Innovation and trust

Social trust as an important contextual determinant of innovation output
A cross-country analysis

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"*Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence*" –

Economist Kenneth Arrow, 1972 Nobel Memorial Prize in Economics Laureate (in Arrow, 1972; 357)

Abstract

The ability to innovate is crucial driver of firm competitiveness (Schumpeter, 1934; Cho & Pucik, 2004; Hult et al, 2004) and the economic development of nations (Romer, 1986; Hasan & Tucci, 2010). This makes innovation an important topic of international business and politics and understanding the contextual determinants of innovation a key issue in both fields. Still, the understanding of which national contextual factors that determine innovation remains somewhat undertheorized (Hult et al., 2004).
One such possible determinant of innovative capacity is generalized trust. Over the last two decades, national levels of generalized trust have proved to be a great explanatory variable for important societal factors such as economic growth (Algan & Cahuc, 2014), corruption (Uslaner, 2012) , happiness and life satisfaction (Bjørnskov, 2011) and more.
In this thesis I propose the existence of a causal relationship going from national levels of generalized trust to innovation output. This hypothesis is based on a theoretical framework, in which I also present five mechanisms by which this proposed causality would work.
The empirical results from my quantitative cross-country analysis are favorable to the hypothesized relationship, albeit causality cannot be concluded.
The implications for further research are wide and potentially open up for a new understanding of what determines innovation, as well as for how trust is linked to economic performance.

Table of Contents

1. Introduction

The ability to increase productivity through innovation is crucial for firms in the modern economy (Schumpeter, 1934; Porter, 1990; Stern et al, 2000; Cho & Pucik, 2004; Hult et al, 2004) as well as for the societies in which these firms operate (Solow, 1956; Romer, 1986; Coe & Helpman; Hasan & Tucci, 2010). Firms lacking innovative capabilities have increasingly less chance of survival (Lawson & Samson, 2001), and societies that do not foster innovation stagnate and wither (Tvede, 2013). Simultaneously, a great (and growing) body of research documents strong associations between economic performance and levels of generalized trust (Knack & Keefer, 1997; Whiteley, 2000; Zack & Knack, 2001; Beugelsdijk, 2004, Algan & Cahuc, 2014) among others.
This inspired my initial inquiry: Could there be a causal relation between these two strong predictors of economic growth; trust and innovation?

1.1 The causes of wealth

Contemplating the sources of wealth is not a novel endeavor. In his economic treatise "*Inquiry into the Nature and Causes of the Wealth of Nations*"(1776) Scottish economist Adam Smith engaged one of the big questions that seems to have always fascinated social science scholars: Why do some societies prosper and others not? What are the underlying reasons for the obvious (geographical) disparities of economic performance (Tvede, 2013)? To Adam Smith, the answer was that the extent of *free trade, competition and the division of labor* is a crucial prerequisite for productivity growth and thus wealth. Nations that allow (or indeed promote) these mechanisms can transform the powers of individual self-interest into economic prosperity for the society as a whole (Evensky, 2011).
Interesting in relation to my subject of innovation, economic performance and trust is that Smith himself concluded that the most economical developed (and most commercialized) nations were also were the most trustworthy people were to be found (Bruni & Sugden, 2000). This striking observation seems to hold true even today (Guiso et al., 2009).

Since 1776 economists have continued to wrestle with what drives economic performance and why some societies do better than others.

As I submerged myself into the literature on trust, innovation and economic growth, a hypothesis about their relation began to take shape. Mutual trust is fundamental to the kind of creative cooperation and knowledge-sharing (Larson, 1992; Johannisson, 1998; Dyer & Singh, 1998, Tsai & Ghoshal, 1998) that drives innovation in the knowledge-based economy[1] (Edquist, 2001; Lundvall, 2005). This in turn *establishes the link between trust and economic performance* - an issue that is still today remarkably undertheorized. At the same time, it answers the call for more research into the *contextual factors conditioning innovation* (Hult et al, 2004).

[1] "The knowledge-based economy" is an expression coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors. Knowledge and technology have become increasingly complex, raising the importance of links between firms as a way to acquire specialized knowledge. (OECD, 2005; 28)

In the following paragraphs I introduce some of the insights instrumental to the idea generation and construction of my research question. The arguments presented in the introduction are expanded further within the thesis.

1.2 Innovativeness important for economic performance

Innovation, the ability to use new knowledge or combine existing knowledge in a way that improves a process, organization, product or service is[2] and maybe even *should be* (Assink, 2006) a top priority for businesses today.
According to global accounting and consulting firm, PWC, in 2015 the R & D budget of the 1000 biggest spenders (firms) was an estimated 680 billion dollars – a 70 % rise since 2005 (PWC, 2015).

Some of the world's large bodies of economic cooperation such as the OECD, the EU Commission and the World Bank tout innovation and entrepreneurship as "the key building blocks of competitive and dynamic economies" (World Bank 2015a).
In October 2016 US President Barack Obama inaugurated the first ever *White House Frontiers Conference* on innovation, in interviews and speeches underlining the enormous importance of innovation on societal performance (WhiteHouse.com, 2016).
These examples are a testament to how important innovation is perceived within the realms of business, politics and academia today. And with good reason:
This is supported by a vast amount of economic literature, both theoretically (Schumpeter, 1934; Solow, 1956; Romer, 1986) and empirically (Coe & Helpman, 1995; Hasan & Tucci, 2010) detailing how innovation is a crucial driver of economic performance. The argument is just as strong at firm level: Innovative capabilities and the ability to absorb and make use of new innovation is at the heart of modern firm's competitiveness (Cho & Pucik, 2004; Stern et al, 2000; Porter, 1990;). Thus, it is only natural to wonder what are the best conditions for such innovation to occur.

1.3 Cooperation and knowledge sharing leads to innovation

One of the most compelling, thoroughly documented and well articulated arguments for the societal importance of innovation has been put forward by Danish philosopher, author and business man Lars Tvede in his book The Creative Society (Tvede, 2013). Here, Tvede examines the history of human societies and the rise and fall of empires, searching for common denominators of both success and failure. What he finds is a remarkably stable pattern of decentralization and *openness towards trade, new ideas and cultures*, enabling creative cooperation and innovation being present in empires on the rise. And equally important; Absence of the vary same openness to cooperation and new ideas triggering their demise.
According to Tvede the ability to innovate and cooperate is the deciding factor of whether societies flourish or wither. And innovation is simply more likely to occur in environments conducive to cooperation, where knowledge is constantly diffused and improved upon.

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[2], PWC, 2013 Executive Survey "reveals that 97 % of responding CEOs sees innovation as a top priority for their business" (PWC, 2013a). Survey of 246 international CEOs. To be fair, the wording and framing of this survey can be biased towards a higher number indicating innovation is a priority. The question asked was "*Which of the following statements best describes your company's appetite for innovation?*" and the following statements were provided to chose from: a) *Innovation is not a priority for us in the markets in which we operate* (3%) b) *We value innovation. We're good at recognising new ideas and approaches and adopting them quickly* (36%) c) *Innovation is one of our priorities. We are good at generating new ideas and approaches* (51%) and d) *Innovation is our primary focus. We are creative and regularly pioneer cutting edge ideas and approaches* (10%) (PWC, 2013b)

1.4 High-trust environments

Since the explosion of modern trust research in the 1990's, scholars have found trust to be strongly positively correlated of a plethora of parameters usually considered important to organizational and societal performance (Rothstein & Stolle, 2008; Algan & Cahuc, 2014)).

On the macro-level, social trust is strongly correlated with parameters such as corruption and rule of law (La Porta et al, 1997; Knack, 2002; Uslaner 2003, 2012; Berggren & Jordahl, 2006; Bjørnskov 2009), with policies of economic distribution (Rothstein & Uslaner, 2005b; Bergh & Bjørnskov, 2011), free trade and market regulation (Bergh & Bjørnskov, 2006), life satisfaction and happiness (Bjørnskov, 2011; Algan & Cahuc, 2014), , levels of education (Knack & Keefer, 1997; Glaser et al, 2002), voter participation (Hooghe & Marion, 2013) economic growth(Whitley, 2000; Knack & Keefer, 1997; Zack & Knack, 2001; Beugelsdijk et al, 2004; Algan & Chauc, 2010, 2014), and more.

On the individual, group and firm-level, social trust is found to promote cooperation (Larson, 1992), knowledge sharing (Dyer & Singh, 1998), managerial problem solving (Zand, 1972), decentralization of firm power (Bloom et al, 2009), investments and trade (Botazzi & Rin, 2011; Guiso et al, 2009), among other things.

The presence of trust seems to enable/strengthen positive and productive relations in nearly all realms of society.
So significant are the effects of social trust on economic performance that economists Yann Algan and Pierre Cahuc estimates that in year 2000 the GDP per capita in Africa would have been more than five times as large as it actually was, had Africans had the same levels of inherited trust as the Swedes (Algan & Cahuc, 2010; 2074).
Not only are these associations significant and corroborated in different countries, using different methodologies and by different researchers, there are compelling theoretical and empirical arguments supporting the notion that social trust is in fact the *causing factor* in many of these relationships (Uslaner, 2008 – see theoretical framework, part two).

On the basis of the theoretical and empirical findings mentioned here and expanded within the thesis, I have an expectation that trust and innovation are positively correlated. This is the issue I set out to explore.

2. Research Question

This leads me to my Research Question:

Are societies with high levels of generalized trust more conducive to innovation than are environments with lower trust levels? If so, what could be the underlying mechanisms behind this association?

In the structure of my thesis, I present the theoretical background for this anticipated relationship first, and then examine the empery to check if my hypothesis is rejected or 'survives'.

In order to operationalize the first part of my research question, ("Are societies with high levels of generalized trust more conducive to innovation than are environments with lower trust levels?") I have reformulated it into a more concrete, quantifiable and

most importantly falsifiable hypothesis question, relating the two concepts of trust and innovativeness to their statistical correlation:

1) Is there a positive and statistically significant correlation between a) national levels of trust and b) national levels of innovativeness?

This question serves as a 'working question' guiding the specific operationalization of the real Research Question. Below, I present the explanatory aim of my thesis, that is the purpose of my thesis and what knowledge I hope to acquire.

2.1 Explanatory aim

In practice, the aim of my thesis is twofold.

The first is *pragmatic* (as in Abbotts, 2004 classifications of explanatory programs), in the sense that I study the phenomena of trust and innovation with the purpose of acquiring knowledge that can be used or acted upon. This entails some degree of prediction power of the findings I make.
I inquire into the effect of social trust (as a contextual feature) on economic agents' ability to innovate and ask: Does high-trust environments foster more innovation than low-trust environments?
This emphasis on pragmatism, however, does dot mean that I have to compromise on the scientific goal of 'approaching truth', as I describe in my methodological considerations (Foss, 2007).

The second (and secondary) explanatory purpose of my thesis is to *on theoretical grounds* substantiate a crude model of *how* high levels of trust are converted into high levels of innovation. I do not regress further backwards into this causal relationship (for instance ie. I do not attempt to explain or reduce trust to something 'deeper' - be it culture, genetics or other factors. In my pragmatic quest to uncover the *effect of trusting environments on innovativeness*, such further regress is simply not necessary, however intriguing it may be. For my practical purposes, the concept of trust suffices and does not need to be reduced to something 'more basic'.

In my thesis, I focus narrowly on testing *whether or not* the trust as a contextual feature has an effect on innovation, argue why I would expect such a relationship, and briefly touch upon to whom this knowledge could be relevant. However I do not provide any detailed prescriptions as to how this knowledge can be converted to concrete strategy or indeed monetized. In other words, while I do suggest that this knowledge would be relevant MNCs relying on innovativeness for competitive advantage, it is beyond the scope of my thesis to deliver ready-to-use decision models or strategy advice based on my findings.

2.2 Thesis structure

Based on and inspired from findings in the fields of social capital research, innovation studies and economics, I anticipate a causal link between generalized trust and innovation. In the **methodology & method** chapter I discuss the most important methodological underpinnings of my thesis, and present the method of choice.

The logical and theoretical support for the proposed connection between trust and innovation is expanded in the ***two theoretical framework*** chapters, where I introduce the theoretical concepts and expand the theoretical argument of the thesis. Here I present the mechanisms by which trust can be expected to affect innovation.

In the ***data & measures*** chapter I present the data sources used and evaluate the quality of the measurements, especially in relation to the two different trust measurements utilized.

Besides arguing why we would *theoretically* expect the hypothesized linkage between trust and innovation to exist, I *test the relationship empirically*. Specifically I perform a series of cross-country regression analyses on aggregate country-level data to analyse the correlation between trust and innovation.
The findings from these tests are reported I the ***results*** chapter. What correlations, if any, can be extracted from the regressions and how significant are they? Do the results support or reject the hypothesis question?

In the **conclusion** I gather the threads of my thesis and summarize the main findings, how well they answer the research question and its related hypothesis question, reflect on appropriateness of my chosen methodology and the robustness of the results.

Lastly, in the chapter ***Perspectives and future research*** I reflect on the *future studies* that can be undertaken in extension of the findings from my thesis.

3. Methodology and method

In the following chapter, I discuss the important theory of knowledge-aspects relevant to my thesis and how social trust places itself in the centre of the contextualization debate. I also briefly describe the quantitative method applied[3].

3.1 Important theory of knowledge positions

I ascribe to the evolutionary understanding of science as developed by Karl Popper (1934). That is, I see science, including the social sciences, as a growing body of knowledge that based on the scientific process of testing and falsifying theories can approach a continuously truer understanding of the world.

In alignment with this understanding I take a deductive approach to the answering my research question. I let empery follow theory in the sense that I develop a theoretical framework (based on earlier theories and findings, an then test it. In this tradition, to which my thesis attaches, the potential falsification of hypotheses and theories is what demarks science from non-science (Foss, 2007). In time, wrong ideas are rejected or corrected, while good theories closer to truth survive. This is (at least) as much an ideal, as an empirical observation of social science as it is carried out in practice.

Although I may rhetorically present arguments and findings as 'showed', 'confirmed' or even 'proved' these expressions are not to be taken at face value, but are merely convenient ways of communicating or perhaps lack of linguistic proficiency. These formulations may instead be translated to statements of probability[4] or negating falsification, such as 'has not (yet) been falsified despite of vigorous and rigorous attempts to do so'.
Thus, in my thesis I have strived to conform to this ideal and formulate an objectively falsifiable theory about the relationship between 'trust' and 'innovation'.
These labels might not correspond exactly to what you or I think of, when we think of trust and innovation. Both are *reductions* of more complex concepts and both are aggregations of micro-level phenomena for the purpose of quantitative comparability. I would classify my approach as quasi-reductionist. My approach is reductionist on two planes; I reduce in a semiotic sense and in an ontological one.
In the semiotic sense I acknowledge that there is a loss of information in between the real object (the signified) and the measurement (signifier) (Saussure in Fuglsang & Bitsch Olsen, 2004). Of course, *trust* is richer than its reduction (one or more answers on a attitudinal survey) and there happens more *innovation* than what is measured in the different variables utilized in my analysis. This sort of reduction is in practice unavoidable.
On a ontological level, my approach also has reductionist tendencies. On this level, reductionism relates to the search of deeper causes or as Foss, 2007 writes:
"*[Reductionism] entails a sustained attempt to identify and theorize the real causal mechanisms – the "cogs and wheels" (Elster, 1989: 3) – that generate and explain observed associations between observed events (Harré, 1970; Bhaskar, 1978)".* This is in fact part of the exercise in my thesis, to explain innovation and economic growth with something

[3] A deeper description of the regression method is provided in the appendix.
[4] Lipsey describes a softer form of falsification as the "… statistical view of testing that accepts that neither refutation nor confirmation can ever be final, and that all we can hope to do is to discover on the basis of finite amounts of imperfect knowledge what is the balance of probabilities among existing hypotheses" (Lipsey, 1966: 184) (from Foss, 2007; 7)

"deeper". However, this does not mean that I have a full reductionist (normative) position on science, ie. that it is a value in itself to deduct to the deepest component or variable (Foss, 2007). While that might very well be a topic for further research, I remain content with trust as my explanatory variable, even if there might exist an even deeper layer. As I will show in the thesis there is also a *practical* benefit to reducing to trust only, ie it works very well as a predictor in large-N quantitative analyses.

The use of large-N type method (or Standard Causal Analysis) is typical to the deductive, positivist approach (Abbott, 2004) that I utilize. The large-N analysis conforms well to the falsification-demand and more or less forces the 'scientist' to formulate his study in operationalized, quantifiable terminology. This method is available only to scholars having a decontextualized, positivist understanding of the world, as other strands within the social sciences would argue that social life cannot be understood, measured or compared out of contexts (Abbott, 2004).
In fact, the discussion of *context* places social trust right in the middle of one of the great battles of social science between positivist strands (epitomized by economists) and interpretevist disciplines (eg. Anthropoligists and sociologists). The quantification of social trust can be seen as the positivist answer to the critique that social action (including various forms of economic exchange) can only be understood in the specific social context in which it is embedded: 'The positivist inclination to articulate universal rules of human nature, mimicking those known from the hard natural sciences, is meaningless because each social event is embedded in specific social context or structure', followers of the interpretevist school could argue. The positivist reply to this then becomes 'Alright, let us measure that social context-thing and integrate it into our models'. The positivist strand of science has embraced the criticism and used. In other words, while the concept of social trust started as a concept of sociology with which interpretevists could claim that positivists could not fully appreciate or understand the spectrum of social life, it migrated into economics during the 1990's in what I describe as 'the quantification of trust research' in my literature review.

Having a positivistic understanding the phenomenon of trust essentially means, that I assume that it really is there. That is, individuals have or 'possess' a (not necessarily constant) level of trust, as a real feature of that particular individual, irrespective of how others think or talk about it. This is a bold statement given the mostly non-physical nature of trust[5], but as I argue in the *literature* and the *data and measures* chapters, the analytical understanding of trust and the attempts to measure it, have been relatively successful on practical terms.
In my thesis, I rely on this perception held by most by scholars in the field of trust research: What is measured in attitudinal surveys such as the WVS, EVS and GSS is *close enough* to our theoretical conception of trust – at least for all practical purposes (Sapienza et al, 2013).

3.2 Method

To answer my research question(s) I have chosen to perform a quantitative large-N statistical analysis.

[5] Non-physical in the sense that it *is inside the heads* of individuals and thus hard to measure as a physical phenomenon. The wording *mostly non-physical* is purposely vague. Neuroscience and biogenetics – both working towards providing direct physical measures of personality traits, feelings etc. – are taking great leaps of progress these years. Whether feelings or personality traits can be reduced to and measured in biologic / chemical terms is beyond the scope of this thesis. For further interest in this issue see *DeYoung, C. G. (2010), Personality Neuroscience and the Biology of Traits. Social and Personality Psychology Compass, 4: 1165–1180.*

The quantitative large-N analysis has the advantage of delivering easily-interpretable results and as well as allowing for very large volumes of data to be compiled and combined. This method is well suited to provide generalizable conclusions due to its large empirical foundation, while a shortcoming is the loss of richness of information. In other words, this method can be criticized for omitting nuance and detail. The large-N quantitative analyses, such as a regression analysis, are often used in combination with a deductive hypothesis-testing approach when looking to clarify effects on an aggregate level. It is rooted in the hard (positivistic) sciences. These traits make it very compatible with the explanatory aim and assumptions stated above.

In performing the bivariate and multivariate regressions I use the Excel extension programme Statplus and the function *Multiple Linear Regression*. I use the same programme's *Descriptive Statistics* function to generate distribution data of the datasets. Examples of regression analysis output can be found in the appendix.

3.3 Evaluating regression outcome

In evaluating the outcome I refer to Cohen's (1988) classification of effect sizes within the social sciences, stating that correlations of $R > 0.1$ is a weak correlation, $R > 0.3$ is a moderate correlation and $R > 0.5$ is a strong correlation. In terms of statistical significance levels use the standard P-value cut-off at 0.05 meaning all values above this cut-off are perceived as statistical insignificant. I also go through the residuals of all the observations in from the regression models to scan for outliers. Datapoints that differ 2 standard deviations or more from the predicted values of the regression model are considered outliers (Saunders et al, 2003)(this only happened in two cases, which are reported in the results chapter).
Descriptions on how data is assembled and processed are to be found in the measures and data chapter (page 51).

"When trust is shaken, individuals pull back and the market system contracts. Where trust grows, individual energy and creativity are unleashed and the system grows."

From *Adam Smiths Essentials: On trust, faith and free markets* - Evensky, 2011; p. 1

4. Theoretical framework 1: Introducing the concepts

In this chapter and the next I review the important theory and findings of the field and present the theoretical foundation for my research. The two chapters are closely related in that they both present some of the important definitions and findings within academic fields of innovation and social capital research on which my thesis stands. But they also serve different purposes in my thesis: The first chapter is more general, describing the key definitions and seminal works in order to *establish the academic tradition* I write myself into, while the second chapter is focused on exactly the theoretical arguments and empirical findings that relates to the overarching of my thesis, ie. the relation between trust and innovation.

In the first part of this chapter I present a definition and taxonomy of innovation and examine the important effects of innovation, both on firm and society level. I also define and clarify what trust is, what it is not and the important distinction between particularized and generalized trust. These clarifications will be needed in the following chapter, where I combine insights from both trust and innovation studies, and discuss the *theoretical arguments for the causal relationship between trust and innovation*.
A key function of this first chapter is also to present *the literature to which my thesis is an extension*, as well as the gaps it aims to fill.

The chapter coming immediately after this one is also part of the theoretical argument and consists of two sections. In the first section I document the stability of trust, how it can reasonably by assumed that trust is cause rather than effect, and why this makes trust a unique predictor of long-term innovation output. The second section is structured as an analytical examination of (5) mechanisms by which trust is expected to positively affect innovation, drawing on insights from both areas. The focus here is mainly on the *cooperation enhancing effects of trust*, arguing that relational quality is essential in creating innovation in the knowledge-based economy. The structure of the following two chapters is this:

<u>Chapter X. Theory: Introducing the concepts</u>
Innovation
Trust

<u>Chapter Y. Theory: Making the case</u>
Stability and causality of trust
Mechanisms by which trust affects innovation

While the two chapters are intimately related in terms of theory apparatus they serve different roles apparent from the labels ‘introducing the concepts’ and ‘making the case’.

4.1 Innovation: The creative process fundamental to firm success and macroeconomic performance[6]

The purpose of the following section is to highlight the important role innovation has to firms and societies, and the relevance and urgency understanding innovation represents to these parties.
In this sections I introduce innovation as a critical component for productivity and economic performance at both firm and society level drawing on important theoretical and contributions to the field. Emphasis is especially on describing theories and findings relating innovation to macroeconomic growth, as it is the common links between trust and innovation to macroeconomic growth that first inspired this thesis. For the purpose of clarity, I also propose a definition of innovation and briefly discuss the potential shortcomings in this.

Innovation is recognized in a vast and diversified amount of literature, both theoretically (Schumpeter, 1934; Solow, 1956; Romer, 1986; Stern et al. 2000) and empirically (Hasan & Tucci, 2010; Coe & Helpman, 1995) as crucial driver of macroeconomic performance[7]. The evidence is no less clear at firm-level: innovative capabilities and the ability to absorb and make use of new innovation is at the heart of modern firm competitiveness (Porter, 1990; Lawson & Samson, 2001; Hult et al., 2004; Assink, 2006).

One of the most well researched and articulated arguments for the societal importance of innovation has been put forward by Danish philosopher, author and investor Lars Tvede in his book The Creative Society (Tvede, 2013). Here Tvede examines the history of human societies and the rise and fall of empires, searching for common denominators of both success and failure. First of all, Tvede finds remarkably *persistent geographical patterns of creativity and innovation* during the last centuries, mainly located in the Western Civilization (Western Europe and offsprings[8]). While this pattern has been true for some hundred years, history is rich with examples of other civilizations that at points in time were centers of power and innovation, only to decline and disappear. So what determines these rises and falls?
According to Tvede, civilizations on the rise are all characterized by decentralized social structures and *openness towards trade, new ideas and cultures* enabling creativity and innovation. While these are defining traits of blossoming civilizations, the opposite values of strict conservatism, hierarchical society structures and isolationism characterize the eventual demises of all the very same civilizations (Tvede, 2013).

According to Tvede the *ability to innovate is the determining factor* of whether societies flourish or wither. Innovation ability, in turn, is a result of cooperation and exposure to new, alien memes[9] that are selected over time, in a trial and error-like process resembling that of natural selection in the evolutionary process (Tvede, 2013). The

[6] On the night of november 29th my laptop crashed, which caused unsaved parts of the paper to be deleted without any possibility of recovery. This incident was especially severe on the innovation theory section.
[7] I use the terms economic performance, economic development and economic growth almost interchangeably when making general claims such as 'innovation is widely recognized as a strong driver for economic performance/growth/ development'. To be precise, they are not exactly the same, but they are analytically closely linked: Economic *development* is a status, and the compounded result of multiple periods of economic *growth/performance*, in other words a temporal aggregation of these.
[8] 'Offsprings' refers to former colonies with a low share of native inhabitants such as USA, Canada, Australia etc.
[9] The term *meme* was coined by Richard Dawkins' in his book The Selfish Gene (1976) and refers to *"an idea, behavior, style, or usage that spreads from one person to another in a culture*" (Miriam-Webster Britannica English Dictionary)

memes (social norms and moral values) can change over time, but they only do so slowly in an incremental fashion.
As I will argue later, trust is a *prerequisite* for creative cooperation and exposure to new memes, as mistrust retards cooperation and makes individuals turn to in-group relations, avoiding contact with strangers (such as through trade)(Banfield, 1958).

Not merely a source of firm competitiveness and economic growth, innovation is being touted as the answer to all the great problems of our world:

" [Innovation leads to] increased productivity, competitiveness, and national wealth. And ultimately, the major problems of our age – poverty, health, and the environment – will only be addressed through our collective ability to innovate" (Carlson et al. 2006: 3).

In light of the potential gains associated with innovation, finding out what determines it can prove intellectually rewarding or indeed; very profitable. But first, let me define what we mean by innovation.

4.1.1 Defining innovation

In the following paragraph I examine and discuss definitions of innovation. On the basis of this, I formulate the definition used in this thesis.

The word innovation functions both as a verb and a noun. Its etymological origin can be traced back to the late Middle Ages and the latin verb 'innovare', meaning *to renew* or *to change*[10]. Innovation is the *process* of creating something new (to innovate) and the *product* of this process is an innovation. The process and the product are closely related and one cannot exist without the existence (or former existence) of the other. That is, without a product[11] which is in some sense new, there can be no process meaningfully referred to as innovation. There might be a process of attempting to innovate, but without product it does not qualify as innovation (process). At the same time, an innovation cannot exist without there having been a process of innovation. Even if the new product happened without purpose it still classifies as innovation, as innovation does not imply intent (Corbett, 1959).
As it happens, most formal definitions of innovation are in good alignment with its etymological roots. One example of this is Lawson and Samson's definition of innovation:

"Innovation is the mechanism by which organizations produce the new products, processes and systems required for adapting to changing markets, technologies and modes of competition." (Lawson & Samson, 2001, p. 378).

The essence in this definition is the creation of something new, specifically created by one ore more organizations for the purpose of competitiveness. In this definition the innovation *output* (what I called 'product' above) is vaguely defined as 'products, processes or systems'. In a general definition of innovation, this vagueness is not a problem, as it can easily be narrowed using a pre-specification before the word 'innovation' (such as 'product-', 'marketing-', 'strategy-' etc. innovation). In a *general* definition of innovation, there is no need to specify the output further.

[10] Online Etymology Dictionary.
[11] In this context the word 'product' is to be understood in its widest meaning, as a tangible or intangible output. Here, it does not necessarily refer to a physical object like it often does in colloquial conversation.

However, the definition above is too excluding, stating that the innovation output is *'... required for adapting to changing markets, technologies and modes of competition*'. Innovation (as in a general definition) does not imply *necessity* (Corbett, 1959), although innovation might be necessary[12].
Another proposal for a definition is Charles Edquist's:

"*Innovations are new creations of economic significance normally carried out by firms (or individuals). They may be brand new, but are more often new combinations of existing elements*" (Edquist, 2001; 7).

This definition is also broad in terms of the innovation output, but for the purpose of a definition the comment on *who normally carries out innovation* seems out of place. Again, this is ultimately an empirical question, not an analytical one[13].

In most definitions, innovation involves the utilisation of new knowledge or a new combination of existing knowledge. And in most definitions it is a requirement that the innovation outcome improves or adds value[14] (Schumpeter, 1934; OECD, 2005).

Innovation is the utilisation of new knowledge or a new combination of existing knowledge that can be perceived as improving a process, organisation, product or service.

Following the taxonomy of Edquist (2001) innovation can be classified in four types: Goods and services as well as technological and organizational process innovations. Goods or services, which are tangible and intangible forms of product innovations, as they are both matters of *what* is being produced. Process innovations may take the form of being technological or organizational. Process innovation relateds to the *how* in producing goods and services (Edquist, 2001). A product innovation can be transformed into a process innovations in a 'second incarnation', eg. an industrial robot is a product when it is produced, and a process when it is used in the production process. While some innovations might take the form of both product and processes this taxanomy provides an intuitive understanding of the different purposes innovations can take. It can also be useful in the sense that the same *innovation determinants* might not affect different *types of innovation* in the same way.
Hence the distinctions can be of use in evaluating whether all innovation types are equally represented in my quantitative data analysis

4.1.2 Schumpeterian rents for firms to appropriate

One can hardly discuss the importance of innovation and entrepreneurship without mentioning Joseph Schumpeter, who during the course of his academic career emphasized the pivotal role of the innovative entrepreneur to the success of capitalist economies.
According to British economist and innovation scholar, Christopher Freeman, the central point Schumpeter's whole academic life work was that "*capitalism can only be understood as an evolutionary process of continuous innovation and 'creative destruction*" (Drechsler et al, 2009; 126).

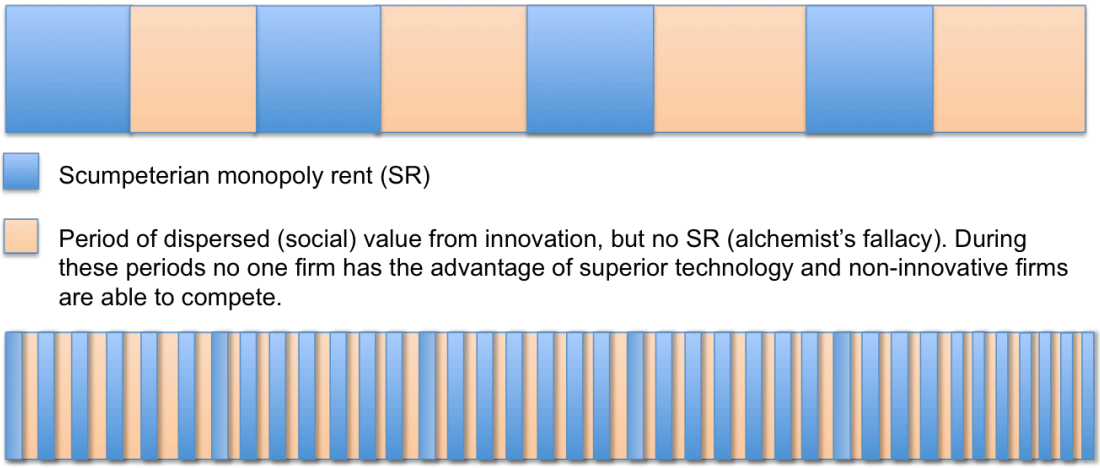
[12] In other words; whether innovation is necessary is a question of empirical observation rather than definition.
[13] As a thought experiment, how could this definition meaningfully be applied to an analysis of an all-state economy with only publicly owned collectives?
[14] Whether the outcome improves or adds value is ultimately a subjective distinction (even if can be operationalized in objective ways by observing action (Hayek, 1988)).

In the Schumpeterian view, the entrepreneur introduces new ways of combining resources into novel products and through novel processes, thereby bettering what is currently on offer in the market. As a result, old ways of doing and incumbent firms are destroyed in the process ('creative destruction', Schumpeter, 1942).
By innovating, the entrepreneur carves out a (temporary) monopoly-like situation in which the entrepreneurial firm can earn supernormal rents before competitors imitate or out-innovate it. These supernormal rents, or 'Schumpeterian rents' as they have since been referred to, in turn incentivize other entrepreneurially spirited persons to engage in innovation in search of supernormal profits (Schumpeter, 1934).

Studying the relationship between firm innovativeness and firm performance, Hult et al. (2004) confirms the Schumpeterian notion:
" *While it is generally agreed that innovation contributes to business performance, relatively little is known about the drivers of innovativeness and how those drivers operate via innovativeness to collectively influence performance. Moreover, little is known about how the drivers of innovativeness operate under varying conditions in the firm's external environment.* " (Hult et al, 2004; 429)
Besides re-affirming the positive correlation between firm innovativeness and their economic and market performance, they find that especially in times of market turbulence and uncertainty innovative firms outperform non-innovative. Hult et al also emphasize that while looking inside the firm for innovation capabilities is useful and interesting, focus on the environmental factors conditioning innovation has been understudied. This is appeal speaks right into the purpose of my thesis, as I study how generalized trust understood as an contextual factor of the firm environment affects innovation outcome (this relationship and the role of diffusion will also be discussed in a later section).

4.1.3 Exponential growth rendering innovation increasingly important

In the rapidly evolving world of today, the ability to innovate and stay up to speed has become ever more crucial to countries and the organisations operating within them. Due to the exponential nature of innovation (Tvede, 2013) incremental as well as radical innovations will become ever more frequent. Angus Maddisons comparison of historical levels of GDP per capita serves well to illustrate this purpose (see the L-shaped curve of historical GDP levels in Madison, 2007).
The effect on profits and competitiveness of this development is depicted in the figure below. The top bar signifies a certain time period T1 and the bar below, T2, a *later*, but equal length time period. The blue parts of T1 and T2 signifies a period in which one firms in the given product or service market can earn Schumpeterian rents due to superior offerings provided by innovation. The sand colored periods are periods when no one firm has the advantage of superior products or processes and firms compete on non-innovative parameters. In period T1 there are longer stretches of time where firms do not rely on innovation for competitiveness, but can compete on other virtues (hard work, marketing, access to raw materials, locations etc.). In T2 the frequency of innovation is higher and as it increases the blue periods begin to overlap, effectively making non-innovative firms become uncompetitive (pace of development making even imitation strategies difficult without innovative capabilities)(Gunday et al, 2011).



According to Samson and Lawson (2001) firms abilities to innovate are more important in today's globalized, knowledge-based economies than before, making innovation a key feature of competitiveness: *"The emergence of the knowledge economy, intense global competition and considerable technological advance has seen innovation become increasingly central to competitiveness."* (Lawson & Samson, 2001; 378).

Not only has competition become global and intensified, the business environment is also uncertain and fast-changing, writes Marnix Assink (2006): *"In a quickly changing and uncertain world, innovation is the key to competitive advantage"* (Assink, 2006; 217).

While there may exist 'secluded islands' in the economy, where firm competitiveness is unhinged by the ability to innovate, as a general rule, innovative efforts are making out an increasing share of economic activity (OECD, 2007; 6).

4.1.4 Innovation in a macroeconomic perspective

As much as Schumpeter's thoughts have contributed to and inspired the research on innovation and innovation strategy, his analysis on the macroeconomic importance of the entrepreneur has been equally influential. Thus, we understand from Schumpeter that there are profits for firms to make from engaging in innovation, and at the same time innovations (technological progress), is what drives economic growth and development. The aggregation of many micro-level productivity improvements has an enormous effect on macro-level.
This insight is reproduced in many later theories on macroeconomic development, most notably Robert Solow's (1956) (exogenous) growth model and Paul Romer's (1986) endogenous growth model.

Put simply, the Solow's growth model states that economic growth is a function of *capital input*, *labor force input* and a previously unexplained residual, Total-Factor Productivity, which is exogenous to the model (not explained in the model).

Economic Output (Y) = Total Factor Productivity (A) x Capital input (K) x Labor input (L).

In other words, since a lot of the growth in economic output observed, could not be explained by corresponding growth in capital or labor input, there had to be something else multiplying the inputs. According to Solow, this unexplained factor of productivity had to be *technological progress* (innovation).

Because there are diminishing returns to classic capital investments the output per worker eventually reaches a steady state, from where only technological progress will have a significant effect on output. Thus, long run economic growth depends on technological progress to overcome this trap of diminishing returns and achieve sustainable productivity growth (Solow, 1956). Solow estimated that 87,5 % of American growth in productivity aws due to technological progress (innovation) (Solow, 1957).

Where in Solow's growth model the driver for economic growth, *innovation*, is exogenous to the model, Paul Romer (1956, 1957) made efforts to include it and account for its antecedents. That is, while innovation is still understood to be the important variable for long-term economic growth, Romer's endogenous growth model 'explains it' /substututes it with *investment in human capital* (education) and *intellectual capital (R&D)*, as they are *determinants* for innovation (technological progress).

The essence of Schumpeter, Solow and Romer is the same as that of Lars Tvede (2013), mentioned in the introduction. Innovation (technological progress being a subcategory of innovation) is the root of economic growth and performance. Innovation provides private gains, in the form of Schumpeterian rents, to innovators and social gains to bystanders and societies as a whole through the process of diffusion. Without innovation societies stagnate and whither (Tvede, 2013).

Just like trust, innovation is often located at the micro-level and is conditioned by micro-level factors, but it is in the aggregation that we see the full effect of many micro-level events. Innovation is the utilisation of new knowledge or a new combination of existing knowledge that can be perceived as improving a process, organisation, product or service as defined in Edquist (2001) taxanomy of inovation.

Put shortly, the ability to innovate stands out as extremely important to societal development[15].

[15] And I only focus on the kind of innovation innate to the world of business, which is of a quantifiable nature, but obviously this does not constitute the total sum of all new creations or ideas that may lead to 'better societies'. Assuming that political and institutional configurations of a country are important factors for its overall performance, is it not important then, if these political / institutional settings can innovate themselves and adapt to changing times? Unfortunately, this discussion (implications of differing capacities for political innovation) is much beyond the scope of my thesis. It is however worth mentioning, that Heinemann & Tanz (2008) find that high-trust countries are more successful in reforming and modernizing their institutional settings.

4.2 Trust: Definitions, distinction and review

4.2.1 Defining trust

In the following part, I will define trust, so that we can 1) differentiate trust from *similar concepts* with which trust is often confused and 2) analytically disentangle *different types* of trust.

Given its relational and situational nature, trust (and its polar opposite; mistrust) can be observed in an infinite number of variants and intensities. There is the kind of trust one has in one's spouse, sibling or best friend, and there is the trust one has in co-workers, neighbors or acquaintances. There is the trust one has in *groups of people*, such as firms, parties and even entire populations. Trust (or distrust) can be aimed at almost anyone and anything, from familiar individuals (I trust my wife) to metaphysical figures (eg. In God We Trust). Later in this chapter, who trust is *directed at* will be useful in distinguishing between different types of trust, but for the time being, loosely defined categories such as 'trustor / trustee' or principal /agent will suffice.

Trust includes (at least) two parties, the trustor, A, and the trustee, B, in a relationship where A exposes him/herself towards B, expecting B not to take advantage.

"[Trust is] *the willingness of a party [trustor] to be vulnerable to the actions of another party [trustee] 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; 712).

This is management scholars Roger Mayer, James Davis, and David Schoorman's definition of trust from their canonical article "An integrative Model of Organizational Trust" (1995), and also the definition of trust applied in my theoretical framework.
I use this definition together with the definition by economist Steven Knack, who define trust using classic Principal/agent terms:

"*Trust can be defined as the belief or perception by one party (e.g. a principal) that the other party (e.g. an agent) to a particular transaction will not cheat, where the payoff structure internal to the transaction can be characterized by a prisoner's dilemma or principal-agent game*" (in James, 2007, p. 1)[16].

I add this second definition of trust, because including the game theoretic notion of *pay-off structure* in the definition is useful to distinguish trust from seemingly similar concepts, such as assurance. Trust is the expectation of the trustee to refrain from opportunistic behavior in situations where the trustee could appropriate short-term benefit from doing so. Hence, if governance mechanisms are in place to the effect that opportunistic behavior becomes economically irrational for the agent, trust is not needed.

To understand what trust is and how it works in action, Mayer et al.'s (1995) integral model of trust is a good place to start. According to Mayer et al. trust is relational and situational, such that attributes of the trustee, the trustor, their relationship history and the situation all affects whether an act of trust will occur or not.

[16] Cited from James (2007) but originating from Steven Knack's contribution "Trust, Associational Life and Economic Performance," in J.F. Helliwell's (ed.), *The Contribution of Human and Social Capital to Sustained Economic Growth and Well-being*, Quebec: Human Resources Development Canada (HRDC) and Organization for Economic Cooperation and Development (OECD), 2001, p. 175

In their trust model, the decision to engage in trusting behavior (action) can be reduced to three factors:

1) Trustor's (A) perception of trustee (B) trustworthiness
2) Trustor's (A) general propensity to trust, and
3) The level of trust vs. the level of perceived risk involved in engaging in trusting behavior[17].

The first and last factors are properties of the mental 'trust calculation' *unique to the situation* (can this *specific trustee*, in this *specific situation* at this *specific point in time* be trusted or not).
All three parts of the trust calculation are subjective. The trustor's **perception of agent B's trustworthiness** is a subjective calculation, based on the biases and information available to the trustor. Likewise, the trustor's **general propensity to trust** is a subjective assessment of the viability of trusting others in general. So is the evaluation of situational **risk**.

The trustor's *perception of trustee trustworthiness* and *assessment of risk in engaging* are situation-unique features of trust, susceptible to new experiences and information. Given the flimsy and situation-specific nature of these two concepts they are not useful for generalizable analysis.
The same does not apply to the trustor's *general propensity to trust*. On the contrary, Mayer et al. defines the trustor's propensity to trust as a general feature of A's personality, considered relatively stable[18].

4.2.1.1 Generalized and particularized trust

This model of trust provides an important analytical distinction between the two concepts of particularized trust and generalized trust often used within trust literature. According to Mayer et al, the *propensity to trust* is equivalent to *generalized trust* ie. the level of trust an individual has in 'people in general'. Generalized trust (or propensity to trust) is what can be measured in survey questions such as "*In general, do you think that most people can be trusted, or can't you be too careful in dealing with people?"*[19] and "*In dealing with strangers one is better off to be cautious until they have provided evidence that they are trustworthy – agree or disagree?*"[20].

According to Mayer et al (1995) generalized trust is *context-insensitive* (at the individual level). In other words, it is the baseline level of trust an individual have, before factoring in specific information about trustee reputation etc. The result of these specific alterations (adding and deducting from the baseline level of trust) is a level of *particularized trust*. Particular trust is the level of trust a trustor has in a *particular* trustee at a *particular* moment in time.

[17] How individuals compute and weigh the two different concepts (risk vs. trust) against each other is not clear from Mayer et al. (1995), but the ability to evaluate and compare seemingly non-related, abstract concepts against each other, is something the human mind does on a regular basis as part of every day heuristics (Kahnemann & Tversky, 2011)
[18] Ultimately, this is an empirical question, but since trust is difficult to measure directly, this issue is not easily solved. For detailed discussion on the stability of trust propensity and trust as a personality trait go to the data / measure-chapter.
[19] This is the question posed in the surveys most used in trust research, the World Value Survey (WVS) and the European Value Study (EVS).
[20] Julian B. Rotter's Interpersonal Trust Scale, 1967

High levels of particularized trust are usually observed between family members, spouses and good friends. It entails a *particular* object of trust and can be understood as the sum of trust propensity +/- trustee trustworthiness.
Below, the relationship between trustee trustworthiness, propensity to trust, generalized and particularized trust is formalized in three simple formulas.

Propensity to trust = Generalized trust Trustor's perception of trustee trustworthiness = Three factors of trustworthiness (ability, benevolence and integrity) Propensity to trust +/- Trustor's perception of trustee trustworthiness = Particularized trust

This gives us a theoretical conception about what shapes individual's (trust) attitudes, but not whether this results in actual trusting *behavior* ('a leap of faith') or not. According to Mayer et al, this is a question of whether the level/intensity of trust outweighs the risk of engaging in trusting behavior:
A might trust B to have the ability, benevolence and integrity to follow through on an agreed action and not take advantage of A's trust, but even so, the repercussions of opportunistic behavior, however small the risk may seem can outweigh the benefits of engaging (leap of action). This last step is formalized:

If Particularized Trust > Perceived Risk of action (contextual) => Trustor engages in trusting behavior

Following this analytical understanding of trust (Mayer et al., 1995), each person will have only one 'score' of *generalized trust*, but infinitely many *particularized* trust 'scores' (millions of potential trustees *times* infinite situations).

The distinction between generalized and particularized trust enables us to better compare (or not compare) different trust studies. While some studies focus on forms of particularized trust, the vast majority of trust research is engaged with the studying the determinants and effects of generalized trust. This distinction is also important because it allows us to understand why high generalized trust increases the likelihood of particular-trust relations to occur, but not the other way around (Uslaner, 2015). High trust in someone you know, is not transferred to apply to strangers, whereas high trust in people in general will enable the focal trustor to quickly establish particularized trust in someone they learn to know.
Trust scholars widely agree that generalized trust – not particularized trust – is the important trust-variant in terms of generating social benefits and positive externalities (Bjørnskov & Svendsen, 2013; Uslaner, 2015).

To further clarify what trust is and what it is not, its important to disentangle trust from concepts easily confused with trust, thus providing a sharper, coherent analysis of the current literature and empirical findings.

4.2.1.2 Separating trust from related concepts and the problem of attribution

Trust not the same as cooperation
Trust is not the same as cooperation, as cooperation does not have to imply risk (vulnerability). Cooperation implies some kind of (joint) action, whereas trust (as described in the model) does not have to lead to action of any sort. Cooperation can be forced, trust cannot. That being said, trust is a strong enabler of cooperation and can mediate cooperative behavior that would otherwise not have happened, had there not been trust: Studies show that generalized as well as particularized trust enhance the likelihood *and* quality of cooperation and economic exchange (Zand, 1972; Boss, 1980; Larson, 1992; La Porta et al, 1997; Den Butter & Mosch, 2003; Zaheer et al, 2008; Guiso et al, 2009; Botazzi et al, 2011; Sousa-Lima et al., 2013).
In the next chapter I argue that this strong relationship between trust and cooperation is in fact *one of the mechanisms* by which trusting societies can be more innovative, given that most innovation is done in

Trust not the same as confidence
Confidence is closely related to trust, but differs in the *conscious perception* or *recognition of risk* and alternative options. Nicklas Luhmann explains this as the difference between going to work every morning without a weapon (confident that one will be ok) and trust, which is a conscious choice one makes between alternatives possibly leading to disappointment (Mayer et al, 1995)[21].

Trust not the same as predictability
Although trust certainly shares some conceptual kinship with **predictability**, they are not the same thing. Predictability is important, but not sufficient in understanding trust. Trust *does* entail some measure of predictability, but a predictable agent is not necessarily a trustworthy agent – if he/she can predictably be expected to take advantage or act opportunistically, that can hardly be considered trustworthy.

Trust not the same as Assurance
Confusing trust with assurance is a widespread phenomenon, even within academic research (Yamagashi & Yamagashi, 1994). An example of this is William Ouchi's thorough comparisons (Ouchi 1979, 1980, 1981) between American and Japanese organizational culture, at a time when Japanese companies like Toyota and Honda outcompeted their American counterparts. Observing what he described as a clan-like firm culture led him to conclude that Japanese firms derived competitiveness from having higher levels of trust. According to Ouchi, the high-performing firm structure and strategy found in most Japanese could *only be viable* with high levels of trust present. This finding is puzzling at face value, as it seems contradictory to the fact that attitudinal surveys consistently find the Japanese to have lower levels of generalized trust than Americans. Proposing a solution to this apparent conundrum, Yamagashi & Yamagashi emphasize the distinction between trust and assurance: Japanese organizations are in fact *not* characterized by higher *trust,* as proposed by William Ouchi. Rather, relations are dominated by high levels of mutual *assurance due to systematic sanctions* (social control), meaning that the 'benign behavior' observed, is benign for self interested reasons (ie. in accordance to payoff structure). Put differently, it may seems as if

[21] Paraphrased from Mayer et al, 1995 p. 713, but originating from Gambetta, D. (1988) Trust: Making and Breaking Cooperative Relations. Oxford: Blackwell, p. 102.

employees trust each other, but in fact they only act as if they do, because they are scared of harsh (social) sanctions from not doing so (Yamagashi & Yamagashi, 1994; 132)(Mayer et al, 1995; 718).

The problem of attribution
Having strict governance (whether formal or informal) structures can be a remedy for principals to avoid opportunistic actions by an agent, but even if it makes the agent act as if he can be trusted, this does not inspire much trust. This is the *problem of attribution*, described by Nikerson et al (2013; 230, 233):

… governance structures are unable to build and support high levels of trust because of either a problem of attribution (Malhotra and Murnighan, 2002) or from formal structures 'crowding out' intrinsic motivation (such as trust) with external interventions. […] They may also inhibit the building of trust between exchange partners directly through the problem of ***attribution****. Attribution occurs when exchange partners attribute good behavior to structure instead of the other party, which results in little residual trust when the formal structure is removed (Malhotra and Murnighan, 2002; Ferrin and Dirks, 2003).* (Nikerson et al., 2013; 230, 233)[22]
The problem of attribution, which Nickerson describes in the quote, is that while formal governance structures (such as a specified contract to which there are sanctions if not upheld) might result in cooperation, the individuals involved will not ascribe the mutual cooperation to the good will of the other, but the governance structure. The existence of formal governance is only effective when they are in place, as soon as removed, one cannot expect the other not to act opportunistically in the new setting.

In this section I have defined trust as the expectation of a trustor (A) that he/she can expose vulnerabilities (risk) to a trustee (B), without the B taking advantage of A – even if the payoff structure internal to the transaction would reward opportunistic behavior (ie. even if B is not monitored or sanctioned). I have shown how this definition helps disentangle trust from related concepts, such as cooperation, confidence, predictability and assurance.
In this section I have also made an important distinction between generalized trust and particularized trust, which is useful in differentiating different forms of trust and understanding why generalized trust is the meaningful kind of trust to look for in cross-country analyses, and particularized trust is not. Later, in the data & measures-chapter I will detail how generalized trust is quantified and present the different measurements applied in my study.
With the most important definitions and distinctions in place, I proceed to the brief literature review of trust research.

4.2.2 Literature review

[22] In his historic description of trust and trade in traditional Muslim societies, Ernest Gellner (2000) describes how attribution can also be a relevant concept on society level (according to Gellner the introduction of a strong, centralized rule destroyed trust in North Africa): *"The Hobbesian problem arises from the assumption that anarchy, absence of enforcement, leads to distrust and social disintegration. We are all familiar with the deductive model, which sustains and re-enforces that argument, but there is a certain amount of interesting empirical evidence, which points the other way. The paradox is: it is precisely anarchy which engenders trust or, if you want to use another name, which engenders social cohesion. It is effective government, which destroys trust. This is a basic fact about the human condition, or at any rate about a certain range of real human conditions. It is the basic premise of Ibn Khaldun's sociology, which happens to be the greatest and most accurate analysis of traditional Muslim society."(p. 143)*

The literature review give me the opportunity to 'set the scene' for my contribution. By providing a review of modern trust research, highlighting some of the seminal works I do two things; 1) I present the tradition and discipline I am writing into and to which my thesis is a natural extension.

Before the explosion of trust research and the use of cross-country analyses, trust was mostly measured with the individual trustor as the unit of analysis.
During the 1970's the study of interpersonal trust slowly received attention in leadership and management literature (Zand, 2016). Trust was studied as interpersonal/organizational (ie. specific) – confined to the organization – as if the firm was an isolated island in a sea of generic 'firm context'. At this point, the understanding of trust as an important feature external to the organization was largely nonexistent. Since the late 80's, beginning of 90's there has been a movement away from merely analyzing trust as something that is created, shaped and maintained in and by the organization, towards an understanding of trust as a deep-rooted environmental factor, conditioning the workings of the firm, the state and other organizations (Coleman, 1990).

This movement away from generics, towards a wider perspective on the firm in its surroundings (context), complemented by the rise of the adaptive strategy understanding (Chafee, 1985), can also be observed within IB and the theory of the firm in general, most prominently exemplified by the rise of New Institutionalism (Brousseau & Glachant (2008).

While most recent trust research focus extensively on the Nordic societies (Denmark, Finland, Norway and Sweden) due to their exceptional high levels of trust, the earliest waves of trust research looked towards Italy for the very opposite reasons. Southern Italy is and has for many decades been plagued by low levels of generalized trust and widespread corruption. And, perhaps unfairly, all of Italy's citizens seem to have been painted with the same broad brush by other Europeans:

When the European Commission in its large Eurobarometer-survey[23] asked Europeans about the trustworthiness of other EU-nationals, the Italians came out as perceived least trustworthy by fellow Europeans, followed by Mediterranean neighbors Spain, Greece, Portugal and France (Guiso et al., 2009).
In another survey of over 1000 European business managers from five countries (England, France, Germany, Italy and Spain) Italians were ranked 'least trustworthy business partners'. Even Italian respondents perceived Italian trustworthiness low, ranking only Spanish managers as less trustworthy (Guiso et al., 2009). And it was also in Italy the cradle of modern trust research was born.

4.2.2.1 The Moral Basis of a Backward Society

Political scientist Edward C. Banfield was far ahead of his time when in 1958 he argued that social trust (or the lack of it) was a crucial determinator of societal performance. When his work is still relevant today, it is because the observations he made and the narrative he told provides such an intuitive understanding of why social trust must be an important lubricant in social and economic relations. Banfield coined the term

[23] The EC have not included this questions in their survey since spring 1993, in the EuroBarometer Standard 39. Reports in French and German are available at:
http://ec.europa.eu/COMMFrontOffice/PublicOpinion/index.cfm/Survey/getSurveyDetail/instruments/STANDARD/surveyKy/1421

'Amoral familism' which is still today essential in understandings the mechanisms that makes low-trust societies underperform. I incorporate Banfield's seminal work into my thesis firstly because a review of the trust literature would be empty without it, but also because his description of 'amoral familists' so precisely predicts the predicaments of low-trust societies.

In his book from 1958, "The Moral Basis of a Backward Society", political scientist Edward C. Banfield set out to explain why some societies are economically backward. Studying the small village of 'Montegrano' in poor Southern Italy, he found that the lack of trust between villagers inhibited them from working together and create of common welfare. After a year's observation and interviews with the villagers, Banfield concluded that the mentality/morality of the local populace, for which he coined the term '*Amoral familism'*, was to blame for the backwardness of the region.
What he observed was a culture of nepotism, zero-sum mentality and narrow self-interest, making civic engagement and philanthropic behavior highly unlikely. In his book he sums up the moral axioms the Montegrano-villagers teach and live by and *"Maximise the material short-run advantage of the nuclear family; assume that all others will do likewise"*[24] was one of them (Banfield, 1958, p. 83)[25]. If any person or institution claimed to do something for the common good, it would unambiguously be regarded with suspicion and considered obvious fraud. The expectations of the 'amoral familists' was always that people were self-serving and corrupt, why the only certain way avoidbeing taken advantage of, was to not engage with non-family at all. As Banfield observed, the untrusting zero-sum mentality had the effect that citizens could not unite for common causes, such as building a well, even if it would benefit all villagers. The mentality served as a self-fulfilling prophecy and a vicious cycle.
These axioms of low-trust societies create an environment in which people exclusively trust (and care about) their immediate family, expect everybody else to behave in that way and therefore (rationally) do not trust non-family and do not expect to be trusted outside the family. Banfields description of Montegrano has since been found to be covering for other low-trust societies too (Alesina & Giuliano, 2011). In relation to trust and innovation it is not hard to imagine how creative cooperation might be drastically retarded in low-trust environments, but more on this mechanism later.

In the following decades, the role of trust as a factor for societal development was not pursued and for many years trust remained a fringe issue within the social sciences[26]. During the 1970's trust became an issue of interest within management and organization theory (Zand, 1972; Boss, 1980; Ouchi, 1979 & 1980, Kavanagh, 1975) and

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[24] Other popular beliefs of the Montagrano villagers includes: *"Only officials will concern themselves with public affairs, for only they are paid to do so"* and *"Officeholders will not do more than is necessary to keep their places [...] [They] will take bribes when they can get away with it ... whether they take bribes or not, it will be assumed by the society of amoral familists that they do"* Banfield, 1958, p. 84-87

[25] Supporting this narrative of strong *strong ties* and weak *weak ties* (Granovetter, 1973), Alesina and Guiliano (2011) find an inverse relationship between strong family ties on one side, and generalized trust and civic participartion on the other (using a large cross-country quantative method). Or as they phrase it: "[...] the more the family is all that matters for an individual, the less he or she will care about the rest of society and the polity." (Alesina & Giuliano, 2011; 818).

[26] Dale E. Zand, now considered a pioneer in trust and leadership research, has later described the development like this:
"*There has been a remarkable acceptance and dissemination of the value of trust during the past 50 years. Once an amorphous concept of limited interest, trust is now treated as a critical factor in social relations at all levels, from dyads to nation states.*
In the early days, it was a challenge to develop interest in trusting behaviour. In those days, my research on the relation of trust to performance appeared to be an isolated, quirky study in an era of authoritarian management. [...] In the academic community, a search of Google Scholar using the phrase trust and performance retrieves more than two million items. The literature is vast and overwhelming!" (Zand, 2016; 68).

in the 1980's sociologists like Diego Gambetta, James Coleman and Nicklas Luhmann gravitated towards the issue. But it was the work by Robert Putnam (1993) that ignited the explosion in studying trust as an important contextual feature that has been going on since the mid-1990's.

4.2.2.2 Putnam introduces 'social capital' as an aggregate measure

The scientific research into the role social capital (including trust) on a societal level got its great breakthrough in the end of the 1980's beginning of 1990's - with Robert Putnam's book 'Making democracy work: Civic traditions in modern Italy' (1993) the perennial testimony to this.

In "Making democracy work" Putnam and Italian co-authors Robert Leonardi and Raffaella Nanetti posits that *social capital* is the key to a well functioning democracy and good governance. In their book, Putnam et al. study twenty Italian regional governments[27] over two decades and find very significant differences in institutional performance, strongly correlating with regional traditions for civic engagement and trust, traceable back to the Free City States of Northern Italy in medieval times (Putnam, 1993). Where Northern Italy is (and historically has been) characterized by high civic and political engagement and associational activity, the opposite was true for Southern Italy, ultimately mirroring Banfield's (1958) description of *amoral familism*.
Part of what makes Putnam's argument so compelling is that his empirical foundation is extremely sound. The twenty different Italian regions were all established at the same time (1970) and thus provided a natural experiment-like setting for Putnam to study how the different regions faired from more or less the same institutional starting point. The difference in institutional function was remarkable and correlated nicely with Putnam's measures of social capital (a combination of associational activities, civic engagement and trust in others).
Subsequent studies has since dismissed civic engagement and associational activities, including membership in voluntary associations to be important predictors of well-performing institution and other social relations, finding only social trust to be significant (Knack & Keefer, 1997; Knack, 2002; Uslaner, 2015). This is an important point, because the conception of social capital in the 1980's and 1990's included social network and civic activities, but during the late 1990's and early 2000's focus gravitated towards studying the effects of trust exclusively (Uslaner, 2015), which is also the path I continue.

The work by Putnam was the harbinger of the role trust would come to play in the following years of comparative political studies and what Jackson Nickerson has since characterized as '*an explosion in papers studying the impact of trust*' (Nickerson et al, in Bachmann & Zaheer, 2013; 227).

4.2.2.3 The explosion and quantification of trust research

"I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be."

[27] The regional governments were only introduced in 1970. Until then, since the unification of Italy in 1870, the country had been ruled by the central government in Rome, with little to no regional government. Circumstances that can be described as a natural experiment.

Lord Wiliam Thomson of Kelvin, mathematical physicist, 1883.

Not only did the field of trust research see an explosion in terms of papers, the literature integrated more quantative / statistical methods and became increasingly concerned with trust as a feature *embedded within* communities, nations and regions *conditioning* economic and bureaucratic performance.

The same year as Putnam published "Bowling Alone" (1995) another political science superstar of the 1990's made his entry onto the scene of trust research; Political economist Francis Fukuyama with his book "Trust: The Social Virtues and the Creation of Prosperity".
Fukuyama's book epitomized the new sentiment in social capital (trust) research; that this new concept had an almost omnipotent explanatory power as a contextual enabler of positive and productive economic relations. However, what really changed the nature of the discipline was not Fukuyama's contribution, but the critique he received.
One of the harshest critics was Nobel Prize-winning economist Robert Solow, who in his review of Fukuyama's book writes:

"*Intuition says that there is something here worth uncovering. Yes, but if "social capital" is to be more than a buzzword, something more than mere relevance or even importance is required. Those cultural and social formations should be closely analogous to a stock or inventory, capable of being characterized as larger or smaller than another such stock. […] The stock of social capital should somehow be measurable, even inexactly. Observable changes in it should correspond to investment and depreciation. Otherwise the analogy to capital is not very useful to the working analyst."* (Solow, 1995; 38).

Social capital is interesting and perhaps even important, Solow admits, but if 'the stock of social capital' is not measurable, the concept itself becomes next to useless, he argues. To fuzzy. The same criticism was later brought forward by political scientist John Ikenberry (1996) and others. Solow's critique soon turned out to be the herald of a new era of trust research. As a response to these criticisms, the use of quantitative analysis grew during the late 1990's, providing new insights, in turn expanding academic interest in the field. Since the 1990's better statistical methods and larger datasets have pushed the literature towards more robust results and consensuses with regards to correlations. Causation, on the other hand, is still debated fiercely (see more on this debate in later in this chapter).
Cross-country analyses have national levels of trust to provide good predictions for an array of diverse organizational, economic and political factors including economic growth (Whitley, 2000; Knack & Keefer, 1997; Zack & Knack, 2001; Beugelsdijk et al, 2004), level of corruption and extend of rule of law (La Porta et al 1997), decentralization of firm power (Bloom et al, 2009), investment decisions and trade (Botazzi & Rin, 2011; Guiso et al, 2009), usage of formal contracting (Woolhuis et al, 2002), life satisfaction (Bjørnskov, 2011), Political reform eagerness (Heinemann & Tanz, 2008) and more.

This is the tradition I follow in my research. Both the strong emphasis on trust as a contextual feature of society that conditions organizational and economic performance (such as innovation), as well as the quantitative cross-country method that has come to characterize the discipline.

Proposing trust as a driver of innovation may be novel idea, but at the same time it connects two of the most robust predictors of economic growth together in logically

compelling causal relationship (both trust and innovation, respectively, have been shown to be strong predictors of economic growth – see next chapter.

As such, my thesis is a natural extension of the theory and findings that precedes me.

"Trust is the glue of life. It's the most essential ingredient in effective communication. It's the foundational principle that holds all relationships."

Stephen Covey, American business man, author and inspirational speaker in his bestselling book "The Seven Habits of Highly Effective People" which has sold more than 25 million copies worldwide (StephenCovey.com)

5. Theoretical framework 2: Making the case

In this chapter I present several theoretically grounded reasons for looking towards trust as a predictor of innovation output. The chapter revolves around two issues, namely 1) why trust is a uniquely interesting contextual conditioner of innovation and 2) The mechanisms by which theory would suggest the trust-innovation causality to work. In companion, the two issues underline the great relevance of studying trust in relation to innovation.

From an innovation literature point of view, proposing social trust as a driver of innovation is untrodden territory. Thus, I have some heavy lifting to do justifying the usefulness and reason in studying trust as a predictor of innovation output.

The first half of this chapter begins with an examination of previous academic work on the inheritability of trust, ie. its 'stickiness' (persistence) over time and the direction of causality. I then compare and discuss the different positions in the causality debate (is trust cause or effect?) and conclude the first part by evaluating the implication this has on trust as a predictor (or driver) of innovation.
What I find is that national levels of generalized trust are very stable, probably because they are the effect of socialized and internalized moral values from an early age. This makes trust a feature of the business and political context, which can be very reliable for long-term predictions.

In the second half of this chapter, I engage the question of how trust and innovation is associated. Building on insights from trust research and innovation studies, I propose five mechanisms, which would explain why high-trust societies innovate more than low-trust societies.

5.1 The stability of trust and trust as the causal factor

Trust is a very persistent (national) trait that can be traced generations back in time. This outstanding stability over time makes it a unique measure and suggests that in most cases; trust being the causing factor (rather than effect) is the logical conclusion to draw. That is what makes trust as a predictor of societal development (including innovativeness) such a powerful factor: It is very stable. Policies and institutions can change rapidly, but trusting values (or lack thereof) usually does not. While this might spell bad news for governments limited by the trust levels of its citizen, it could prove useful knowledge for MNCs in position to take advantage of it.

In this chapter I go into the historic stability of trust and the discussion of causality. I argue why it is important to determine cause from effect and touch upon the question of whether social trust can be cultivated.
In relation to the overarching argument of the thesis, this section serves to show how trust *given its stability* can be a unique predictor of innovation. Secondly, this section is key to forestalling the frequent objection to using trust as a causal factor: "Isn't trust just an *effect* of societal performance / configuration?".

5.1.1 A question of causality

Direction of causality. A question inherently present when constructing logical (time linear) arguments of correlation, often times impossible to reach definitive, empirical conclusions on. This leaves discussion on the grounds of theoretical arguments or

indeed ideological axioms and assumptions. As I showed in the previous chapter, generalized trust has been found to be strongly correlated with a long series of variables at individual, organizational and society level (see also Knack & Keefer, 1997 or Delhey & Newton, 2005). Leaving aside the possibility that all these strong associations are spurious, the natural next step is to contemplate the nature of these relationships. Is generalized trust the cause or effect here, or could there be an underlying factor affecting them all?
While no definitive academic consensus on the matter has been reached, the majority view is in favor of seeing trust as a basic cause (Rothstein, 2008). That being said, no scholars hold the extreme positions that trust is *only* a cause (and cannot be effected by other factors) or that it is *only* an effect of other factors.

5.1.2 The exceptional Nordic countries

In this academic debate the Nordic countries (Denmark, Sweden, Norway, Finland[28]) has become the popular case when discussing the direction of causality. The Nordics are in many ways *exceptional* (understood as a non-normative description of deviation from the norm) on a series of variables. Studies find that the peoples of the Nordics consistently have higher levels of generalized trust than can be found anywhere else. At the same time, the Nordic societies share many of the same traits, when it comes to political and institutional configuration: The Nordics are all democratic countries with high voter and civic participation rate (Hooghe & Marien, 2013; Paxton, 2002), low economic inequality (Rothstein & Uslaner, 2005)(Delhey & Newton, 2005)(Bjørnskov, 2006), fair and uncorrupted civil service (Knack, 2002)(Bjørnskov, 2010)(Rothstein & Stolle, 2008), a strong rule of law and property right protections (Knack & Keefer, 1997) (Berggren & Jordahl, 2005), and are all open, trade-friendly economies with a high degree of economic freedom (Berg, 2006) (Berggren & Jordahl, 2005)[29]. They also have a history of Protestantism and their populations are ethnically homogenous (Delhey & Newton, 2005)(Bjørnskov, 2007)[30].

All these characteristics are also positively correlated with trust on a global scale - even when removing the exceptional Nordic countries from the equation, the associations remain significant (Delhey & Newton, 2005). The human mind looks for patterns and causes, and this remarkable pattern is no exception. But before entering into the discussion about causality, a brief discussion on why causality is important.

5.1.3 Why does causality matter?

Danes are one of the happiest people in the world (worldhappiness.report), Denmark is a high-trust nation and Denmark has one of the highest tax burdens (total tax revenue as a percentage of GDP, Heritage.org) in the world. Does that mean the rest of the world would be happier and more trusting if they just tried to emulate the economic structure of the Danish welfare state? Perhaps. But the causality could also go the other way around, so that high levels of trust is a *prerequisite* for a Scandinavian-style welfare state. Economist Christian Bjørnskov (2015) argues in favor of the latter, providing Greece as an example of how dangerously wrong it can go when economic systems are not aligned with its social capital conditions / environment in which it is embedded. What this example by Bjørnskov emphasizes is that *mixing up cause and effect can lead to terrible decisions* (in this case, they argue that trust is the cause of both happiness and

[28] The Netherlands (NL) has been close for years and the most recent World Value Survey W6 reports a (unspecified) generalized trust score of 67.4 which would make NL part of the high-trust cluster.
[29] Even more characteristics of shared societal configuration of the Nordics could be added to this list.
[30] While it is certainly true that the Nordic nations are ethnically homogeneous, Hooghe et al. (2009) questions whether this correlation is universal (using European data).

a successful expansion of the welfare state otherwise prone to freeriding and opportunistic behavior).

" *[…] social capital is associated with a number of political, social, and economic outcomes that for most people are normatively desirable. Among these are well-performing democratic institutions (Putnam 1993, Newton 1999b, Woolcook 2001), personal happiness (Helliwell, 2002), optimism and tolerance (Uslaner 2002), economic growth (Knack & Keefer 1997, Zak & Knack 2001), and democratic stability (Inglehart 1999).*" (Rothstein & Stolle, 2008, p. 4)

As Rothstein & Stolle write, social capital (trust) is associated with a number of 'normatively desirable' outcomes. But what if trust is nothing but an effect of these outcomes (or they share a common cause)? If so, it becomes meaningless to talk about the *effect of trust* on x, y or z.

Whether trust is cause or effect has major implications for how knowledge about trust and its correlations can be put to use by decision makers within international business and politics. If trust is the underlying cause of these societal and organizational outcomes, it has the potential to *complement* or even *substitute* existing theories. If, for example, *trust is the main driver of political-electoral participation*, allocating resources into 'get out and vote'-campaigns might be wasteful, even if it follows recognized theories of political mobilization. Or, if a decentralized firm structure works in a high-trust context *because it is high-trust*, it might not be worthwhile trying to duplicate and incorporate the same structure and routines into a business unit operating in a low-trust environment.
Ultimately, distinguishing cause from effect can lead to better solutions to real life problems and discontinued use of wrong, ineffective (or even harmful) theories.

5.1.4 Different understandings of how trust is created and maintained in society

In order to understand the different positions on the question of causality, it is useful to know how the creation and maintenance of trust over time is perceived in the literature. The differences between the views can be condensed into two pairs of frequently used dichotomies, being the *Experiential versus Cultural view (Uslaner, 2008)* and the *Institution-centered versus Society-centered understanding (Dietlind & Stolle, 2008).* Below, I will briefly introduce these four schools before I continue to a presentation and discussion of the arguments made on both sides of the causality-debate.

The experiential view
According to scholars holding the *experiential view*, individuals' levels of trust are predominantly based on *their* specific experiences as a 'going concern', ie. constantly evaluated (Uslaner, 2008). For instance, two siblings having the same upbringing may experience different people and situations outside their home, which shape each sibling's individual level of generalized trust.
As a result, we would only expect an individual's trust to be stable over time if said individual consistently had (more or less) the same kind of experiences of (un)trustworthy behavior.

The institutional understanding
Institutions and regulations might explain how a given population (on average) have consistent / uniform experiences. The *institutional understanding* rests on the assumption that it is this backdrop of well-functioning (administrative and regulatory) institutions which *create* an environment where trusting is more rational simply because the pay-off structure (formal regulations and sanctions) is not favorable to

opportunistic behavior[31]. In this understanding, trust and trustworthy behavior would evaporate should the formal institutions supporting it disappear. The institutional and experiential approaches are closely related: The institutional understanding relies on an experiential view of how trust is constantly shaped by experiences, but it goes a level of analysis 'upwards', pointing to the structures conditioning such experiences.

The cultural view

Contrary to the experiential view, we find the *cultural* (socialized) view. Here, generalized trust is thought of as a moral value instilled in children from a very early age, steadily passed on from our parents (socialized)(Barney & Hansen, 1994)(Uslaner, 2008). According to Barney & Hansen, this may start out as a set of socialized rules and sanctions (in effect a payoff structure) to which young persons are taught to comply. That is, during early childhood (the *conventional* morality age) individuals are not really trusting[32] in the absence of sanctions, but *over time* non-opportunistic (trustworthy) behavior induced by a certain payoff structure is *internalized* to the effect that agents act *as if* the set of sanctions were still in place, even when they are not (and the person is aware that they are not):

"In the conventional morality stage (Kohlberg, 1969), children conform their choices and behaviors to a set of values, principles, and standards in order to avoid the costs imposed on them by others for failing to do so. In this stage, children are moral because the costs of being caught violating principles and standards (i.e., punishment) are too high. In the post conventional morality stage, choices and behaviors conform to a set of values, principles, and standards because they are internalized by individuals."

Once these principles and moral values has been internalized, individuals follow them by their own choosing and will be reluctant to sway from them, as this will make them feel bad about it, what Barney & Hansen refers to as 'internally imposed costs':

While extemal costs could still be imposed on choices and behaviors that do not conform to these principles and standards, avoiding these costs is not the primary motivation for moral behavior. Rather, the primary motivation for such behavior is to avoid internally imposed costs, including a sense of personal failure, guilt, and so forth." (Barney & Hansen, 1994; 180-181)

The effect of socialized values is that individuals behave according to them, with no regards to the (material) pay-off structures presented to them. Hence, trust and trustworthy behavior is a foundation not easily changed, why only major shocks will affect it significantly. From a cultural view, stable levels of generalized trust over time are expected, not because the sanctioning regimes are stable, but because the socialized and deeply internalized moral values are.

The society centered approach

The society centered understanding follows in the Tocquevillian tradition, emphasizing how association activity and social networks has socializing effects on democratic and cooperative values and norms, including social trust between strangers (Hooghe & Stolle, 2003).

[31] Notice that this contradicts our trust definition by Stephen Knack (James, 2007) where A trusts B to not take advantage of A, even though the payoff structure would prompt a purely self-interested B to do so.
[32] Remember, if a certain behavior is expected to be non-opportunistic due to the apparent sanctions, it does not apply to our definition of trust (and trustworthiness).

In the society centered approach, social trust is determined by long-term traditions of social organization, ie. regular social interaction, preferably through membership in voluntary associations, sports clubs, etc. (Rothstein & Stolle, 2008)

This understanding is advocated by Robert Putnam, who in his book "Bowling Alone – The Collapse and Revival of American Community" (2000) explains how social capital (social interaction) is the fabric of a successful society and why the decline in social capital is detrimental to American society. According to Putnam, social capital can be cultivated by engaging people in associational activities in their community with people both similar to and different from themselves (so-called bonding and bridging nefworks, Putnam, 2000).
Having established these four positions within the causality debate we can proceed to the specific arguments on each side.

5.1.5 The current debate on the relationship between trust and political institutions

In the following section I present and discuss the most prominent views on the causal relation between generalized trust and *Politics*[33] in current trust.

Bo Rothstein[34] represents the argument that trust is an effect of political institutions, while Eric Uslaner[35] and Christian Bjørnskov[36] represent the view that social trust is conditioning the configuration and performance of political institutions.

To some extend, this juxtaposition is artificial in that all three acknowledge some degree of circular reciprocity between *trust* and *Politics* / Institutions. That is, even though Uslaner and Bjørnskov consider trust as generally independent from legality, economic system, and policies they conceit that certain policies can affect trust (negatively, at least).

Bo Rothstein: *Political institutions create social capital*

Bo Rothstein is a proponent of the institutionalized understanding of trust. According to Rothstein, it is the state institutions, which shape the trust of its citizens. The egalistic welfare states of Northern Europe create conditions that shape the beliefs and attitudes of people living in them, making trusting relationship more viable – put differently; expectations of trust will be disappointed less often.
In their 2008 article "The State and Social Capital: An Institutional Theory of Generalized Trust" professors Bo Rothstein and Dietlind Stolle[37] "[…] *present a theory in which the causal logic that has been the established wisdom in most studies of social capital is reversed."*(2008; 441). Here, the established wisdom refers to the society

[33] I use the term *Politics* as convenient shorthand for all input, output and throughput (process) of the political system and public institutions when the exclusion of finer nuances in this aspect is not crucial to the argument.
[34] Bo Rothstein is professor at University of Gothenburg as well as Oxford University. His work primarily revolves around the nordic welfare state, the importance of institutions and social trust.
[35] Eric M. Uslaner is professor of Government and Politics at University of Maryland and is also associated with Aarhus and Chonqing University in Denmark and China, respectively. He specializes in the study of trust, corruption and the rule of law.
[36] Christian Bjørnskov is professor in Economics at Aarhus University and specializes in the causes and effects of trust and happiness.
[37] This review is primarily based on Rothstein & Stolle (2008), but Rothstein has a number of academic articles to his name about the same discussion, leading up to and following this contribution. This text is chosen as my focal point as it is Rothstein's most explicit discussion the issue of causality direction.

centered and cultural view of causality running from trust to institutional design and institutional performance.

According to Rothstein and Stolle, it is the fairness and even-handedness of government officials, working through rules and regulations that permeate through the layers of society (top-down), making the norms, attitudes and behaviors of its people a mirror of their government. And not just any part of government; it is specifically the order institutions (army, police and legal institutions) that shape trust.

People *become* trusting, *because* the political system[38], specifically the order institutions, inspire them to be so. Because state institutions sanction non-trustworthy behavior, ensuring citizens abide contracts, do not steal, or engage in other kinds of untrustworthy behavior, in turn instilling in people that others will not try to do so. Or put in game theoretic terms, government changes the payoff-structure so that the dominant strategy becomes positive cooperation.

In their data analysis Rothstein and Stolle find a strong association between confidence in 'order institutions' and generalized trust (as hypothesized) (p. 450), whereas confidence in political (partisan) institutions (and media) is not significantly correlated with generalized trust.

To establish the direction of causality, they perform a longitudinal test, comparing changes in generalized trust to changes in confidence in police (order institution). If indeed they could show a time-lag from changes in confidence in police and generalized trust that would substantiate the claim that trust is in fact the effect.

Here they find a positive, but scattered and non-significant correlation, detrimental to their hypothesis.

Although the theoretical hypothesis finds *some support* in the data analysis – the part about not *all* Government institutions, but only *order institutions* that are related to generalized trust – the evidence in favor of the institutional approach is modest.

Uslaner & Bjørnskov: *Trust is persistent over time because it is socialized from generation to generation*

For a long time, that *one good argument* or *one great study* that finally creates consensus in the debate about the causality of trust and erases all doubt, did not present itself. Because general surveys of trust only date back to the 1960's the sort of time-lag conclusions showing the existence of *one before the other* proved difficult. But in the last decade, several studies pointing to national cultures of trust *predating* current societal configurations have trickled out. One study in particular stands out, as perhaps the conclusive argument in favor of the cultural, socialized view.

The clever contribution to this debate was made by prominent trust researcher Eric Uslaner in 2008. In his article, "Where You Stand Depends upon Where Your Grandparents Sat: The Inheritability of Generalized Trust", Uslaner investigates the relation between Americans of different ethnic heritage's generalized trust and the current day trust levels in his/her 'Home Country'. For example, how do the trust levels

[38] Note here that Rothstein & Stolle's term the 'political system' refers to both the *implementation side* (cicil service, police, army, courts) of politics, and the *representational side* (politicians, parties, government). To Rothstein and Stolle, it is an independent point in itself that different logics apply to these two sides of the political system, and that only the fairness of the implementation side has an effect on generalized trust.

of Scandinavians[39] (living in Scandinavia) *today,* match that of American-Scandinavians whose ancestors immigrated to America decades, even centuries ago?

What he finds is a remarkable case for trust being an inheritable cultural trait, more or less constant from generation to generation: Americans having Nordic ancestors are more likely to be trusting than Americans with other ethnic roots - just as the peoples of the Nordics today are more likely to be trusting. Americans of German and British decent are more likely than Americans with Latino ancestry to be trusting, just as their respective homeland populations exhibit these differences. Overall, the trust levels of immigrants spatially and temporarily separated from the culture from which their ancestors travelled, mirror the (dis)trusting attitudes of that very culture today.
As such, Uslaner's findings lend support to the cultural view, stating that trust is a cultural trait, stably transferred from generation to generation.

Uslaner also contrasts this finding against the *experiential view* according to which we would expect individuals' immediate environment to be of greater importance to their trust levels than that of their ancestry.
Uslaner finds little support for such conclusion. Comparing immigrants from various ethnic backgrounds across United States he finds that their trust level is predominantly predicted by their own ancestry rather than the ethnic/cultural composition of fellow state citizens[40]. That is, it is where their ancestors came from, rather than whom their neighbor is that makes the difference. In a state like Minnesota where the share of people with Nordic and German ancestry is high (and thus the overall average trust levels of its inhabitants) the trust level does not 'rub off' to people originating from low-trust cultures (e.g. Latino or African American). The same goes for individuals originating from high trust cultures (Nordic, German and British) living in low trust contexts; their trust levels do not deteriorate. Uslaner's findings have since been confirmed by Bjørnskov & Svendsen (2013).

In conclusion, Uslaner shows that levels of trust are a very persistent and sticky ethnic/cultural value. Like oil and water, low trust-cultures and high-trust cultures are immiscible. The good trusting vibe of high-trusters does not seem to rub off.

Trust is not a product of certain legal and economic institutions (at least not in the short to medium term), but socialized from parent to child (Uslaner, 2008 & 2015) [41]. It is more likely that the form of political and economic system (and business environment) of a country – such as Denmark – is conditioned by the levels of social trust (Bergh & Bjørnskov, 2011; Bjørnskov & Svendsen, 2013).

5.1.6 The historic roots of trust

National levels of generalized trust are very stable (Knack & Keefer, 1997). That is not to say that trust levels never change. To the extent that trust levels do change, they usually do so in a slow, incremental fashion, but occasionally historical 'shocks' can have sudden, detrimental and long-lasting effect on trust levels. For instance, Rose-Ackerman (2001), Delhey & Newton (2005) Nichols (1996) and others find that the experience of having lived through communist regimes have significantly lowered the level of generalized trust in Eastern Europe.

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[39] Scandinavians are just one of the ethnic ancestry lines Uslaner look at. The study also includes people of German, British, Irish, Spanish/Latino, Italian, Eastern European and African descends.
[40] One exception to this is that people of Nordic descend experience positive effects on trust levels when they live in communities with larger shares of other people of Nordic descend.
[41] An alternative line of reasoning points toward genetic / hormonal explanations to the heritability of trust. To get a good primer to the biological take on trust, genes and hormones see Cesarini et al. (2008).

Nathan Nunn & Leonard Wantchekon have in a series of studies showed how the coastal areas of East and West Africa are still today affected by the 16th to 19th century Atlantic and Indian slave trade. In their 2011 study on slave trade and trust, they find that the peoples living in areas more severely exploited in the 400 year slave trade are today – 100 years after the end of slave trading – significantly less trusting than peoples of otherwise comparable, neighboring regions. One can imagine the shock of seeing fellow villagers kidnapped or killed, and how that might fundamentally change the worldview passed on to following generations.

Svendsen & Svendsen (2016) even trace the Scandinavian high-trust culture back to medieval times(!), when illiterate Vikings engaged in long-distance trading had to rely on high levels of mutual trust and an 'A word is a word'-code of honor:

" *[…] the Scandinavian trust culture was reflected in the ideology of a 'Man's honor', the oral Thing system and trade norms as revealed in later written sources. Viewed in this light, the relative socio-economic success of the Scandinavian welfare state may be traced in a pathdependent historical process, the root of which may be long-distance trade and the rise of a trust culture in the late Viking age (10th and 11th centuries). This could explain in part why Scandinavian countries today enjoy high levels of trust that have insulated these nations from non-cooperative behavior and free-riding."* (Svendsen & Svendsen, 2016; 204).

As pointed out in the quote by Svendsen & Svendsen, trusting and trustworthy traits have long historical roots within the Nordic countries. Thus, the relatively novel invention of the modern welfare state (in the 1960's) cannot be responsible for a high level of trust, as it is predated by it, the argument goes. In this understanding trust is very much the cause, not the effect. The peoples of the Nordics are [ex ante] more trusting than peoples of other countries and regions, enabling them to create and *sustain* a societal structure that would otherwise fall pray to free-riding, rent-seeking and other kinds of non-trustworthy behavior:

"*Knowing that social trust reduces the risk of potential free riding—either due to an actual effect or that most voters believe so—contributes to explaining why Scandinavians and populations of other high-trust societies may be willing to pay very high taxes to finance a universal welfare state (Nannestad 2008)."* (Bjørnskov & Svendsen, 2013; 272)

Even if this argument by Bjørnskov & Svendsen is not in itself evidence that trust is the determining factor in terms of the configurations of the Nordic welfare state, it does provide *theoretical ammunition* as to how this causality would work.
Held together with the findings of Uslaner (2008), Svendsen & Svendsen (2016), Putnam (1993) Guiso et al, (2014) it makes a very compelling case for trust being a cause rather than effect.

5.1.7 Can national levels of trust be cultivated?

Given that generalized trust appears to be a potent *predictor* or even *driver of* the 'normatively desirable', determining whether (and how) trust can be fertilized and nurtured, becomes a valuable insight from policymakers' perspective. If indeed trust and its associated outcomes can be augmented, the societal gains could be vast. That is why The Behavioral Insights Team (also known as the Nudge-unit) sponsored by The United Kingdom Government is currently looking into how social trust can be improved (Halpern, 2015).

On the other hand, if generalized trust cannot be promoted by political doings, policies pursuing that end ought to be discontinued.

According to Eric Uslaner the task of building trust is not straightforward:

"*Building trust is not so easy, especially if it follows people from their family's "old country. Trust has been declining in the United States as economic inequality has been rising and also as immigrants from historically disadvantaged (and lower trusting) groups make up a larger share of the population. If we worry about the decline in trust, we might pay less heed to the waning of league bowling and dinner parties and more to understanding why people from some cultures are less trusting than others.*" (Uslaner, 2008; 739)

The reference to league bowling and dinner parties is obviously aimed at Robert Putnam and the society-centered understanding in which the get-together of people in communities is seen as the salvation to declining trust.
At this point, no good formula for enhancing national trust levels by the blink of an eye has emerged and I am not aware of programs garnering such an effect within a longer timespan either. This might be bad news for governments who are limited by their populace' stock of social trust, but for free-roaming MNC's this insight is not as bad as it can be useful.

5.1.8 Trust as a constant in the international business environment

In this thesis I treat trust as a feature of the social environment in which firms are embedded, influencing economic decision-making (Granovetter, 1985). As I have shown, trust is a constant in a world of ever changing technology, business models, macroeconomic cycles and regulatory regimes. In the following paragraphs I describe how my study of innovation and trust relates to international business managers concerned with innovation.

To understand how trust as a stable factor of business environments is relevant to strategy, let us first consider a few definitions of what strategy and strategic management is.
In their 2007 article "What is Strategic Management, Really?" management scholars [fornavne] Nag, Hambrick & Chen (2007) perform a meta-study of the management literature in order to concentrate the essence of strategic management. Analyzing the most frequently used words and 'distinctive vocabulary' from 385 peer-reviewed strategy management articles, they condense it into the following definition of strategic management:

"*The field of strategic management deals with the major intended and emergent initiatives taken by general managers on behalf of owners, involving utilization of resources, to enhance the* ***performance of firms in their external environments****"(emphasis added).*

I put emphasis on the last part 'the performance of firms in their external environment.' because it is exactly the firm context (high/low-trust countries) that is the focus of my analysis. Knowing how different environments condition various aspects of firm performance is vital to strategy and decision-making.

Business strategy scholar Charles Hofer defines strategy in the following way:

"[Strategy is] concerned with the development of a viable match between the opportunities and risks present in the external environment and the organization's capabilities and resources for exploiting those opportunities" (Hofer, 1973; 3).

This definition more explicitly focuses on the matching of the firm's external environment with its capabilities. As a logical consequence firms need to understand their external environment in order to 'do strategy'.
Just how important the context is for firm strategy has been debated fiercely in IBS literature, with views ranging from 'environmental determinism' to the notion of 'full strategic choice' (Hrebiniak & Joyce, 1985).

In Hofer's definition of strategy, the concepts of 'risk' and 'opportunities' are also worth noticing as they point to future events. In other words, some measure of prediction or forecasting ability is important to strategy formation. What is going to happen to demand for our products and services? How will the interest and inflation rates affect financing? Are there new regulatory policies in pipeline for the jurisdictions we operate in? These questions consider important aspects of MNCs' external environments, but they are all quite difficult to forecast in a 5-10 year timespan. National levels of generalized trust are not. In fact, the unchanging nature of social trust is potentially a great advantage when applying the insights from this thesis to concrete strategic business decisions.
At this moment, trust researchers are aware of a plethora of issues that can be predicted by levels of generalized trust, some of them I have mentioned in this chapter. But the predictive power of generalized trust is still largely unknown (forget about unused) outside to the realm of academia – it does not seem to have caught the attention of business practitioners[42].

If the proposed relation between trust and innovation output is found to be strong and significant, this has practical implications. The consequence for MNCs would be to consider national levels of trust when making strategic decisions about the location of business units. Especially if these business units rely on cooperation or innovation for competitiveness. The same conclusion has been reached by management scholars Dyer & Singh, who in their article "The Relational View: Cooperative Strategy and the Sources of Interorganizational Competetive Advantage" write the following:
"The strategic implication of this mechanism [that relational rents depends on so-called extrahybrid institutions, ie. trust] is that firms may need to locate operations in particular institutional environments in order to realize the benefits associated with extrahybrid institutions" (Dyer & Singh, 1998)
The mechanism they refer to here is that in order to obtain certain kinds of profits ('relational rents') firms rely on an environment characterized by high levels of trust (what they refer to as 'extrahybrid institutions').

In my thesis, I take the first step towards making the insights from trust research relevant to I wider audience, namely business practitioners, specifically practitioners engaged with innovation dependent business. That being said, my thesis is still an academic product first and foremost, and I do not offer a ready-to-use guide for managers to operationalize and capitalize on the insights acquired. This being a first step, it might provide more new questions, than it gives answers. The question to which I do provide an answer, is: Are hight-trust environments more conducive to innovation? In other words; are national levels of generalized trust is a good predictor of innovation output?

[42] At least I am not aware of any widely used prediction / strategy tools or models for business incorporating generalized trust.

Knowing *how* different trust-environments affect business as well as knowing *where* environments most favorable to innovation-dependent firms are to be found, can be of great (monetary) value to the MNC.

In this thesis trust (social capital) is treated as an environmental (contextual) factor, affecting and conditioning innovation. As a necessary, but not sufficient factor for innovation output, just as the stock of human capital (education) or physical capital.

In the following section, I describe how environments characterized by high levels of trust is expected to lead to higher rates of innovation.

5.2 Five mechanisms by which trust leads to innovation

In the following section I present five mechanisms of trusting environments leading to more and better innovation. The five mechanisms through which trust is expected to augment innovation output are: better cooperation, lower transaction costs, positive innovation spill-overs from trade, better matching of competencies and less corruption.

5.2.1 Trust leads to innovation through better cooperation

Innovation rarely happens in isolation, but through trusting relations between people and organizations engaging in knowledge-sharing (Dyer & Singh, 1998; Minguela-Rata, 2013). This understanding is clearest exemplified in the Innovation Systems approach, emphasizing the importance of knowledge flows between economic actors (OECD, 1997). The level of trust in firm relations are crucial for the innovation outcome (Tsai & Ghoshal, 1998).
In the following section I discuss how trust can enhance cooperation in general, and knowledge-intensive, creative problem-solving in particular. Studies show that the existence of trust between economic agents allows them to share important, even proprietary, knowledge with others and expose themselves to relation-specific risks without fear of exploitation. This, I propose is one of the mechanisms by which we would expect trusting environments to be more conducive to innovation.

5.2.1.1 Knowledge flows and innovation

One of the truisms of innovation research is this: Most innovation does not happen in isolation, but through cooperation characterized by reciprocity and feedback loops (Edquist, 2001; Lundvall, 2005). Recent decades, a number of theoretical frameworks stating the importance of knowledge flows to aggregate innovation-output have emerged. An epitome of this is the National Innovation Systems framework.
The essence of the National Innovation Systems approach is that knowledge flows between different economic actors is understood to be one of the best tools for creating new knowledge and ideas (OECD, 1997).

In 1997 the Organization for Economic Cooperation and Development (OECD) published a large report on *National Innovation Systems* (OECD, 1997) with the stated goal to "[…] *help policy makers develop approaches for enhancing innovative performance in the knowledge-based economies of today*" (OECD, 1997; 3). The report focused on best practices of how to enhance national innovation output and develop effective innovation policies, theories and measures.
At the heart of the National Innovation Systems (NIS) thinking, lies the assumption that knowledge flows and cooperation between different economic actors stimulate

innovation. The NIS approach analyze different knowledge flows in the economy, ie. joint industry activities, public research/university and firm collaboration, technology diffusion of equipment and machinery, and personnel mobility between entities (OECD, 1997). Put simply, the more and the stronger knowledge flows are between these agents in the economy, the more likely innovation is to occur. Lack of such knowledge flows, conversely, retards a country's innovation potential.

Any given innovation is a product of input and feedback from many different actors (Edquist, 2001). In some sectors (such as biotech) public research institutions and university research centers, execute the first stages of innovation, while the latter are taken over by firms in order to convert the invention into innovation (commercialize it) (Powell et al., 1996). Another great source of innovation comes from feedback within the production chain by input from customers and suppliers (Von Hippel, 1988). Cooperation and knowledge-sharing across entities and borders are key drivers in these processes. According to Dyer & Singh (1998) firms can achieve *interorganizational competitive advantage* through knowledge-sharing routines enabling them to appropriate supernormal profits, or in Dyer & Singh's terminology; *relational rents*.

Since its introduction, the National Innovation Systems approach has become a widely recognized analytical and diagnostic tool for countries trying to optimize their innovation performance (Lundvall, 2005). While the NIS approach offers a toolbox for mapping the knowledge flows within an economy and states that these knowledge flows are important for innovation output, it does not provide any arguments as to why knowledge flows of one economy would be different from the other ex ante – this is exogenous to the model. That is where social capital and especially social trust comes into the picture, as an enabler of knowledge sharing (*Tsai & Ghoshal, 1998*). In the following, I present a number of studies suggesting that high levels of trust is conducive to processes of knowledge-sharing and creative problem-solving, ie. innovation processes. As Putnam (1993: 170) argues: "Trust lubricates cooperation. The greater the level of trust within a community, the greater the likelihood of cooperation."

5.2.1.2 Trusting partnerships between firms

In an exploratory ethnographic study of seven highly innovative inter-firm alliances Larson (1992) finds that *trust and reputation* are the most important control mechanisms between *entrepreneurial firms* and their partnering organizations. Larson studied firms in *knowledge-intensive industries* involving *collaborative knowledge-sharing* and in *fast moving industries with short product cycles* and found that the *network partnerships* they formed with other firms were largely *governed through trust*. That is, the primary governance form in these partnerships was mutual trust and personal relations (as opposed to authority, price, or contracts - the primary control mechanisms of hierarchies and markets, respectively) (Larson, 1992; 77). The firms operated in the exact kind of industries *where we would expect the highest rates of innovation* (due to the knowledge-intensity, short product cycles and knowledge-sharing routines), and according to Larson's study they relied almost exclusively on trust in personal relations, rather than other more formal types of governance, such as contracts.(Woolhuis, Hillebrand & Nooteboom (2002) finds that trust business relationships can both be a substitute for, as well as an enhancer of formal contracting). This kind of governance mechanism allowed for flexibility and the possibility for the partners to respond quickly to changing market conditions and technological developments. Also, trust allowed the partnering firms to take on risks, such as sharing proprietary difficult-to-codify, knowledge-intensive skills (at the risk of theft/copying) and in relying heavily on the other party due to high asset-specificity of products (risking hold-up etc.) without fearing for opportunistic behavior.

So trust enhances the creative cooperation across firm boundaries, but it also does so within firms. A study from 1972 by Dale E. Zand is a testament to this.

5.2.1.3 Trust and cooperation within the firm

In his classic article "Trust and Managerial Problem Solving" (1972), Dale E. Zand[43] explores how the perceptions of trust among professional managers affect their ability to jointly solve complex managerial problems. As he notes in his introduction, although there might have been assertions about trust having positive effects, the correlation between trust and managerial effectiveness were grocely under-theorized and under-tested at that point:

"It has been difficult, however, to show a direct correlation between trust and managerial effectiveness in a working organization, so that there is a need to clarify the theoretical basis for assertions about trust and managerial effectiveness and to devise experiments to test them." (Zand, 1972 p. 229)

And so he did (devise experiments to test the relation). In Zand's study, 64 upper-middle managers from a large, international electronics company were assigned to groups of four. Here they were faced with a complex managerial task and had to cooperate to solve it. No managers were assigned to groups with people from same department or division, ie. they did not know the other participants. Half of the groups were briefed to expect trusting behavior, the other half to expect mistrusting behavior from other group members. The result was clear and confirmed Zand's initial hypotheses: In the high trust groups managers readily shared information and developed ideas, ultimately working out better, more comprehensive solutions to the managerial problems in question. The opposite was true for low-trust-groups, Zand writes:

"Apparently in low-trust groups, interpersonal relationships interfere with and distort perceptions of the problem. Energy and creativity are diverted from finding comprehensive, realistic solutions, and members use the problem as an instrument to minimize their vulnerability. In contrast, in high-trust groups there is less socially generated uncertainty and problems are solved more effectively" (Zand, 1978; 238).

Zand's classic study of Trust and Managerial Problem-Solving has since been replicated with a larger and varied population leading to the same results (Boss, 1978). Other studies again have concurred the finding that trust enhances the quality and output of cooperation (Jones, 1998; Thöni, 2010).

What we learn from these studies is that trusting relationships seems to be a powerful enhancer of the creative cooperation and problem-solving tasks involved in knowledge intensive business (including management), partly because it allows firms to take on interrelational risks without having to guard themselves for opportunistic behavior. When firm relations need to be agile and flexible trust is superior to formal governance (contracts and control) and when the sharing of proprietary knowledge could be handled opportunistically.

There are two remarks regarding the findings of Larson (1992) and Zand (1972 + Boss, 1980) that are important to make in relation to my thesis.

The first remark is that trust observed in these studies is *particularized trust*. Trust in specific persons from the partnering firms (Larson) or in specific managers from other divisions of the same firm (Zand - which is closer to generalized trust, since they did not know each other before the experiments, but still not a 'generalized other') is

[43] Dale E. Zand is professor at Stern Business School, NY, where he specializes in Strategic Management, Organizational Development, and Leadership and Trust. He has also worked as senior management consultant.

particularized trust. Recall, these two types of trust are closely related in that particularized trust is the sum of generalized trust plus the information the focal trustor has on the particular trustee. All else equal, the baseline of generalized trust towards a stranger is higher in high-trust societies, why the 'sufficient level' of particular trust should also be easier to achieve. In other words, the likelihood of high *particularized* trust between persons who meet in a professional setting is higher, when they start off at higher baseline of trust (the generalized trust).
The second remark is that while these studies are illustrative and makes a strong case for the positive effect of trust, the have a limited scope for generating universal conclusions. Larsons (1992) exploratory study follows 7 entrepreneurial firms and their partners, while the samples of Zand (1972) and Boss (1980) are larger, but still confined to only one country (USA).

5.2.1.4 Trust and cooperation in large organizations (Large-N)
In their article "Trust in Large Organizations" (1997) economists Rafael LaPorta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny accommodates this lack of generalizability, by analyzing the effect of trust on large cooperations across 40 countries.

Based on classic game-theory La Porta et al (1997) argue that generalized trust is especially important, when interactions are infrequent or of a one-shot nature, than for closer relationships, because in closer relationships opportunistic behavior can be *retaliated* in later interactions:
"[…] trust should be more essential for ensuring cooperation between strangers, or people who encounter each other infrequently, than for supporting cooperation among people who interact frequently and repeatedly. In the latter situations, such as families or partnerships, reputations and ample opportunities for future punishment would support cooperation even with low levels of trust. (La Porta et al, 1997; p. 333)

This kind of *infrequent encounters* are more often to be found in large organisations, they argue. Hence, they hypothesize that high levels of generalized trust will be positively related to the performance of large organizations:

"This implies that trust is most needed to support cooperation in large organizations. Where members interact with each other only infrequently because they are rarely involved in coproduction." (La Porta et al, 1997; p. 333)

The logic, they argue, applies to firms as well as states and other organizations.
To qualify their hypothesis La Porta et al. perform a cross-country multivariate analysis on levels of generalized trust together with variables concerning government effectiveness, corruption, civic participation, firm size, and more.
Indeed they find that high levels of generalized trust allows firms to grow bigger and the state (a very large organization) to function better on variables such as judicial efficiency, bureaucratic quality, tax compliance (used as a proxy for tax authority effectiveness), and education levels.

In summary, some of the most widely used innovation frameworks, such as the NIS approach, highlights the importance of knowledge flows and cooperation between different economic actors as essential to innovation. At the same time, studies at micro-level concludes that trust is a strong enhancer of creative cooperation between and within firms, and macro-level economic studies suggests that the level of trust is a good predictor of, how firms can grow. This provides a solid foundation for anticipating high-trust countries to be more innovative than lesser trust countries.

5.2.2 Saved Transaction Costs can be diverted into innovative efforts

The improved cooperation as described above can be understood as trust related *gains* that are *internal the economic exchange*. The better quality of cooperation in trusting relationships means *more and better innovation output*. This can be likened to improving the topline of a balance sheet ie. increasing the revenue. That is, enhanced innovation through cooperation is analytically a *benefit* from high trust which is internal to each transcation where high trust is present.
But besides 'increasing the revenue', increased profits can be reached through cost-cutting. That is, the presence of trust not only enables more and better copperation and economic exchanges, it also makes it cheaper.
As mentioned in the previous part, trust is a form of governance different to the two archetypes markets and hierarchies (Williamson, 1985). According to Williamson Economic transactions are not frictionless and can be costly to execute. This is due to the uncertainty and opportunistic behavior involved, which makes the use of various transaction specific costs rise (search and information costs, bargaining costs, and policing and enforcement costs)(Williamson, 1975). But in trusting relations less resources are needed to be spend in hedging against opportunism.
Hence, the resources saved from reduced transaction costs can be diverted into more productive activities, such as innovation:

"Low trust can also discourage innovation. If entrepreneurs must devote more time to monitoring possible malfeasance by partners, employees, and suppliers, they have less time to devote to innovation of new products or processes." (Knack & Keefer, 1997; 1252

This cost-cutting mechanism is true on all levels; individual, organizational and societal.

5.2.3 Trust enhances innovation through cross-border trade (the diffusion of ideas)

Environments open to the flows of new knowledge and ideas (diffusion) are more likely to be innovative (Coe & Helpman, 1994; Tvede, 2013; OECD, 2015) and trust can be a driver of international, cross-border investment decisions (Guiso, et al. 2009)(Botazzi et al., 2011). Hence, environments that are trusting (and perceived as trustworthy) might experience a greater flow of new technology, knowledge and ideas, making the environment more conducive to innovative business.

While better cooperation enables each relation to produce more and better(increase revenue from each transaction), and lowered transaction economics saves resources (cuts costs associated with each transaction) trust also enables *more* transactions (quantitatively). Each transaction has the potential to inspire new combinations of knowledge that will in turn foster innovation output to rise. This is true for both national and international relations and knowledge-sharing routines (Tsai & Ghoshal, 1998).

5.2.3.1 Diffusion of innovations happen through trade

Openness to trade is a strong driver for international diffusion of ideas and innovation, as it strengthens the knowledge flows across borders, heightens competition and magnifies the expected profits arising from successful adoption of foreign, new technologies (Coe & Helpman, 1994; OECD, 2015).

Diffusion is the mechanism of new ideas, knowledge or technology spreading from the originator, to other economic agents, but diffusion does not occur automatically, nor is necessarily evenly spread out (OECD, 2015). While innovation - if successfully commercialized - can lead to Schumpeterian rents, innovations usually create more value than what is appropriated exclusively by the innovator. Other actors achieve productivity gains larger than the price of acquiring (buying) the new innovation (otherwise they should not make the investment) and society as a whole get richer from new innovations (Nordhaus, 2005). In other words, most innovations produce social as well as private value. William Nordhaus estimates that of all the value created from new innovations in the US in the period 1948-2001, only 4 percent was captured by the innovators. The rest was by means of innovation diffusion spread out to the rest of society, partly to other firms who could use the new innovations in their production or indeed create new innovations on the basis of them.

One can understand the mechanism as a series of concentric circles with the innovation (and the value it connotes) 'spreading from the center' like the rings from a drop of water, weaker towards the periphery. *Geographic proximity* is still (but decreasingly) a good predictor of diffusion spill-over effects (OECD, 2015). That is also, in part, the idea behind innovation clusters (Debresson et al, 1997). Besides geographic proximity, foreign trade is an important component in determining who acquires value (and innovation spill-over effects) from a given innovation. (OECD, 2015; Davis, 2006; Acemoglu et al. 2013). Hence, societies open to trade is should – all else equal – be a more innovation-inspiring business context for firms to be embedded in. In other words, companies situated in countries that are more open towards the influx of new ideas and products through trade, are more likely to become beneficiaries of the international diffusion of innovation.

Evidence of the positive influence of trade on the transfer of knowledge and firm innovation in a country has been established by several studies using firm-level data, including MacGarvie (2006), Bernard et al. (2007), among others.

5.2.3.2 The trust-trade connection - theory

Trade and trust is connected, it appears. In the paragraphs to come I briefly mention the two analytical arguments for a trust-trade connection and then proceed to some empirical findings.

According to Knack & Keefer (1997) high levels of generalized trust is a *key determinant* for *advanced economic exchange* (such as long-distance trade, finance and credit markets) because the payment and delivery of goods or services are *temporally* and/or *spatially* separated, meaning that one or both parties to such exchanges expose themselves to risk of being exploited (Knack & Keefer, 1997; 1252).
The argument about the causal relationship of the trade/trust-association seems to go both ways, though. As suggested by Knack and Keefer, trusting people could be more likely to 'dare' engaging in trade, not fearing being taken advantage of. On the other side, the argument for an opposite causality goes like this: A merchant relying on trade for his/her sustenance will be more conscious about achieving a reputation as a trustworthy business partner, in turn creating an environment where trusting attitudes are more sensible to hold. Thus, it is the prevalence of trade, that causes trust. This notion of free trade encouraging virtues such as politeness, trustworthiness and trust, dates back as far as Adam Smith[44] and has recently been advocated by Svendsen &

[44] *In Smiths 'Lectures on Jurisprudence (1763, p. 538-39) he writes: "*Whenever commerce is introduced into any country probity and punctuality always accompany it. These virtues in a rude and barbarous society are*

Svendsen, who ascribe the high levels of Scandinavian trust to a history of long-distance trading (Svendsen & Svendsen, 2016).

5.2.3.3 The trust-trade connection - Empirical findings

While theoretical arguments connecting trust and (free) trade are compelling, the empery is not as unequivocal. While there are good studies supporting the proposed trust-trade connection, both at macro and micro-level, Berggren & Jordahl does not find a significant correlation between trust and regulations in favour of free trade (Berggren & Jordahl, 2006).*(using the Economic Freedom Index they did find a positive correlation between trust and free trade, but the relation was not significant even at a 10 % cut-off. No studies on trade volumes per capita, which might be the more relevant measure in this regard, has been carried out.)
Below, I present two studies documenting a connection between trust and trade, the first by Guiso et al. describes results at the macro-level, while the study by Botazzi et al. is concerned with micro-level effects of how trust conditions international investment decisions at firm and individual level.

Guiso et al. (2009) in their article "Cultural Biases in Economic Exchange" study how the cultural biases of European citizens affects trade, Foreign direct investment (FDI) and portfolio investments. They find that bilateral trust between nations is a significant predictor of trade, FDI and portfolio investment – even when controlling for distance between countries, common borders, common language or linguistic roots. For example, if citizens of country A has significantly higher trust in people from Country B than they have in people from country C, then that will correspond to higher trade, FDI and portfolio investment volumes to country B - even if Country C is closer and speaks the same language. The trust data is from EUROSTAT who until 1995 performed surveys, where they asked European citizens, how much they trusted other nationalities *("I would like to ask you a question about how much trust you have in people from various countries. For each, please tell me whether you have a lot of trust, some trust, not very much trust, or no trust at all"). This finding lends support to the notion that trust and trade are connected, whether it is because people trust their trading partners or because they choose the trading partners they trust most. Or put differently, some trade and investments do not materialize because there is a lack of trust (Den Butter & Mosch, 2003; Guiso et al, 2009).
This finding is confirmed at micro-level, concerning investment decisions of venture capital firms: Botazzi et al (2011) find that venture capitalist are remarkably more likely to invest in start-ups that hail from countries that are trusted *(Botazzi et al use the same EUROSTAT data of bilateral trust between countries) in the home country of a) the venture capital firm and b) the specific decision-maker in the venture capital firm. This effect is significant, statistically as well as economically (Botazzi et al; 2011; 24).

Neither the study by Botazzi et al.(2011) nor the one by Guiso et al.(2009) is direct evidence that trusting societies are more engaged in trade and that firms in trusting societies therefore will experience more the positive spill-overs (such as diffusion of

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almost unknown. Of the nations of Europe, the Dutch, the most commercial, are the most faithful to their word. The English are more so than the Scotch, but much inferior to the Dutch, and in some remote parts of this country they are far less so than in the more commercial parts of it. […] A dealer is afraid of losing his character, and is scrupulous in performing every engagement. When a person makes perhaps 20 contracts in a day, he cannot gain so much by endeavouring to impose on his neighbours, as the very appearance of a cheat would make him lose. Where people seldom deal with one another, we find that they are somewhat disposed to cheat, because they can gain more by a smart trick than they can lose by the injury which it does their character" (Bruni & Sugden, 2000; 33). What Smith suggests is that *trustworthiness* is but a mere self-interested response to certain conditions – here specifically the extent of commercial trade.

innovation) from trade. Even if the citizens of trusting nations would like to trade more, regulations could inhibit it (I am not claiming that this is the case, nor that it is not). The studies do however support the claim, that trusting nations are (or have the potential to be) trading nations, albeit in an more indirect way:
The two findings show that there is a *preference* to trade with and invest in companies, individuals, products or services that come from countries that the buyer/investor considers more trustworthy. What the study by Guiso et al. also finds is that the countries who have the highest levels of generalized trust (The Nordic countries and Netherlands) are considered more trustworthy by citizens of other European nations – with regional variations. That is, overall Europeans have more trust in Northern Europeans (also as business partners) and less so in citizens (and business partners) from the mediterranean countries (Spain, Italy, Portugal and Greece) (Guiso et al., 2009). This assessment is true both for high-trust countries (ie. Danes have higher trust in fellow Scandinavians and less trust in Italians, Spaniards etc.) and for low-trust countries (ie. Spaniards trust Scandinavians + NL and BE more than they trust the French and the Portugese)
In other words, if people more a less agree to which nationalities are more trustworthy and at the same time have a preference to trade with the most trustworthy. This means that companies from high trust countries are generally less likely to 'miss out on' trade or investment opportunities due to a lack of trust in/from their exchange partner, which will – all else equal – lead to more trade.

In sum, theory states that trade and flows of international investments is associated with positive spill-over effects into (among other things) the diffusion of new knowledge, technology and ideas. This positive spill-over is expected to generate more new innovations. At the same time, trade is connected to trust, either because people come to trust the partners they trade with, or because they prefer to trade with partners they trust. This relation is found to be true both at micro- and micro-level. Based on this relationship (trust – trade – innovation), I expect innovation output to be higher in high-trust environments.

5.2.4 Trust leads to innovation through better utilization of human capital

"Low trust implies a society where you have to keep an eye over your shoulder, where deals need lawyers instead of handshakes, […], and where employ your cousin or your brother-in-law to work for you rather than a stranger who'd probably be much better at the job." David Halpern, Chief Executive of the UK Behavioural Insights (Halpern, 2016)

What David Halpern says in the last part of the quote above is that hiring-decisions are more likely to be suboptimal and provide bad matching of competencies in low-trust cultures than in high-trust cultures. One can imagine societies of 'amoral familists' as described by Banfield (1958): Environments in which people exclusively trust (and care about) their immediate family, expect everybody else to behave in that way and therefore (rationally) do not trust non-family and do not expect to be trusted outside the family.
The process of bad competency-matching employment can be explained by at least two different mechanisms – a smaller pool of individuals considered trustworthy and social pressures to hire relatives.
The first mechanism means that in high-trust environments, where people assume that 'most people can be trusted', employers can focus on job relevant competencies when picking employees, whereas in low-trust environments employers are restricted to a much smaller pool of individuals to pick from that he/she considers trustworthy (Knack & Keefer, 1997). The second mechanism means that employers embedded in low-trust

environments can experience a firm social pressure from his/her immediate surroundings to 'take care of his/her own' (Banfield, 1958; Alesina & Giuliano, 2011). Following from this, individuals in low-trust environments will have lower return to specialized education and competences, as these competencies are not matched in the labor market, thus generating less value (Knack & Keefer, 1997). This mechanism is supported by micro-level studies documenting a significant correlation between generalized trust and education at the individual level (Glaeser et al, 2000; Delhey & Newton, 2003).

The same mechanism can also be expected to exist between groups of people., ie. one firm not hiring the optimal firm to perform a task, due to trust issues.

In sum, due to a theoretical expectation of worse matching of competencies in low-trust jobmarkets and less return to education, I expect that innovation output is higher in high-trust societies. Thus the costs incurred from this mechanism are twofold: Matching of competencies are suboptimal in low-trust societies and individuals (or entities) may refrain from competency-enhancing investments that would add be profitable (both in terms of private and social gains)(Psacharopoulos, 1985)

5.2.5 The conserving effect of corrupt government

One of the most robust findings in trust research is the strong negative correlation between social trust and corruption (Knack, 2002; Uslaner, 2003, 2012; Bjørnskov, 2010; Algan & Cahuc, 2014). While the causality debate is also relevant in this corner of trust research, there seems to be a consensus on *some degree of reciprocity* between generalized trust and corruption (Uslaner, 2012). Corruption (as well as other forms of bad government) is an externality cost incurred by all members of society, even those who are not directly involved with the government themselves (Uslaner, 2003).

In relation to innovation, corruption has the effect of powering the incumbent firms, ideas and technologies, thus retarding 'renewal'. Uslaner, (2012; 3604) explains the mechanism thus:
"If one person is sufficiently richer than another, and courts are corruptible, then the legal system will favor the rich, not the just. Likewise, if political and regulatory institutions can be moved by wealth or influence, they will favor the established, not the efficient."
The 'established triumphs over efficiency', is exact opposite of what constitutes innovation, which is way corruption and innovation are opposite forces.

A new study of corruption and innovation in China confirms this inverse relationship: Using a detailed dataset of Chinese listed companies from 2009 to 2015 Xu & Yano (2016) find that the Chinese anti-corruption campaign (started by president Xi Jinping in 2013) has made firms more likely to acquire external funds (long-term debt) for the purpose of innovation-related investments. They also find that firms located in provinces with stronger anti-corruption efforts invest significantly more in R&D and generate more patents (Xu & Yano, 2016).
So, if trust is closely connected as described in Banfield's communities of 'amoral familism' established powers will thwart innovation efforts through the force of the state.

In sum: These five mechanisms of trust to innovation works through making each interaction better and more productive, cheaper, as well as enabling more such

productive interactions occur. Trust also improves the matching process of agents (and subsequent skill-improvement) as well as it reduces the conserving (anti-innovative) effect of corrupt government.

6. Measures and data

In the following chapter I present the data sources used for the quantitative analysis in this thesis. The chapter is divided into three parts relating to the three phenomena studied and regressed against each other, namely 1) measures of generalized trust, 2) measures of cooperation between economic entities (and measures of attitudes towards such cooperation) and 3) measures of innovation. All data are publicly available online[45] and can be provided upon request.

6.1 Data selection principles

The data resources have been chosen after a continuous, wide and intellectually open search over the span of several months and on the basis of these four selection criteria; Public availability, wide coverage, source credibility and cross-country comparability.

Availability: All the data selected for the purposes of my analysis are publicly available, which means that calculations can be easily reproduced and tested, or indeed elaborated upon.
Coverage: For representativeness purposes, the data has been selected on a criterion of having a wide coverage, meaning encompassing as many data points [countries] as possible and preferably with a global distribution, meaning from all 5 (or 6 with Australia) continents[46].
Comparability: A key selection criterion for the data obtained for my analysis is that it is comparable across borders. That is, is the measure stringent and measuring the same phenomenon in different countries. Although this is a complex discussion, at this point it suffice to say that all the data used in my regression analysis has explicitly been sampled and published for the purpose of cross-border comparative analysis.
Sources: All data have been obtained from large, well-renowned data sources, such as OECD, EUROSTAT, World Bank, WIPO etc. (I rely only on secondary data.)

6.2 Trust measures

In the following sub-chapter I introduce the trust measures used in my regression analysis and describe the data and its sources. In this part I also explain how I have arrived at the two final trust data sets utilized in the analysis. The first dataset is a set of trust data combining data from both the WVS and the EVS, bot measures of generalized (but 'unspecified') trust. The second dataset is the *radius-adjusted trust* score, which is a measure developed by social science scholars Jan Delhey, Kenneth Newton and Christian Welzel as an improvement of the WVS data.

[45] Some demand setting up an online account, some demand institutional login or payment, but otherwise they can reasonably be considered publicly available.
[46] The only exception to this criterion is the innovation-cooperation data from EUROSTAT, which only include data from 21 European countries.

6.2.1Trust is difficult to observe

''*Since trust is so central to the theory of social capital, it would be desirable to have strong behavioral indicators of trends in social trust or misanthropy. I have discovered no such behavioral measures.''* (Putnam (1995) quoted in Glaeser et al, 2002; 812)

As suggested by Robert Putnam in the above quote, social capital and perhaps *especially trust*[47] is a difficult phenomenon to observe and measure. At the micro-level researchers can create trust games in laboratory settings (with controlled payoff-structures, information etc.) and *observe* trusting behavior, or something that looks like it. But this is a far more complex exercise when taken out of the lab, and as a result, researchers have come to rely on self-reported trust measures rather than observed trust. This measure is obtained through the use of surveys.

6.2.2 The 'standard' trust measure

Attitudinal surveys asking respondents to rank their trust in politicians, government institutions, market actors or other predefined groups of people are manifold and can be of use for various purposes. However, as expanded in the literature review chapter, there is a wide consensus among scholars that *generalized trust* ie. the trust one has in an (unknown) generalized other (as opposed to particularized trust) is the crucial trust-variant in terms of generating social benefits / positive externalities (Bjørnskov & Svendsen, 2013; Uslaner, 2015).

Over the last two decades of trust research, the *general trust-question*, also known as the Rosenberg Generalized Trust Question, has emerged as the most frequently deployed measure of trust across the social sciences (Glaser et al, 2000; Sturgis & Smith, 2010) to an extent where it is now referred to as 'the standard trust question'.
The question wording "*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people*" explicitly aims at uncovering the respondents' trust in a generalized other ("most people") and this particular question is used in most prominent attitudinal surveys, including the World Value Survey, European Value Study, and the US General Social Survey.

The operationalized (country-level) measure that comes out of this is referred to as the 'trust score'[48]. A population's trust score is an aggregate number and is computed by removing the "Don't know" or "No answer"-responses from the dataset, so that the remaining 100 % is comprised of *only* the affirmative ("Most people can be trusted") or the negative ("You need to be very careful in dealing with people") responses. The trust score then is the percentage of *positive responses* out of this total. The highest trust scores recorded are consistently found in the Nordic countries (Denmark, Finland, Iceland, Norway, Sweden[49]) where approximately 2/3 of the populations reply in the affirmative, whereas the lowest scores are to be found in Latin American and African countries with trust scores below 10%.

How well does these measures translate back to actual trusting behaviour? Researchers have tried to take the results from self-reported measures of trust back into the lab setting and tested just that.

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[47] Compared to *voluntary networks* and *civic participation*, which are essential parts of Putnam's (1995) own definition of social capital, social trust seems vastly more complex to measure *as a behavioral indicator*.
[48] At this moment the term *trust score* suffices. Later, when introducing the radius-adjusted trust, this trust score will be referred to as the *'unspecified' trust score*.
[49] In the most recent WVS the Netherlands has moved into this exclusive group, recording a trust score of 67.4 (WVS Wave 6)

Results vary, but overall the measure has been found to be a good predictor of both trusting and trustworthy behavior in social trust experiments, such as Knack's (2001) wallet-drop experiments (wallet return-rates correlate with national trust scores). Other experimental evidence suggests that the standard trust question is a good determinant of actual trusting behaviour in ultimatum, dictator and public goods games, at least when the stakes are sufficiently high (Özcan & Bjørnskov, 2011).

6.2.2 The stability of trust measures

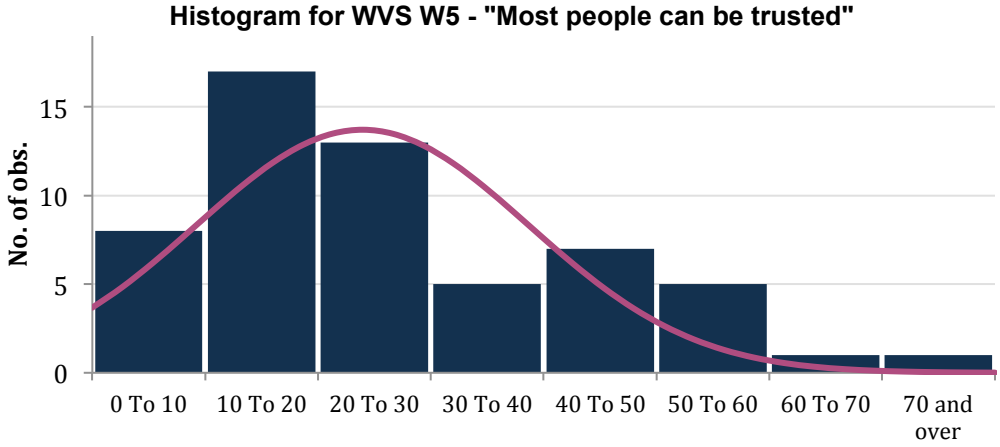
The aggregate trust scores are quite stabile (Keefer & Knack, 1997), meaning that the trust score for any given population does not vary a lot over time, or put differently; the best predictor for a given country's trust scores is its scores from previous years. This point is further supported by studies tracing roots of national levels of trust centuries back in time (Putnam, 1993; Nunn & Wantchekon, 2011; Uslaner, 2008).

Globally, levels of generalized trust have been in slow decline since the measure was introduced in the 1981 World Value Survey. In the six World Value Survey waves – with data sampled from 1981 to 2014 – 36 countries have been included in three waves or more waves. Out of these 36 countries, 12 countries have had positive trust level trend line, 23 a negative trend line and one country a flat trend line, the average trend a negative 0.2 percentage point change in trust score per year, the biggest relative change found in Morocco where trust levels went from 24% in the 4th wave (1999-2004) to 13% in both the 5th and 6th wave (2005-2009 and 2010-2014).

With the trust measure introduced, I will now proceed to describe the specific datasets used in the regression analyses.

6.2.3 The World Value Survey (Wave 5)

The World Values Survey (WVS) is a non-commercial, non-governmental international social survey organization studying 'changing values and their impact on social and political life'. The WVS is led by an international team of scholars, with the WVS association and secretariat headquartered in Stockholm, Sweden (www.worldvaluessurvey.org).
The WVS has been carried out since 1981 with roughly 5 years between each round of surveys ('waves'). The newest data is the 6th wave published in 2015 with data sampled between 2010 and 2014. For the purpose of my analysis, though, I use data from the 5th wave, sampled between 2005 and 2009.
The main reason for this being that these data are compatible and comparable with two other dataset, namely the trust scores from the European Values Study (EVS, 2008) and the *Radius-adjusted trust scores* developed by social science scholars Jan Delhey, Kenneth Newton and Christian Welzel (2011, 2014). More on the EVS, the radius-adjusted trust scores and their compatibility later in this chapter.

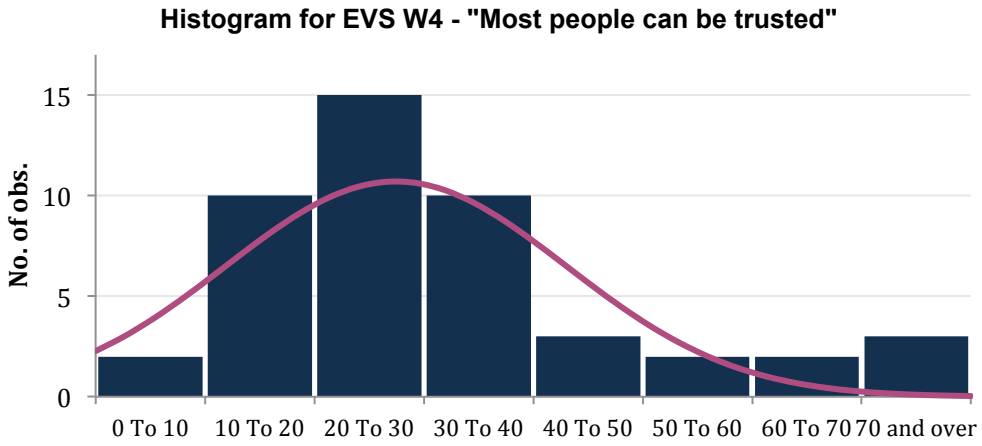


WVS W5 includes 265 survey items, one of them (V23) being the standard trust question. The WVS 5th wave comprise in total 57 observations (countries) with an average trust score of 26.94, median at 22.2 and a 16.58 standard deviation, the distribution skewed to the right side. The maximum and minimum trust scores recorded are 74.2 (Norway) and 3.8 (Trinidad & Tobago) respectively. The average number of (stratified, randomly sampled) respondents in each country (N) is 1365 with a maximum and minimum of 3045 (Egypt) and 865 (Bulgaria) respondents respectively.

6.2.4 The European Values Study (Wave 4)

The European Values Study was initiated by an informal grouping of academics calling themselves the European Value Systems Study Group (EVSSG) in the late 1970's. Today, the survey is carried on in the setting of a foundation, using the abbreviated name of the group: European Values Study (EVS).

I am using EVS Wave 4 sampled from 2008-2009. This ensures temporal comparability with trust data from the WVS W5. As in the case of the WVS, respondents are randomly sampled and the survey population is approximated to be statistically representative with respect to gender, age, education level, and urbanisation degree (stratified random sample).
The EVS W4 includes data from 47 different countries and the average trust score from the standard trust question is 30.89. The median is 27.6 and the standard deviation 17.52 with maximum and minimum scores of 76.0 (Denmark) and 4.9 (Northern Ireland) respectively. The average number of respondents in each country is 1691 with a maximum and minimum of 1951 and 1240 respondents respectively. Just as the WVS data the distribution is skewed to the right, but the point of balance is slightly higher. This difference is due to the different pool of countries in the selection, not difference in measurement (see WVS-EVS combination part below).



6.2.5 Combining WVS and EVS into one large dataset [trust dataset 1]

In order to have as large a dataset to analyse and draw my conclusion upon, I have combined the to datasets into one. As I show in the following paragraphs, this should be unproblematic in terms of compatibility.

Together the two datasets combine into what I dub *trust dataset 1*. Trust data set 1 includes 76 datapoints (countries), which is less than the simple sum of WVS+EVS. One of the reasons for this is the fact that 22[50] countries appear in both the WVS W5 and the EVS W4. Instead of having two different x-datapoints in the regression for only one y-datapoint, I have collapsed all double entries into one by taking a simple average of the two ((WVS+EVS) / 2).

Below I have plotted a X,Y-scatter diagram with EVS as a function as WVS.

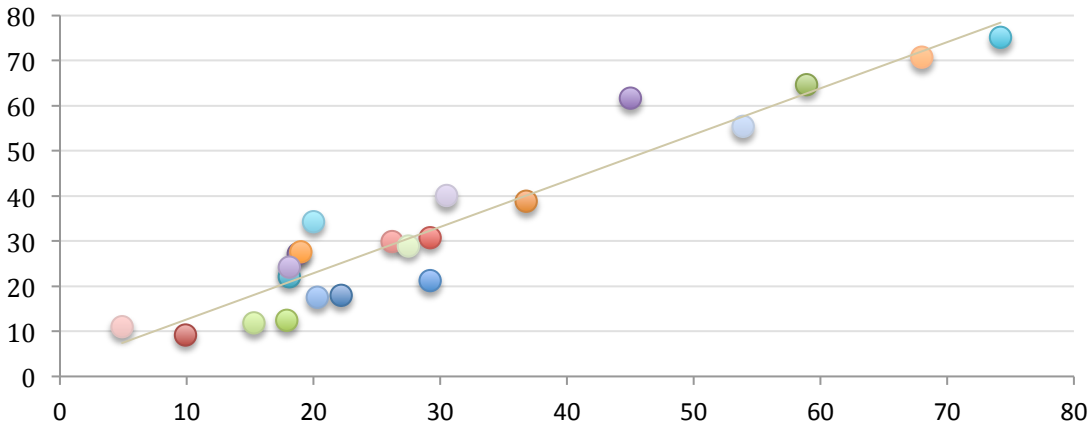


Figure 1: EVS as a function of WVS

It is evident from the X,Y-scatter that the WVS and EVS measures are effectively identical with a slope of 1.02, R = 0.95 and standard error of 0.07. Thus, it seems reasonable to combine the two datasets into one.

A second reason the number of datapoints in trust dataset 1 is lower than then of WVS + EVS is because a number of countries from the original dataset have been removed due to data scarcity. That is, countries which innovation measures are non-existent or very

[50] The 22 countries are Bulgaria, Cyprus, Finland, France, Georgia, Germany, Hungary, Italy, Moldova, Netherlands, Norway, Poland, Romania, Russia, Serbia and Montenegro, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine and the United Kingdom.

scarce are not included in trust dataset 1. This is the case for Andorra, Iraq, Kosovo, Northern Cyprus, Serbia & Montenegro[51], Taiwan and more. [52]
Although there is a tendency for the excluded countries to be low trust-level countries, the mean of trust dataset 1 is slightly lower than that of both WVS and EVS. This is most likely because the 22 countries represented in both surveys (but averaged into one datapoint instead of two in the *combined* dataset) are mostly high trust-level countries. Comparison of the descriptive statistics of all three datasets can be seen below.

Table 2	Trust dataset 1	WVS	EVS
Count (N)	76	57	47
Mean	28.13	29.94	30.89
Median	24.9	22.2	27.6
Standard Deviation	16.53	16.58	17.52
Minimum	3.8	3.8	4.9
Maximum	76	74.2	76

6.2.6 The radius problem

A common objection against the standard trust measure, involves the comparability of responses. How can we be certain, respondents understand the loosely defined term 'most people' in the same way across languages and cultures?
This is what has been referred to as *the radius problem*. How large is the circle of people respondents think of, when asked if 'most people' can be trusted or not?
It is evident from research that the closer and more similar a group of people are to the focal trustor, the more likely he/she is to trust them (Delhey & Newton, 2005; Delhey et al, 2011; De Bruine, 2002 even finds that facial likeness is a good predictor of trust). Trust in in-groups is consistently higher than trust in out-groups – this is a global phenomenon (Delhey et al, 2011, p. 791). Thus, responses would be biased and not directly comparable, should the radius differ *systematically* from country to country, critics argue.

If respondents in trust surveys mentally replace 'most people' with someone particular close to them (in-group), the response will not reflect their real *generalized* trust level, but a particularized kind of trust (most likely biased in the direction of higher trust).

To solve the radius problem professors Jan Delhey, Kenneth Newton and Christian Welzel in 2011 introduced a new, augmented trust measure dubbed *radius-adjusted trust*.
To make clear the distinction between radius-adjusted trust and the normal trust measure derived directly from the trust standard question, I refer to the latter as '*unspecified trust*' in the following sections.

6.2.6 Computing radius-adjusted trust

The key to computing radius-adjusted trust (RA trust) is to uncover the trust radius and to operationalize this into a quantitative measure. The technique introduced by Delhey et al 2011) does both. In computing the trust radius for each country, they rely on a

[51] Serbia & Montenegro was split into two countries in 2006 when Montenegro declared its independence.
[52] A third reason is this: In the WVS dataset United Kingdom (UK) is represented as one entity, whereas it is represented separately as Great Britain (GB) and Northern Ireland (NI) in the EVS dataset. I have merged the two data entries of GB and NI into one UK score, by weighed average on the basis of 2009 UK Office of National Statistics population data. In 2009 NI made out 2.87 % of the UK, the remaining 97.13 % being GB (England, Scotland, and Wales).

survey item introduced in the WVS 5, a battery of questions asking respondents to rate their trust in six different subgroups, comprising in-group and out-group respectively. This provides the opportunity to compare 'unspecified trust' to trust in in-groups and trust in out-groups and see which are more strongly correlated. If the level of 'unspecified trust' closely resembles in-group trust and is vastly different from trust in out-group, this implies a low trust-radius. On the other hand, if 'unspecified trust' is closer to the level of out-group trust it implies a wider trust radius.
Out of the six subgroups, three are classified as in-groups ('your family', 'your neighborhood' and 'people you know personally) and three are classified as out-groups ('People you meet for the first time', 'People of another religion' and 'People of another nationality').

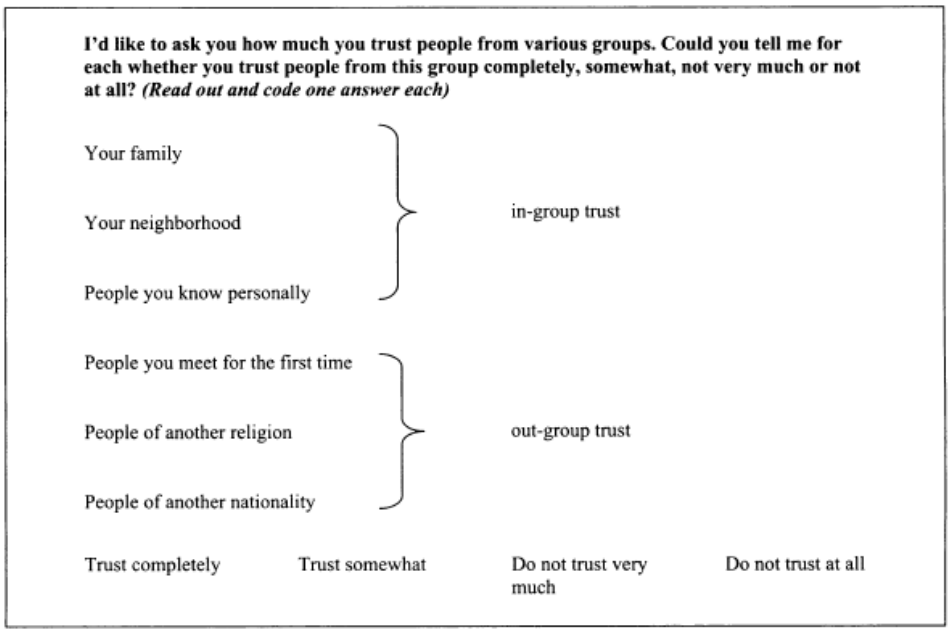


Figure 2: The 3+3 subgroups comprising in-group and out-group (Delhey et al, 2011; 792)

Respondents rate each group on a 4-point trust scale ranging from 'Do not trust at all' and 'Do not trust very much' to 'Trust somewhat' and 'Trust completely'.
The association between the nominal value of trust in 'most people' ('unspecified trust') and in- and out-group trust respectively is used to calculate trust radius:

"*Respondents were not directly asked whom they had in mind when answering the standard trust question, so it is necessary to uncover trust radiuses indirectly. For this purpose, we estimate the associations of unspecified trust with in-group and out-group trust and calculate the difference in strength between these two associations. The more the balance tips toward out-group trust, the wider the notion of "most people" and the wider the radius of unspecified trust. For each country separately, we run an individual-level regression model in which the dependent variable is a respondent's unspecified trust, and the independent variables are in-group and out-group trust.*" (Delhey et al, 2011; p. 792)

Once the radius is calculated, the RA trust is computed by multiplying the unspecified trust level with the trust radius. As the trust radius is always between 0 and 1 (it is a measure of correlation), the RA trust can never be higher, but is often significantly lower than the unspecified trust in 'most people'.

Interestingly, Delhey, Newton & Welzel (2011, 2014) find that the trust radiuses do indeed differ systematically from country to country, providing a new ranking of countries. The most striking change compared to unspecified trust is the downward

adjustment of East Asian countries (especially China, South Korea and Thailand), where respondents' trust radiuses are found to be quite narrow (Delhey et al 2011).

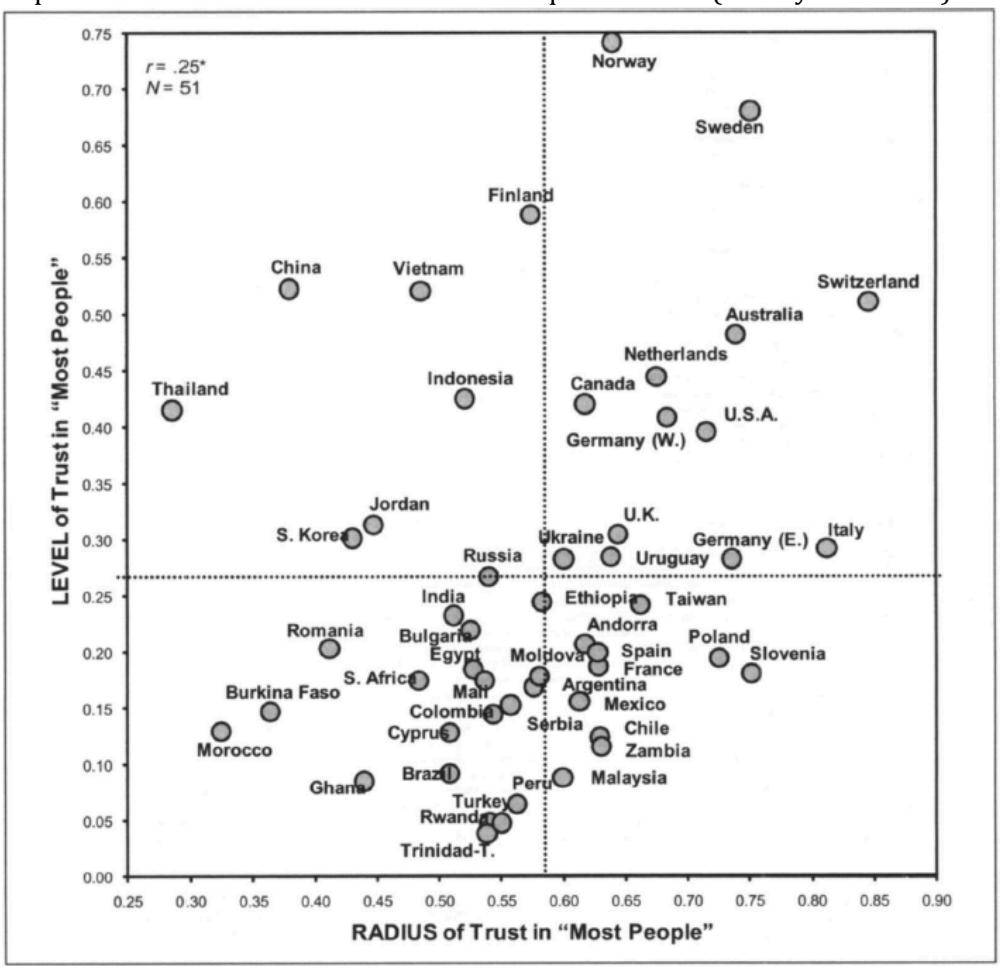


Figure 5: Scatterplot of countries trust radius and unspeficied trust levels Delhey et al, 2011; 794).

Delhey, Newton & Welzel also find that the RA trust strengthens the correlation between trust and various indicators of civicness ie. is a better predictor of these than unspecified trust. On this basis they conclude that radius-adjusted trust is in fact an improved measure, *'... making sense theoretically and paying off empirically'* (2011, p. 801).

In light of these findings, I will use both the standard generalized trust measure (in the context of RA-trust referred to as 'unspecified trust') and the radius-adjusted trust in my analysis and compare the results. Hopefully, I will be able to on this basis to assess whether the radius-adjusted trust measure is indeed an improvement to the existing unspecified trust measure.

6.2.7 The RA trust dataset

The RA trust dataset I use is the original data developed by Delhey, Newton & Welzel (2011, 2014), which is an augmented version of WVS W5 data. The dataset contains 49 observations. As explained above, the RA trust measures are (by definition) lower than the unspecified trust measure. The mean is 15.28, the median 11.4 and the standard deviation 11.71. Maximum and minimum values are 51 (Sweden) and 1.9 (Trinidad & Tobago) respectively.

A comparison of the two dataset[53] can be found in table 4 below.

Table 4	Trust dataset 1	RA trust
Count (N)	75	49
Mean	28.13	15.28
Median	24.9	11.4
Standard Deviation	16.53	11.71
Minimum	3.8	1.9
Maximum	76	51

6.2.8 Trust data - Summary

In my data analysis I test two different measures of trust: 1) the widely used standard measure of generalized trust and 2) the radius-adjusted trust measure, which is a development of the standard measure.
The first data set consists of three different datapoints; a) Observations from World Values Survey Wave 5, b) observations from European Values Study Wave 4 and c) observations that are averages of observations from both the WVS W5 and EVS W4. This dataset consists of observations from 75 different countries from all over the world.
The second dataset contains data that are gathered through the World Values Survey wave 5, but computed so as to adjust for difference in trust radius (hence the name radius-adjusted trust). Using both measures entails the possibility of getting conflicting results, but also the possibility of evaluating the two measures against each other.

6.3 Innovation and cooperation measures

In my analysis I use innovation and cooperation data from four different sources; the Global Innovation Index (GII), World Intellectual Property Organization (WIPO), The Global Competitiveness Report and EUROSTAT. In the following paragraph I introduce each source and the specific variables used in the regression analysis.

6.3.1 The Global Innovation Index (GII)

The Global Innovation Index (GII) is an index created to rank and analyse countries' abilities and prerequisites for innovation. The GII aims to capture the multi-dimensional facets of innovation and "*[...] create an environment in which innovation factors are continually evaluated*" (GlobalInnovationIndex.org). In 2016 it encompasses detailed metrics for 128 economies, which represent 92.8% of the world's population and 97.9% of global GDP (Ibid.).

The GII is co-produced and published by Cornell University, INSEAD, and the World Intellectual Property Organization (WIPO, an agency of the United Nations).
The Index' final Innovation score is comprised by 79 indicators, which fall within the following three categories: 1. quantitative / hard data (55 indicators), 2. composite indicators/index data (19 indicators), and 3. survey/qualitative/subjective/ soft data (5 indicators)(GII Report, 2015; 407).
The GII consists of seven subindexes, the first five representing input and the last two output: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication - (6) Knowledge and technology outputs and (7) Creative outputs.

[53] Trust dataset 1 refers to the combined dataset of 'unspecified' generalized trust derived from WVS W5 and EVS W4. RA Trust refers to the dataset of radius-adjusted trust developed by Jan Delhey, Kenneth Newton and Christian Welzel.

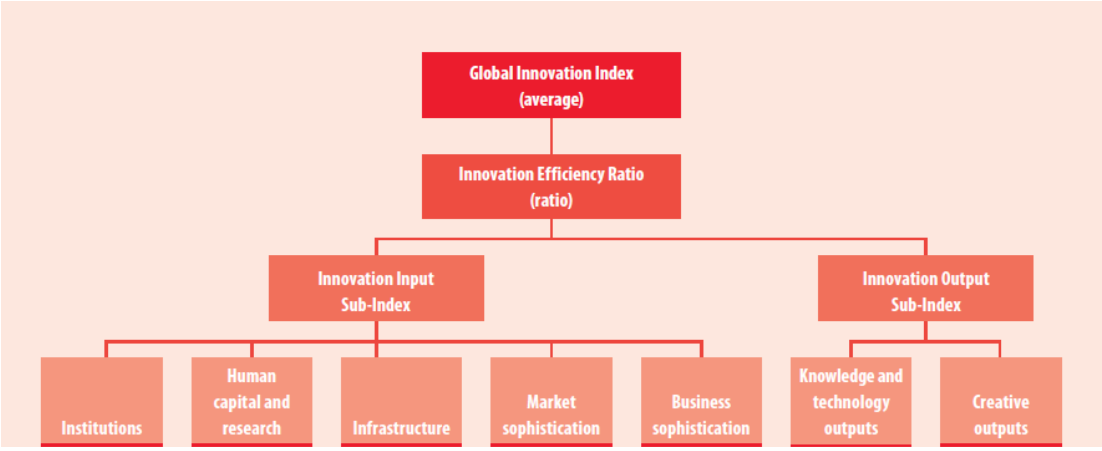


Figure 3: Structure of the Global Innovation Index and its seven sub-indexes.

For the purposes of my regression analysis I utilize the *Innovation Output sub-index*, which consists of two sub-sub-indexes, namely the *Knowledge and Technology Outputs* and *Creative Outputs*. All in all, the GII Innovation Output Sub-index includes 27 independent parameters, divided 14 – 13 on the two sub-sub-indexes, respectively. The knowledge an technology index includes parameters such as Communications, computer and information services exports, Royalties and license fees receipts, high-tech exports and New business density. The Creative Outputs index covers various intangible and creative outputs such as National office resident trademark applications, Cultural and creative services exports (music, tv, movies), Printing and publishing output, Wikipedia monthly edits and more.

6.3.2 WIPO Patent applications

The second measure is a measure of resident patent applications per million population as a 10-year average, pulled from the World Intellectual Property Organization (WIPO). I have calculated a ten year average (2005-2014) to smoothen the year on year fluctuations, which especially small countries can experience.

Some scholars have questioned the validity of patents as a good measure for innovation as this measure focuses on a rather narrow aspect of innovative activity, excluding incremental product modifications, some process innovation or innovative activities that is rarely patented, such as fashion design (Dakhli & De Clerq, 2003). However, I estimate that patents represent a large part of marketable all innovations (at least product innovations and technical process innovation) and thus is a fairly good indicator for overall innovation output. Admittedly, this hinges on there not being a bias in patent-application-rates systematically discriminating against the innovative output of some nations and not others. This would be problematic to using it for cross-country comparison. As I am not aware of such systematic bias in patent application rates[54], I proceed in using the data as an indicator of (or proxy for) *overall innovation output.*

[54] One *potential* systematic bias is that developing countries in general have weaker property rights protection and enforcement (legally or by practice)(Berggren & Jordahl, 2006), which lowers the ROI on patent application costs (which may even be more time and resource demanding, due to less well-functioning patent offices procedures / formal institutions). On the other hand, developed economies rely more on the production of intangible products, knowledge and services, which are categories not as easily patented. All this to say, that while there may be sources of uncertainty in using patents as an indicator for total innovative output, this might mean a higher variation around the mean, but not necessarily a skewed one.

6.3.3 Capacity to innovate

The capacity to innovate is a soft data measure (survey) that has the purpose of tracking the perceptions of high-level managers about their local business environment. I retrieve it from the Global Competitiveness Report 2015 produced by the World Economic Forum, but it origins from WEFs large Executive Opinion Survey. The indicators derived from the Executive Opinion Survey are used in the calculation of the Global Competitiveness Index (GCI) and other World Economic Forum indexes and reports, including the Networked Readiness Index, the Enabling Trade Index, the Travel & Tourism Competitiveness Index, the Gender Gap Index, and the Human Capital Index as well as in The Inclusive Economic Growth and Development Report and a number of regional competitiveness studies. The 2015 Survey captures the opinions of over 14,000 business leaders in 144 countries and is collected in 2013-2014 (depending on country)(EOS, 2015).

Most questions in the Executive Opinion Survey ask respondents to evaluate, on a scale of 1 to 7, one particular aspect of their operating environment. The Capacity to Innovate question is no different. The question is the following:

In your country, to what extent do companies have the capacity to innovate? [1 = not at all; 7 = to a great extent]

This subjective measure obviously has the disadvantage that it does not relate directly to actual, materialized innovation output. On the other hand, managers 'on the ground' may have decentralized knowledge about the level of innovativeness that cannot be captured in centralized hard data. That is, if a given country innovates products that are not patentable and do not show in the broad-ranging Innovation Output Index developed by the Global Innovation Index, this survey measure can serve as a 'reality check'.
A shortcoming in the data is that while the three innovation variables cover a broad aspect of innovation types, they do not cover well organizational (process) innovation.

7. Results

The purpose of this chapter is presenting the important results from the quantitative data analyses as they relate to my research question. That is, how do trust and innovation output correlate, including sign, significance and explanatory power of the association. This applied statistical method is very much in line with the traditions of cross-country trust studies.

The quantitative data analysis is analytically divided in two parts.
In the first part I perform ten different bivariate regressions combining the two different trust measures (unspecified trust and radius-adjusted trust) and their association to the three different innovation variables, one soft data (survey), one hard data (patent applications) and one hybrid (an index consisting of many sub-variables of innovation output)[55]. Including three different output measures adds to the certainty by which it can be claimed that the correlation does not just randomly follow one particular measure of innovation.
The second part of the quantitative data analysis is concerned with testing the significance of the findings in part one further. By introducing five control variables, one at a time, I am able to *test the strength of trust as a predictor of innovation output*. In the second part I utilize only one dependent variable, the GII total Innovation Output variable (index), as it is documented in part one that trust is correlated to all three innovation measures.
Besides analyzing the data as they relate to my research question I evaluate the two different trust measures against each other in terms of how well they explain the dependent variable (the innovation output).

7.1 Results part one: Bivariate regressions of trust and innovation

In a series of bivariate regressions using respectively unspecified trust (*trust dataset 1*) and radius-adjusted trust (Delhey et al, 2014) as the independent variable, trust comes out as strongly correlated with the battery of various innovation variables presented in previous chapter (Capacity for innovation, Innovation Output and Patent Applications). In the following paragraphs I run through the results of the analyses and interpret the output. The most important output measures for each bivariate regression analysis can be seen in tables below.

7.1.1 Capacity for innovation

Capacity for innovation-score is survey measure asking executives to rate their country of operation on a 1-7 scale, 7 being very capable of innovation. In the bivariate regression between Capacity for Innovation and trust we observe a Pearson Correlation Coefficient (R) of 0.65 and 0.74, for unspecified and radius-adjusted trust respectively. That is, the correlation is *positive* and *strong* for both measures, a bit more so for the RA trust. The adjusted coefficient of determination (R^2) is 0.42 and 0.54 respectively (again in the favour of RA-trust), meaning that the model explains roughly half of the variation in the capacity for innovation-variable. Residuals (not shown) fall symmetrically around the trend line, suggesting that the proposed linear model is a fair approximation of the relationship (in other words, a straight line describes the observations better than would a curved or exponential, for example).

[55] The reason it becomes ten bivariate regressions is that I also test to submeasures of the GII Innovation Output-index independently.

Both regressions have a P-value effectively at zero implying high statistic significance. All in all, generalized trust (both measures) is strong and statistically significant predictor of the capacity for innovation-variable, ie. how positive executives are about a country's innovation capacity.

Radius-adjusted trust	Capacity for innovation	Innovation output (total)	Creative outputs	Knowledge & Technology Outputs	Patents	Patents excl. South Korea
Coefficient (β)	0.051	0.75	0.7	0.82	13.27	15.74
Standard error, SE	0.007	0.1	0.1	0.12	5.6	2.26
Pearson correlation coefficient, R	0.74	0.75	0.72	0.72	0.34	0.73
Adjusted Coefficient of determination, R2	0.54	0.56	0.5	0.51	0.095	0.525
Observations, N	48	48	47	47	45	44
P-Value	1.51E-9	6.44E-10	1.55E-8	1.14E-8	0.0225	1.63E-8
0-hypothesis (0,05 cut-off)	rejected	rejected	rejected	rejected	rejected	rejected

Table 1: Bivariate regressions of radius-adjusted trust and innovation variables

Notice that the coefficients for the different innovation variables are not directly comparable, as they relate to variables of different sizes / scale[56].

Trust dataset 1 (Unspecified trust, WVS + EVS)	Capacity for innovation	Innovation output (total)	Creative outputs	Knowledge & Technology Outputs	Patents	Patents excl. S.K. & Japan
Coefficient (β)	0.031	0.45	0.42	0.484	9.53	8.47
Standard error, SE	0.004	0.06	0.078	0.067	3.18	1.36
Pearson correlation coefficient, R	0.65	0.64	0.55	0.65	0.34	0.61
Adjusted Coefficient of determination, R2	0.42	0.4	0.29	0.42	0.1	0.36
Observations, N	74	76	73	73	71	69
P-Value	2.96E-10	5.74E-10	6.26E-7	4.09E-10	0.00378	3.50E-8
0-hypothesis (0,05 cut-off)	rejected	rejected	rejected	rejected	rejected	rejected

Table 2: Bivariate regressions of unspecified trust and innovation variables

7.1.2 Innovation output

The Innovation Output variable is an index with the country with the highest innovation output (Switzerland) indexed at 100. The Innovation Output-variable is comprised by two sub-indexes; *Creative Output* and *Knowledge and Technology Output*, both weighing 50 % in the total Innovation Output score (see figure 1).
With R equal 0.64 (unspec. trust) and 0.75 (RA trust) and adjusted R^2-values at 0.4 (unspec. trust) and 0.56 (RA trust) both regressions show strong correlation between generalized trust and the Innovation Output-variable (again, RA trust is stronger).

[56] Capacity for Innovation is measured on a 1-7 scale, the GII innovation outputs on a 1-100 scale, and the patent variable is measured in absolute numbers.

Residuals are symmetric around the trend line and the model is very statistically significant with both regressions having P-values effectively at zero.

To check whether trust is correlated more with Creative Output or Knowledge and Technology Output, regressions for both sub-indexes and both trust measures are performed.
For the unspecified trust measure Knowledge and Technology Output is stronger correlated than Creative Output, whereas for in the radius-adjusted trust regression, the two are almost identical. Both regressions are very similar to the overall Innovation Output regression, as well to each other. Hence, it cannot be concluded from this that there is any difference, as to which of two sub-indexes drive the correlation between the total Innovation Output and trust.

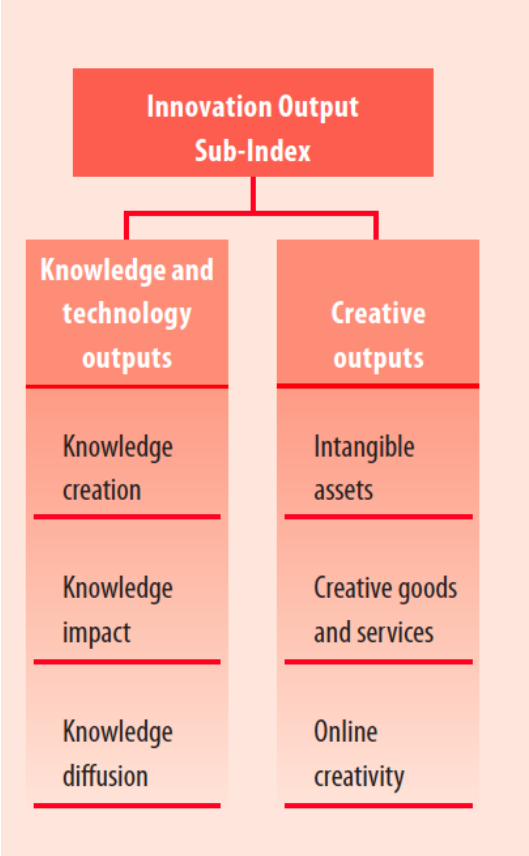


Figure 4: Innovation Output and its sub-components (Global Innovation Index).

7.1.3 Patents

The last regression contains patent applications per million population by country of origin, as a 10-year average value (2005-2014, WIPO - appendix). I use the 10-year average in order to smooth out year-on-year fluctuations that are especially severe / misleading for countries with fewer patent applications.
As South Korea and Japan are obvious outliers (see figure 5) in this category, I have also done a regression in which they are excluded[57]. I do not offer any explanations to the over-performance of Japan and South Korea, but .
Figure 5 below shows the patent-variable as a function of unspecified trust. The blue-red datapoint is South Korea and the red-white is Japan.

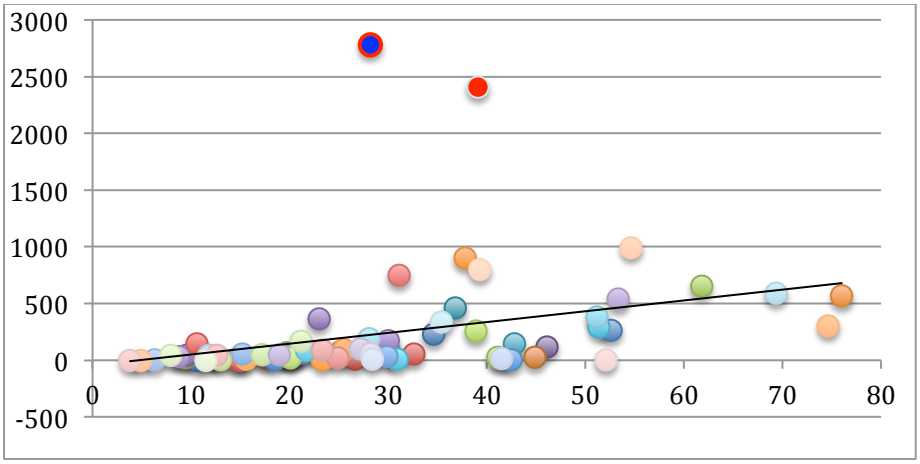


Figure 4: Patent applications as a function of unspecified trust.

Even the regressions including South Korea (and Japan) show a positive, medium-strong correlation (R = 0,34) between the two measures of trust and patent applications. They

[57] In case of trust dataset 1 (unspec. trust) both South Korea (SK) and Japan are excluded. The radius-adjusted data only includes SK from the beginning, thus I have only excluded SK from it.

are both significant at the 0,05 cut-off, but only just so (P = 0.038 and P = 0.023 for unspecified and radius-adjusted trust, respectively).

Excluding South Korea (and Japan) improves the bivariate regression model remarkably. The correlation coefficient, R, is now 0.61 for the unspecified trust and 0.73 for the RA trust, ie. strong/very strong (adjusted R^2 = 0.36 and 0.53 respectively). Likewise, the P-value is now significant at a 0.0001 cut-off for both regressions.
While the low P-values indicate high statistical significance, it is also interesting to assess the effect size in absolute numbers. That is, how does generalized trust (according to the model) translate into a country's expected number of patent applications?
From the regression model coefficients (β) we get that a *one standard deviation increase in unspecified trust* (on average) translates into a 139 increase in patent applications per million population per year. One *standard deviation increase in radius-adjusted trust* (on average) results in an increase of 184 patent applications per million population per year[58]. That is roughly the same number as Israel (186) and Singapore's (177) yearly total (patent application per million population) and more than Italy (170), Canada (144), and Australia (118)(WIPO statistic database, 2015).

From the regression analysis of patent applications and generalized trust it can be concluded that *in general* trust is a good predictor of patent applications, but that it cannot explain the extraordinary patent application rates of outliers Japan and South Korea. Besides being statistically strong and significant, the effect is remarkable in an absolute output sense, exemplified by the difference one standard deviation of generalized trust has for the number of patent applications.

7.1.4 Conclusion for bivariate regression analyses

Countries' levels of generalized trust have a *positive, strong* and *very significant* correlation with their overall Innovation Output. This statement is equally true for *Knowledge and Technology Output* (such as scientific and technical publications, high-tech output and exports, royalties and license fees received, patent applications etc.) and *Creative Outputs* (such as trademark applications, movie and music production/export, Wikipedia edits, Youtube-uploads etc.). However, while generalized trust is on average a good predictor (strong and significant) for patent applications, it does not explain well the performance of outliers South Korea and Japan.
Survey responses from executives subjectively evaluating the innovation capacity supports the findings from the hard data. Executives rate the *Capacity for Innovation* higher in countries with higher levels of trust – this correlation is also strong and significant.
Finally, a tentative conclusion about the two 'competing' measures of generalized trust can begin to shape: Overall, the radius-adjusted trust measure seems to be a stronger predictor of the innovation variables (higher R and adjusted R^2 values) than the unspecified trust measure.

These findings are all based on bivariate regression analyses, where trust is tested 'in isolation'. In the next part, I test the effect of trust on Innovation Output by including a number of other independent variables, theoretically affecting innovation and productivity.

[58] The standard deviation for the trust dataset 1 is 16.5 and the coefficient for the best fit regression model is 8.47 (16.5 * 8.47 = 139.76). The standard deviation for the radius-adjusted trust dataset is 11.7 and the coefficient for the regression model is 15.74 (11.7 * 15.74 = 184,16)

7.2 Results part two: Multivariate regressions – introducing control variables

In this section I look at the statistical relation between generalized trust and the Global Innovation Index measure of Innovation Output, and control for other factors that have been suggested as drivers of innovation. I have included five variables besides generalized trust, which are; Economic development (GDP per capita), GERD (Gross Expenditure on Research & Development), Education expenditures, General Infrastructure and Political Stability.[59] The five variables are all features of national environments that MNCs (should) take note of, when deciding where to place innovation-driven business units. I do not argue, that if one were to compose a 'top 5 of most important variables conducive to innovation' these are the five variables - that would be a matter of a different thesis all together.

In the following paragraphs I introduce each of the five control variables and then proceed to present the results of the regression analyses.

Economic development [GDP]: As the variable for economic development / wealth I use a 5-year average of the Gross Domestic Product (GDP) per capita measured in Purchasing Power Parity (PPP) 2016-dollars. The per capita condition is crucial to comparing economies of different sizes, the PPP stabilize the effect of short run currency volatility and the five-year average is calculated in order to smooth out year-on-year fluctuations. Data is sourced from The World Bank's *World Development Indicators*. Economically developed nations have more resources available to invest in productivity-enhancing capital equipment (Solow, 1956), Education etc. and they also have a higher domestic demand for new products.
Qatar ranks as number one in this measure.

Gross Domestic Expenditure on R & D [GERD]
The GERD-variable is the Gross Domestic Expenditure on R & D as a percentage of GDP. The GERD contains public as well as private investment, domestic investment in R & D as well as FDI in R & D. The data is gathered from the Global Innovation Index (GII) 2015, but the original source is UNESCO Institute for Statistics. Investments in R&D broadly perceived as a source of innovations (Romer, 1986; Coe & Helpman) and many more. In fact, both the World Economic , OECD and the World Bank all include measures of R & D in their innovation rankings (WEForum.org, OECD, WorldBank.org).
South Korea ranks as number one in this measure.

Education expenditures
The Education Expenditures variable denotes the government operating expenditures in education as a percentage of GDP. The Education Expenditures include salaries and wages, but capital investments in buildings and equipment is excluded. The data is gathered from the Global Innovation Index (GII) 2015, but the original source is UNESCO Institute for Statistics, UIS database. Education and human capital is a widely recognized driver of innovation and productivity growth (Romer, 1986; Stern, 2000)
Botswana ranks as number one in this measure.

General Infrastructure (index)

[59] This is not an exhaustive list of all potentially relevant variables and good arguments can be made for the inclusion of other factors, such as financial market sophistication, institutional settings (Hall & Soskice, 2001), cultural traits (Shane, 1992 / 1993 and Tayor & Wilson, 2012), taxation levels, regulatory environment and so on. This is an inherent challenge in drawing boundaries. In this regard, it is beyond the scope of this chapter to discuss all the variables that *could have been included*. Instead, I focus on arguing why the variables included are relevant.

The General Infrastructure variable is an index measure containing several submeasures of infrastructure. The general infrastructure score consists of electricity output per capita, logistics performance (a sub-index of its own) and gross capital formation. According to Delgado (2012) infrastructure is an important determinant of national development and innovation.
Qatar ranks as number one in this measure.

Political stability (index)
The Political Stability variable is an index that captures the perceptions (survey-based) of the probability that current government could be destabilized or indeed overthrown by unconstitutional means (including destabilization through politically motivated violence and terrorism). World Governance Indicators, World Bank. According to Higgs (1997) not knowing what policy is going to be, is worse than bad policies. Regime uncertainty makes businesses avoid taking risks and making investments detrimental to innovation and economic activity in general.
New Zealand ranks as number one in this measure.

All results of the multivariate regression analyses can be seen in overview form in table 3 on next page. In this section I highlight the most important findings and interpret the results as they relate to my research question.
In table 3a and 3b the six independent variables (Trust, GDP, GERD, Education exp., Infrastructure and Political Stability) are found in the left column and just below the variables the adjusted R2, the P-value of the model and the number of observations in each regression model. Table 3a shows regressions using the unspecified trust measure and in table 3b RA trust is used. In all regressions the dependent variable is Innovation Output (GII). For each different trust variable and its associated variables ten different models are tested. Model 1 in each table is a bivariate regression between innovation output and the trust variable, model 2-6 contains trust and one of the other five independent variables. Model 7 Model 8 contains all six variables and model 10 contains all variables except trust. Model 9 is different in table A and B – both are attempts at creating optimal models with high adjusted R^2-values and significant variables.

7.2.1 Results: Unspecified trust
In the following I go throw the results of the different regression models, assessing the strength and significance of the models as a whole, and of their respective variables individually. The main focus is on trust (unspecified here and Radius-adjusted trust), but I also deviate to describe other interesting findings along the way.

The adjusted R^2-value of unspecified trust in isolation is 0.4. In model 2-6 unspecified trust is paired with the five competing variables one at a time. Each of the models have higher adjusted R2-values than trust alone, meaning the variables add explanatory power. Trust remains significant in all cases, as does the variables included in the models.
Model 2 (pairing trust and GDP) is the best fit with an adjusted R2-value of 0.7 (70 % of the variance in Innovation Output explained). Model 3 (GERD) and Model 6 (Political stability) follow after with R2 equal 0.63 and 0.62 respectively.