and have goodwill. Since different types of agents have a different role at each stage of the innovation process, different types of trust will be more important at each of these stages. We argue that in order for firms to experience successful innovation, they need to embrace and exercise trust in their agents at each different stage in the innovation process. We discuss the evolution of a firm's trust within their innovation process in the next section.

3.2 The Evolution of the Firm's Trust within its Innovation Process

We argue that the firm's trust evolves during its innovation process and is dependent on the stage of the innovative activity and the type of agents the firm interacts with at that point in time.

Rasiah (1994) discusses the imperfect yet coordinated and uncoordinated nature of knowledge flows, which can surface as a response, to solve a specific problem or to the sudden impulsive idea of the innovator. It is here that the firm's trust in their agents encourages and enforces the firm to take actions necessary to improve their innovation process. For instance, the findings of a study of local machine tool firms subcontracting between electronic components transnationals (ECTs) and local machine-tool firms (LMFs) clearly indicated that there was no need for close cooperation in the manner these relationships evolved as it was due to trust relationships derived through past employment experiences (Rasiah, 1994). This line of reasoning suggests the importance of predictability trust.

In addition, factors such as language, ethnicity and culture facilitated the development of trust relationships as evidenced in the quote "interviews show that strong ethnic division which are also reflected in ethnic-based federal government policies have encouraged strong cooperation amongst the Chinese" (Rasiah, 1994: 284). Thus the lines of cooperation and trust between ECTs and LMFs increased and they often took orders beyond their own capacity, subcontracting the excess to third level firms (correlating to goodwill trust). There was an increase in the reliability of the second level LMFs who were more knowledgeable of their capacity. Here it is evident that competence trust leads to greater economic returns and successful innovation outcomes. Thus competence trust becomes important in the firm's input activities as its agents apply the relevant talents, ideas, skills, training, expertise, and ability required

to enhance and complete the innovation activity. Rasiah (2011) suggests that innovation processes do not terminate at a point in creation as there are linkages in the spread and diffusion of knowledge and the subsequent evolution as it is viewed as a learning process. Competence trust therefore serves as an initial learning process in the firm's innovation process. During the initial and subsequent interactions of the firm with its employees in the innovation process, the firm develops experience about the behaviour of its employees, and the actual fulfillment of its promise. The expected services could refer to improving an existing process in the innovation activity, improving the quality of the product or the quality of the service.

Murphy (2002) takes creative innovation as meaning efficiency, productivity and market accessibility. Similarly, Sverrisson (1994) referred to creative innovation as independent improvements in production technology, independent product diversification and labour productivity improvements, all pertaining to micro firm level activities. Therefore competence trust at a micro firm level increases productivity and profit since the employees are well trained, have the necessary skills and qualifications and are thereby able to complete the assigned activities by the due time thereby leading to successful innovation processes. The firm's *competence trust* in the input activities in the innovation process depends on online sources, face-to-face interactions, communications, talents, training, skills, qualifications, and expertise of their internal employees and how well the employees communicate effectively and share their ideas. Therefore, we posit that the firm's impact of its competence trust is significant at the micro level since it focuses on the firm's internal activities and employees.

Innovation outputs are derived from secondary sources of information the firm collects, such as innovation links from innovation surveys and published documents. Therefore, trust in the reliability, dependability and accuracy of information from the surveys and published documented sources is crucial to the success of the innovation output process. This is based on the firm's prior experiences in relying on the information from the surveys and published documents. Previous research on the subcontracting arrangements between electronic component trans-nationals and local machine-tools firms indicated that past employment experiences created trust relationships (Rasiah, 1994). We argue that *predictability trust* is emphasised here as it allows predictions on the efficiency of the innovation process based on the firm's prior experiences.

Previous research suggests that a firm's performance is determined as a function of its own conduct and interactions with related economic agents (Rasiah, 2003). These economic output measures show that successful innovation activities occur when competence and predictability trust are met with goodwill trust. The branding and reputation of a firm can add to the level of trust in the competence of agents in providing promised services. The firm

begins to believe that its agents will not only act in a competent and reliable manner, but also have the well-being and interests of the firm at heart when making service decisions and providing service. Goodwill trust is attained when the firm experiences successful innovation when agents are satisfied and are committed to the firm.

Luhmann (1979) referred to system trust as a belief in the system as a regulator of behaviour where trust in the wider system is more generalised and structuralised. Here the firm's trust evolves to the highest level *goodwill trust* that focuses on a win-win relationship, where all the agents at the micro, meso and macro levels benefit as they fulfill the input, process and output activities of the firm's innovation process targeted at achieving successful outcomes. These activities begin from a basic level applying standard operating procedures, and critical success factors at this micro level facilitate achievement at the next level in meeting industrial standards, thereby setting benchmarking standards at a meso level toward abiding by quality check lists and balancing scorecard indicators in an effort to meet regulatory government policy requirements at a macro level.

Goodwill trust at the macro level focuses on referred laws, contracts, legal system accountability and to responsiveness innovation by higher order formal government institutions. Trust at the macro level is structuralised and generalised based on the agents' overall confidence. Trust is derived from actors' institutionalised attitudes about trustworthiness of actors in general, as well as expert systems, institutions, and the ability of formal and informal institutions to regulate. We argue that effective competition and successful exchange of knowledge in a global economy demands trust among the firm's agents as it paves the way for cooperation and commitment in the innovation process. This in turn encourages the firm to work at preserving relationship investments by coordinating with its agents and resisting attractive short-term alternatives in favour of expected long-term benefits. Trust produces outcomes that promote efficiency, productivity, and effectiveness (Ganesan, 1994; Morgan and Hunt, 1994). Therefore, we posit that the firm's impact of its goodwill trust is significant at the macro level with agents of the state, nation, NIS, MNCs, within and outside the firm at a macro level as the firm attempts to identify agents based on their social relationships, cooperation, satisfaction, commitment, and reputation.

4. A Framework for Trust within the Innovation Process

Table 2 distinguishes between the evolution of the firm's trust in its agents at the various stages of the firm's innovation process involved in transforming an input idea into an output product or improvement. We posit that factors listed in the framework contribute to high levels of competence trust gained

by the firm during the learning stage, as inputs to its innovation process (from its employees at the micro level, to its external agents at the meso and macro levels) lead to increased predictability trust in the experiencing stage. This is based on the consistent prior experiences the firm had with its agents in the innovation process activities that in turn led to high levels of goodwill trust during the affective stage. These high levels of trust in turn contribute to positive outcomes in the input, process and output activities in the innovation process. Therefore, we conclude that high levels of competence (during the learning stage), and of predictability (at the experiencing stage) leads to goodwill (during the affective stage) trust the firm has in its agents, thereby leading to successful innovation. The generic framework presents an analysis of the activities that a firm undergoes during its innovation process and the firm's trust in its agents at the different stages in its innovation process.

Table 2: A Framework of the Firm's Trust in its Agents at Various Stages of the Innovation Process

Stages in the Firm's Innovation Process	Impact on Competence Learning Stage	Impact on Predictability Experiencing Stage	Impact on Goodwill Affective Stage
MICRO LEVEL Innovation at the Activity Input Level	Brainstorming ideas to improve the service and/or product. Undertakes a feasibility of the idea.	Quality and reliability of ideas based on the firm's perception of their employees' past performances.	Firm supports, cooperates and encourages the idea.
Innovation at the Activity Process Level	Initiates the inputs required for the feasibility of the idea.	Firm sees the consistency and reliability of their employees in activating the idea.	Firm coordinates talented, skilled employees around the blue print of the idea.
Innovation at the Activity Output Level	Develops a blue print of the idea to move forward.	Firm judges the quality and feasibility of the blue print.	Firm commits and is satisfied with the blue print of the idea.
Innovation at the Firm Input Level	Firm creates teams of talented, skilled employees with expertise to initiate inputs for the idea. Firm initiates to procure resources needed to transform the idea.	Firm monitors the adequacy of the input resources for the activity.	Firm cooperates with and coordinates their employees to ensure that the right, skilled, matured and talented employees are recruited for the activity.
Innovation at the Firm Process Level	Firm ensures that adequate resources are provided to employees to perform their activities.	Firm monitors the employees' performance and judges their quality.	Firm is satisfied with their employees' performance and its impact on the outputs.

Table 2 (continued)

Innovation at the Firm Output Level	Firm observes and validates the outcomes of employees' activities.	Firm monitors quality of employees' performance and ensures that it abides by the quality checklists, and benchmarking standards of the firm.	Firm is satisfied and is committed to the outputs of their employees' activities as it impacts the firm's innovation process.
MESO LEVEL Impact of the Firm's Innovation at the Industry-University Input Level	Firm interacts with their industry and university (academic) agents for ways/ ideas to improve their innovation process. Firm seeks for talented employees to recruit.	Firm monitors the consistency, reliability and accuracy of the information provided by their industry and university agents.	Firm coordinates and communicates frequently with their industry and university agents and ensures that they have the relevant innovation inputs.
Impact of the Firm's Innovation at the Industry-University Process Level	Firm applies the ideas, and method provided by their industry and recruits the talented skilled employees to be trained.	Firm monitors the integrity and quality of the methods provided by their industry and university agents.	Firm cooperates with their industry and university agents to ensure that their innovation process is functioning properly.
Impact of the Firm's Innovation at the Industry-University Output Level	Firm ensures that the ideas and methods provided by their industry-university agents are successfully converting their innovation activities into outputs.	Firm monitors the quality of the outcomes of the methods and ideas provided by their industry and university agents.	Firm is satisfied and commits to its industry and university agents as outcomes impact the firm's reputation in a positive manner.
MACRO LEVEL Impact of the Firm's Innovation at the Government Bodies, NIS, National, Trans-national and Global Input Level	Firm seeks government bodies and NIS agents for tax relief, subsidies, grants, training and additional monetary support.	Firm monitors the consistency and reliability of their macro level stakeholders' contributions.	Firm coordinates and communicates frequently with their macro level agents in order to maintain the liaison and reputation with them.
Impact of the Firm's Innovation at the Government Bodies, NIS, National, Trans-national and Global Process Level	Firm receives and applies the tax reliefs, subsidies, grants, training and additional monetary support to their innovation process.	Firm monitors the quality of the outcomes of their innovation process.	Firm coordinates, cooperates and communicates frequently with their agents for the smooth functioning of their innovation process.
Impact of the Firm's Innovation at the Government Bodies, NIS, National, Trans-national and Global Output Level	Firm completes validating the outputs of its innovation process.	Firm monitors the quality of the outputs and predicts the success of their innovation process.	Firm is satisfied with the outcomes of their innovation process and its impact on their reputation in a positive manner.

5. Conclusions

This paper has outlined the development of a framework for trust within the firm's innovation process. First, we discussed the types of agents the firm interacts with and coordinates at the micro, meso and macro levels that form the firm's NIS. Second we defined innovation and trust then identified three types of trust (namely, competence, predictability and goodwill trust). Finally, we discussed how trust evolved at different stages in the firm's innovation process and integrated this evolution with factors that impact a firm's trust in their input, process and output activities and its impact on outcomes within its innovation process. We then identified which type of trust is significant at each stage in the firm's innovation process leading to the development of a framework for the firm's trust in its agents at different stages of its innovation process.

The theoretical contributions within this study focus on the major relationships between different types of trust the firm has in its agents at the different stages of its innovation process. It presents a coherent framework for empirical research and applies a systematic manner of measuring the firm's trust in its agents at each stage of their innovation process. This study not only identifies the types of trust a firm experiences with its agents at the various stages, but also determines the most significant type of trust relevant to each type of agents at each stage, i.e. the study correlates the type of trust significant to the type of agent in the firm's innovation process.

By examining the impact of the firm's trust within the innovation process, it allows the firm to be aware of the impact of trust on the quality of their interactions with its different agents and how it impacts the firm's innovation activities. Further, it assists the firm in understanding and taking proactive measures on how to manage successfully its intra-firm, inter-firm and global relationships during the innovation process. The paper does pose some limitations as it does not take into consideration the specific types of activities involved in a firm's innovation process, type of industry, size of firm, geographical location of the firm, culture, language, ethnicity of its agents, time/stage the firm is in its innovation activity, and the type of agents the firm is interacting with at any one point in time. These factors will be incorporated as part of a future longitudinal study where we identify innovator firms within a specific industry.

Future research aims to develop a survey questionnaire to test the framework. The questionnaire will pertain to the role of agents at the different stages of the firm's innovation process and to the types of trust. We hope that the findings will assist in accelerating the growth of innovation by minimising some major remaining obstacles to its development, namely, those related to the lack of trust.

Note

[1] The author acknowledges Dr. Nagaraj for her contributions towards this paper, and Dr. Rasiah for his review comments on the earlier versions that have enhanced the quality of the paper.

References

Anderson, J.C. and Narus, J.A. (1990) "A Model of Distributor Firm and Manufacturer Firm Working Partnerships", *Journal of Marketing*, 54(1): 42-58.

Barney, J.B. and Hansen, M.H. (1994) "Trustworthiness as a Source of Competitive Advantage", *Strategic Management Journal*, 15: 175-190.

Brattström, A., Löfsten, H. and Richtnér, A. (2012) "Creativity, Trust and Systematic Processes in Product Development", *Research Policy*, 41(4): 743-755.

Castaldo, S., Premazzi, K. and Zerbini, F. (2010) "The Meaning(s) of Trust: A Content Analysis on the Diverse Conceptualisations of Trust in Scholarly Research on Business Relationships", *Journal of Business Ethics*, 96(4): 657-668.

Deming, W.E. (2000) "How are We Doing", in *The New Economics for Industry, Government, Education* (2nd ed.), Cambridge: The MIT Press, pp. 1-21.

Doney, P.M. and Cannon, J.P. (1997) "An Examination of the Nature of Trust in Buyer-Seller Relationships", *Journal of Marketing*, 61(2): 35-51.

Dovey, K. (2009) "The Role of Trust in Innovation", *The Learning Organisation*, 16(4): 311-325.

Dyer, J.H., and Chu, W. (2000) "The Determinants of Trust in Supplier-Automaker Relationships in the US, Japan and Korea", *Journal of International Business Studies*, 31(2): 259-185.

Edquist, C. (1997) "Systems of Innovation Approaches – Their Emergence and Characteristics", in Edquist, C. (ed.), *Systems of Innovation: Technologies, Institutions and Organisations*, Washington: Pinter Publishers, pp. 1-35.

Ettlinger, N. (2003) "Cultural Economic Geography and a Relational and Microspace Approach to Trusts, Rationalities, Networks, and Change in Collaborative Workplaces", *Journal of Economic Geography*, 3(2): 145-171.

Gabarro, J. (1987) *The Dynamics of Taking Charge*, Boston: Harvard Business School Press.

Ganesan, S. (1994) "Determinants of Long-term Orientation in Buyer-Seller Relationships", *Journal of Marketing*, 58(2): 1-19.

Gittell, R. and Vidal, A. (1998) *Community Organising: Building Social Capital as a Development Strategy*, Newbury Park: Sage Publications.

Humphrey, J. and Schmitz, H. (1998) "Trust and Inter-firm Relations in Developing and Transition Economies", *The Journal of Development Studies*, 34(4): 32-61.

Lee, M.K.O. and Turban, E. (2001) "A Trust Model for Consumer Internet Shopping", *International Journal of Electronic Commerce*, 6(1): 75-91.

Lewicki, R.J. and Bunker, B.B. (1996) "Developing and Maintaining Trust in Work Relationships", in Kramer, R.M. and Tyler, T.R. (eds), *Trust in Organisations: Frontiers of Theory and Research*, Thousand Oaks, CA: Sage Publications, pp. 114-139.

Luhmann, N. (1979) *Trust and Power*, Chichester: Wiley.

Lundvall, B-Å. (ed.), (1992) *National Innovation Systems: Towards a Theory of Innovation and Interactive Learning*, London: Pinter Publishers.

Maskell, P. (2000) "Social Capital, Innovation and Competitiveness", in Baron, S., Field, J. and Schuller, T. (eds), *Social Capital: Critical Perspectives*, Oxford: Oxford University Press, pp. 111-123.

Maskell, P. and Malmberg, A. (1999) "The Competitiveness of Firms and Regions: 'Ubiquitification' and the Importance of Localised Learning", *European Urban and Regional Studies*, 6(1): 9-25.

Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995) "An Integrative Model of Organisational Trust", *Academy of Management Review*, 20(3): 709-734.

McAllister, D.J. (1995) "Affect and Cognition-based Trust as Foundations for Interpersonal Cooperation in Organisations", *Academy of Management Journal*, 38(1): 24-59.

Mishra, A.K. (1996) "Organisational Responses to Crisis – The Centrality of Trust", in Kramer, R.M. and Tyler T.R. (eds), *Trust in Organisations: Frontiers of Theory and Research*, Thousand Oaks, CA: Sage Publications, pp. 261-287.

Mohnen, P. and Roller, L-H. (2005) "Complementarities in Innovation Policy", *European Economic Review*, 49(6): 1431-1450.

Moorman, R., Deshpande, R. and Zaltman, G. (1993) "Factors Affecting Trust in Market Research Relationships", *Journal of Marketing*, 57(1): 81-101.

Morgan, R.M. and Hunt, S.D. (1994) "The Commitment-Trust Theory of Relationship Marketing", *Journal of Marketing*, 58(3): 20-38.

Murphy, J.T. (2002) "Networks, Trust and Innovation in Tanzania's Manufacturing Sector", *World Development*, 30(4): 591-619.

Nelson, R.R. and Rosenberg, N. (1993) "Technical Innovation and National Systems", in Nelson, R.R. (ed.), *National Innovation Systems: A Comparative Study*, New York: Oxford University Press, pp. 3-28.

North, D.C. (1984) "Three Approaches to the Study of Institutions", in Colander, D. (ed.), *Neoclassical Political Economy: The Analysis of Rent-seeking and DUP Activities*, Cambridge, MA: Ballinger, pp. 33-40.

North, D.C. (1990) *Institutions, Institutional Change and Economic Performance*, Cambridge, UK: Cambridge University Press.

OECD and Eurostat (1997) "The Measurement of Scientific and Technological Activities: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data: Oslo Manual" (2nd ed.), Organisation for Economic Co-operation and Development and European Commission, Paris, downloaded from www.oecd.org/dataoecd/35/61/2367580.pdf. *[Accessed 20th December 2011]*

Ramachandran, R. (ed.), (2009) *ICT Strategic Review 2009/10: Innovation the Way Forward*, Petaling Jaya: The National ICT Association of Malaysia (PIKOM).

Rasiah, R. (1994) "Flexible Production Systems and Local Machine-Tool Subcontracting Electronics Components Transnational in Malaysia", *Cambridge Journal of Economics*, 18(3): 279-298.

Rasiah, R. (1996) "Innovation and Institutions: Moving Towards the Technological Frontier in the Electronics Industry in Malaysia", *Journal of Industrial Studies*, 3(2): 79-102.

Rasiah, R. (2003) "Foreign Ownership, Technology and Electronics Exports from Malaysia and Thailand", *Journal of Asian Economics*, 14(5): 785-811.

Rasiah, R. (2011) "The Role of Institutions and Linkages in Learning and Innovation", *International Journal of Institutions and Economies*, 3(2): 165-172.

Rasiah, R., Kanagasundram, T. and Lee, K. (2011) "Introduction: Governance and Coordination Modes in Driving Innovation and Learning", *Asia Pacific Business Review*, 17(2): 135-141.

Sako, M., and Helper, S. (1998) "Determinants of Trust in Supplier Relations: Evidence from the Automotive Industry in Japan and the United States", *Journal of Economic Behaviour and Organisation*, 34(3): 387-417.

Schmitz, H. (1999) "From Ascribed to Earned Trust in Exporting Clusters", *Journal of International Economics*, 48(1): 139-150.

Schumpeter, J.A. (1934) *The Theory of Economic Development*, Cambridge, MA: Harvard Economic Studies.

Sengün, A.E. (2010) "Which Type of Trust for Inter-firm Learning?" *Industry* and *Innovation*, 17(2): 193-213.

Skytt, C.B., and Winther, L. (2011) "Trust and Local Knowledge Production: Inter-Organisational Collaborations in the Sønderborg Region, Denmark", *Danish Journal of Geography*, 111(1): 27-41.

Sverrisson, A. (1994) "Making Sense of Chaos: Socio-technical Networks, Careers and Entrepreneurs", *Acta Sociologica*, 37(4): 401-417.

Williamson, O.E. (1975) *Markets and Hierarchies: Some Elementary Considerations*, New York: Free Press.

Williamson, O.E. (1985) *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, New York: Free Press.

Williamson, O.E. (2000) "The New Institutional Economics: Taking Stock, Looking Ahead", *Journal of Economic Literature*, 38(3): 595-613.

Zaheer A, McEvily B, Perrone V. 1998. Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance. *Organization Science* 9: 141–159

Zucker, L.G. (1986) "Production of Trust: Institutional Sources of Economic Structure: 1840-1920", *Research in Organisational Behaviour*, 8(1): 53-111.