

Trust In Virtual Teams: An Irish Post-Pandemic Exploratory Study

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Abstract

The COVID-19 pandemic has led to rapid organisational change in businesses across the globe. Following nationwide restrictions, many organisations adopted a remote working approach to allow business operations continue. This was, for most, unplanned, at speed, and applied to employees often unfamiliar with working within virtual teams.

When considering the academic literature on this subject, trust is considered a key factor in the virtual team's success. However, most of the existing literature makes assumptions regarding virtual team operations which predate the COVID-19 pandemic and therefore may be less applicable. These are largely based around cultural, temporal, and linguistic issues, which negatively impact the development and maintenance of trust within a team. This study will instead look at the specific challenges more relevant to virtual teams established during the pandemic.

The findings presented will reflect both the latest academic research on the subject, and a quantitative study analysing the results from surveys with team leaders of relevant virtual teams. The results will expand our understanding of a relatively new research area, allowing the management of organisations that utilise virtual teams to lead effectively and improve the team's likelihood of success.

Submission of Thesis and Dissertation

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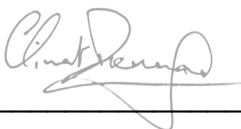
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Vincent Dennany

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Chapter 1. Introduction

1.1 Background

The COVID-19 pandemic has created widespread disruption to businesses around the world. The virus first originated in China in late 2019 and within six months it had become widespread throughout the world. Governments responded to the public health threat with a series of restrictions imposed across their populations.

These restrictions have forced organisations to adapt their business models to continue operating. The level of organisational change required has been extraordinary and will likely represent a seismic shift in how future operations are shaped. With 'working from home' restrictions imposed in many countries including Ireland, organisations have been forced to rapidly establish virtual teams, operating within a remote environment.

Although certain managerial controls, such as informal lunches, in-person meetings, and direct observations, were no longer accessible, the crisis accelerated the adoption of new technologies to work, coordinate, and communicate, affording managers new control opportunities (Delfino and van, 2021). The speed at which this change has been possible is driven by advances in information and communication technologies and high-speed internet (Wang *et al.*, 2021). The ramifications of such abrupt shifts in the workplace remain largely unknown.

1.2 Identified Problem

As organisational working parties become more transitory with the growth of remote working and supervision lessened, concerns grow around the increased human resources, communications and operational challenges facing organisations (Bordia, 1997). Some question whether these teams can function effectively without face-to-face interaction (De Meyer, 1991; Handy, 1995).

With the emergence of the pandemic, organisations were required to evolve faster than previously envisaged to accommodate the shift to remote working. With this new norm office workers were forced to embrace a host of digital work tools enhancing collaboration and communications in new ways (Davison, 2020). A 2020 Irish nationwide survey found that 51% of the workforce had never worked remotely before the pandemic (McCarthy *et al.*, 2020). This highlights potential challenges regarding time to setup, organise and plan the appropriate structures to do this efficiently. According to scholars and industry leaders this is a trend which is expected to continue long after restrictions are removed (Richter, 2020).

As teams scramble to pivot to this new workplace, valuable insights can be observed regarding what factors improve the effectiveness and likely success of the team and particularly the role trust plays in helping achieve this. Team managers will be presented with new challenges such as information asymmetries resulting from the lack of in-office interactions. Various factors may contribute to size and nature of these, but through identification and analysis, leaders can better comprehend and mitigate future occurrences.

1.3 Proposed Research

This research will focus on the role of trust in virtual teams, focusing on how it interacts with the overall effectiveness of the team and how it is impacted by the ability, size, and age of the virtual team. When considering this subject, much academic research exists on the subject (Handy, 1995; Jarvenpaa and Leidner, 1998; Kirkman *et al.*, 2004). Interestingly, almost all of this might to some degree be considered outdated, given it has been observed within an environment dominated by in-office work. This study will therefore focus on the subject since the onset of the pandemic and through the lens of Irish organisations shifting from a model of conventional teams to virtual.

The research aims to provide guidance to these firms to develop and maintain trust within virtual teams and hence increase the likelihood of success. It will look at identifying challenges relevant to the current environment. With this information, lessons can be learnt to better prepare teams to operate

successfully in future, where virtual teams are sure to play a more significant role and therefore add to the growing body of research on trust and success factors for virtual teams.

1.4 Delimitations

Since Virtual Team research spans a variety of areas, the following delimitations are specified to constrain the scope of this thesis:

The thesis is limited to teams within Ireland, which were previously collocated and have shifted to virtual. This has become popular since the emergence of the COVID-19 pandemic, where national restrictions forced organisations to pivot their teams to the virtual workplace. This thesis does not intend to study globally dispersed teams, those of which have always been virtual, or the wider implications of the shift to virtual working on the organisation.

Chapter 2. Literature Review

The purpose of this literature review is to present the reader with the latest academic research on virtual teams, expanding on the common themes proposed. This will allow us to better identify and explore the issues faced both by virtual teams and their leaders. Further, this will include the key influence of trust within the team and the problems and characteristics of virtual teams for both leaders and team members.

2.1 Conventional and Virtual Teams

A team is a collection of individuals who collaborate on activities, share responsibility for outcomes, see themselves and are perceived by others as a social entity embedded inside one or more broader social systems, and manage their relationships beyond organizational boundaries (Cohen and Bailey, 1997). They are often difficult to characterise, with some having members who are functionally homogenous, whereas others are more varied. In addition, while some teams work in surroundings that are intense and complicated, others function in environments which are more stable (Mathieu *et al.*, 2008).

The increase in globalisation and its impact on the evolution of organisations towards flatter corporate structures has increased the adoption of virtual teams (Montoya-Weiss, Massey and Song, 2001). This shift has contributed to the growth in the academic field of research on virtual teams. Throughout academic research the word virtual is used interchangeably with temporary and permanent virtual organisations, virtual offices, teleworking, home-based or mobile working and so represents a spectrum of virtual work. Miles and Snow (1986) define a virtual team as an evolved form of conventional network organisation. It designates an abstract requirement to a group who collectively possess certain skills which can meet transient, unanticipated needs (Mowshowitz, 1997). The team, brought together by information and telecommunications technology, may transcend time, space and culture (Jarvenpaa and Leidner, 1998; Powell, Piccoli and Ives, 2004).

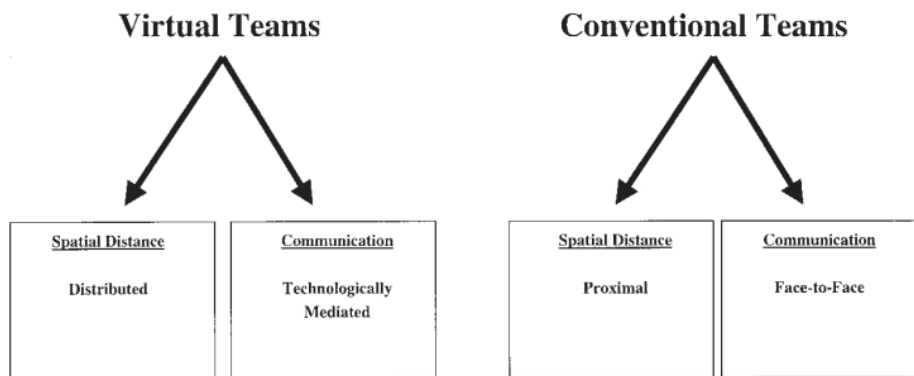


Figure 2.1: Conventional and Virtual Team Differences

(Bell and Kozlowski, 2002, p. 22)

Virtual team members may be situated across the globe (Jarvenpaa and Leidner, 1998), but working within one can involve challenges such as the difficulty of assessing the trustworthiness of a team member (Coppola, Hiltz and Rotter, 2004; Rusman *et al.*, 2010). As seen in Figure 2.1, the lack of in person communication is the key difference between virtual and conventional teams (Bell and Kozlowski, 2002). Although significant debate exists regarding to what extent face-to-face interaction must lack, definitions are gradually shifting away from this classification (Guzzo and Dickson, 1996). Instead, they see it as a possible trait shared by all teams. (Griffith and Neale, 2001).

With a wealth of academic research on the subject, the environment is changing at a considerable rate and academia must react accordingly. Many agree this area is challenging and a lack of consensus exists on which direction future research should take (Griffith and Neale, 2001). It is important to define the notion of virtual labour and provide explicit criteria for conceptualizing virtual teams as separate entities. Without a clear differentiation between virtual and co-located teams, similar design features that disregard the complexity and organizational change needed in virtual team formations might be used.

2.2 Adoption of Remote Working

While many highlight the merits of virtual working, historically one of the widely agreed challenges has been the speed of adoption within organisations. Handy (1995) discusses how disasters can speed up the progression and adoption of organisational change. He recounts an incident involving a library fire that resulted in organizational transformation. The librarians had the reasons, technology, and resources to change how it operated, but had until then lacked the hearts and minds of their staff and political masters.

This message has lasted the test of time and lends itself well to the current landscape. With the COVID-19 pandemic, fast changing government policies have forced the adoption of tools to facilitate remote working at a rapid pace. Although these tools had previously existed with many favouring the change, it too had lacked the will of its political masters. Of those who had never worked remotely before COVID-19, 78% surveyed in Ireland indicated a willingness to continue working remotely after the crisis (McCarthy *et al.*, 2020).

It is impressive the speed at which lockdown has prompted the majority of office employees to completely embrace digital work solutions such as collaboration platforms and video conferencing tools in order to continue working remotely in innovative ways (Davison, 2020). As a result, digital proficiency has increased dramatically in a few of weeks:

- Employees' increased proficiency with digital work tools has helped introduce new routines and daily habits. These digital work tools are often adaptable without the need for major technical customisations. As a result, workers throughout the globe began experimenting with and commenting on developing use scenarios such as virtual coffee breaks and after-work social events.
- Organisations have been exploring a greater range of digital customer engagement strategies, while consumers are discovering that their demands will continue to be met via various digital modes of operation.
- Executives are finding solace in the fact that their employees work continues even when they are physically apart. Interestingly, both Facebook and Twitter have announced that, following the pandemic,

their employees can choose to work from home "forever" (Wang *et al.*, 2021).

2.3 Virtual Team Characteristics

Many of the characteristics associated with the success of conventional teams are also required for virtual team success (Bergiel, Balsmeier and Bergiel, 2008). Digital proficiency has accelerated the transition to the virtual workplace in innovative ways resulting in teams with similar characteristic, listed below (Richter, 2020):

2.3.1 High Levels of Trust.

In order to lower the high levels of unpredictability inherent in a global and technologically-based environment, trust is crucial in a virtual team (Jarvenpaa and Leidner, 1998). However, unlike for co-located teams research focuses less on the development of trust through communication behaviour. Instead, like temporary teams, the notion of swift trust is adopted. This generally involves the team assuming trust, while later verifying through experience and adjusting the assumption accordingly (Jarvenpaa and Leidner, 1998).

2.3.2 Clear Communication

Given its key role within the team structure, communication has been the focus of extensive research. Much of this considers a successful team to be one which can communicate well and exchange critical information in a timely manner (Bordia, 1997). This becomes considerably harder to achieve in a virtual team which may be forced to communicate through email omitting nonverbal communication such as verbal tone or expressions (Kirkman *et al.*, 2004). However, this has become less of an obstacle over time with experienced digital nomads figuring out ways to reduce communication issue and so improve their productivity (Richter and Richter, 2020).

2.3.3 Effective Leadership

While a vast body of research exists on leadership within a conventional team, much less has been researched within the context of virtual teams. Existing studies comparing leadership between both typically indicate that conventional teams experience relatively more effective leadership (Judge and Bono, 2000). Several of these reveal that while traditional team members had a relatively high level of accuracy in estimating the personalities of their co-located team members, virtual team members had much lower levels of accuracy in similar activities (Purvanova, 2008). Virtual teams tend to create a more difficult environment for understanding and recognizing the behaviour of team members. Instead of interpreting physical signals, virtual team members in a virtual context must rely on computer-mediated cues when attributing behaviour to their colleagues.

2.3.4 Utilisation of Technology

Technology plays an important role in facilitating the day-to-day tasks of a virtual team. The technology must function perfectly, and technical assistance should be accessible all day, every day, in the absence of administrative and technical support found at the home office (Wayne F. Cascio, 2000). The variety of solutions has continued to expand over the last decade, and teams may now use collaboration tools, document sharing, document cocreation, meeting tools, project management tools, and social networking (Gilson *et al.*, 2015).

Further the area of virtual environments is receiving a great deal of organisational and popular press attention. These are communication systems in which numerous users share the same 3D digital environment while being physically separated. Although they are expected to become more popular over time, currently they are considered useful for "high-level" purposes such as establishing a feeling of presence, but are still considered more difficult to use and less readily incorporated into standard business operations (Luse, Mennecke and Triplett, 2013).

2.3.5 Varying Time Zones

Crossing different time zones, which lowers the potential time for team interaction, is one of the most significant issues virtual teams confront. When one person's day starts another may be eating supper or sleeping. Everyday tasks such as organizing a meeting, become complicated and might cause interpersonal stress. Work time diminishes as time zones increase, reaching almost non-existent if they are located on opposite ends of the globe. Consequently, team members must leverage appropriate and relevant technologies to bridge the gaps caused by working different time zones. The meeting schedule must satisfy the demands and schedules of all team members (Bergiel, Balsmeier and Bergiel, 2008).

2.3.6 Culture and Language

In global virtual teams, cultural and linguistic disparities are quite common. Yet, even within the same country, minor differences between team members from various regions might have a negative impact on a remote team. Further the negative impact of cultural differences may be reduced by making an intentional effort to comprehend and accept the differences (Robey, Khoo and Powers, 2000).

2.3.7 Diverse Conflict Resolution Strategies

Conflict is often considered more likely in virtual teams (Furumo, 2008). The importance of conflict resolution is driven by the direct effect it has on team performance. Due to the differences between collocated and virtual teams, investigating conflict resolution in virtual teams is of critical importance.

Given that knowledge management systems are typically designed for relatively unstructured domains where consensus on standard practices has not yet emerged, there have been calls for researchers to focus more on the issue of conflict management during knowledge capture from experts in virtual teams (Ananth Chiravuri, Nazareth and Ramamurthy, 2011).

2.4 Virtual Team Evaluation

Virtual teams may provide significant business benefits compared to the more conventional method of face-to-face working. Even in the years preceding the COVID-19 pandemic, the number of organisations allowing for some form of remote working had increased significantly (Delfino and van, 2021). Many of the key drivers to the increase in popularity include the following:

1. They benefit from technological advantages (Handy, 1995), allowing them to reduce travel time and costs, such as those associated with bringing together geographically, temporally, and functionally dispersed employees (Wayne F. Cascio, 2000; Martins, Gilson and Maynard, 2004).
2. Teams can be composed of the optimum membership within an organisation regardless of each individual's location, enhancing the quality of the decision making and allowing members with particular skills to serve on several teams concurrently (Anthony M. Townsend, Samuel M. DeMarie, and Anthony R. Hendrickson, 1998).
3. They can recruit the most talented and suitable employees since they are less restricted to a geographical location and provide incentives of flexibility to potential employees. This in turn can help enhance the organisation's competitiveness (Wayne F. Cascio, 2000).
4. They may increase productivity, with some studies showing a productivity improvement of forty percent amongst its teleworking staff (Wayne F. Cascio, 2000). Some of this may be attributed to a reordering of work in such a way as to take advantage of time lags, resulting in faster completion of tasks (Powell, Piccoli and Ives, 2004).

However, not all organisations are suited to operating wholly or partly as a virtual organisation. The limitations which apply may include the following:

1. The setup costs associated with a virtual workplace can be high (Wayne F. Cascio, 2000). This may be particularly so where organisations need absolutely seamless video interaction (Anthony M. Townsend, Samuel M. DeMarie, and Anthony R. Hendrickson, 1998). However, as with most

forms of technology, advances lead to decreasing costs and this should continue to reduce with time.

2. Working remotely can lead to a feelings of isolation amongst team employees (Bergiel, Balsmeier and Bergiel, 2008; McCarthy *et al.*, 2020). Although some may thrive with a feeling of autonomy it needs to be carefully balanced ensuring the team communicates so as to mitigate loneliness (Gilson *et al.*, 2015).
3. Lack of trust can lead to uncomfortable and negative feelings towards managers, as well as damaging collaboration and team relationships (Chen, Sriphon and Kyriakopoulos, 2021). Establishing an environment of trust instead of control is one of the key components to operating successfully as part of a virtual team (Handy, 1995). In a 2020 survey, lack of trust from employers had been one of the key reasons cited by Irish employers for preventing their employees from working remotely (McCarthy *et al.*, 2020).

2.5 Trust

Trust may be considered a multidisciplinary and complex construct which spans across many areas from historical links to psychology, while more recently broadening to areas such as computer science. It may be defined as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer, Davis and Schoorman, 1995). Before determining whether or not to put one's faith in another, one must weigh the benefits and drawbacks of doing so, weighing the trustworthiness of the potential trustee against the potential harm which may result (Rusman *et al.*, 2010).

It is widely considered one of the most studied areas in virtual teams' literature, despite its narrow scope. Since conventional social control is replaced with self-direction and self-management in a virtual team, trust is crucial. Members of virtual teams must have confidence that everyone will perform their responsibilities and act consistently and predictably (Wayne F. Cascio, 2000).

Understanding how, why, and under what circumstances trust emerges continues to be a significant area of study. The prominence of this topic may be partially attributable to findings indicating a favourable correlation with the success of virtual teams (Furumo, 2008). It is often considered the cornerstone of successful relationships, and for virtual teams to be successful, they must create and cultivate their connections with great care and purpose (Coppola, Hiltz and Rotter, 2004). Positive leadership, communication and knowledge sharing are all positively correlated with high levels of trust within virtual teams. If complicated concepts must be written down or described over the phone, information sharing is less likely to occur since communication is slower and provides fewer cues, making shared comprehension more difficult to attain (Gazor, 2012).

One of the most common issues experienced within literature on this subject relates to the significant challenges faced when assessing teammates' trustworthiness without having met them (Jarvenpaa and Leidner, 1998; Rendon, 2001). This can be further exacerbated by the short shelf life of these teams, requiring the need for what some academics refer to as swift trust (Jarvenpaa and Leidner, 1998; Gilson *et al.*, 2015). Although this represents a common area of analysis, it might be considered less relevant to this study. This is because the virtual teams within this study should have at least some familiarity and established relationships dating pre-pandemic.

2.6 Knowledge Sharing

To improve the organizational efficiency and effectiveness of a team, many leaders desire their employees to freely share their knowledge amongst the team. However, organizations do not "own" the intellectual property of their employees, and many individuals choose to retain their skills to themselves (Kelloway and Barling, 2000). Many workers appreciate that information sharing may benefit the larger group, they are also aware of the possible personal costs that sharing may entail, such as fear of being assessed or loss of authority (Connelly and Zweig, 2014).

Knowledge hiding is defined as the deliberate effort by an individual to withhold or hide requested information from another party (Anand and Hassan, 2019). It can be broken down into the following approaches:

- Rationalised hiding, where an explanation is provided or rationale to explain the reasons for the lack of a knowledge source.
- Evasive hiding, in which persons delay or offer less information than is acceptable by the other party; and
- Playing dumb, where the party displays ignorance of the information or knowledge source

Recent studies on the subject have linked knowledge hiding, or alternatively knowledge sharing, to trust within the organisation (Connelly *et al.*, 2019), with some examining the importance of knowledge sharing in building trust (Narda R. Quigley *et al.*, 2007).

2.7 Summary

It is evident from this literature review that virtual teams offer many advantages for today's organisations. Although the role of trust has been well researched in this field, the environment has changed considerably. An already fast changing environment has accelerated with the disruption of the COVID-19 pandemic. There appears to be a need for work to be done in this area to bring literature up to date.

Therefore, the objective of this study is to test several hypotheses related to the role of trust in virtual teams formed in the pandemic to improve the overall success of virtual teams.

Chapter 3. Research Question

3.1 Research Aim

The primary aim is to conduct research that would add to the existing body of knowledge and provide organizations with a deeper understanding of the role of trust within virtual teams. It will build upon common themes from past literature on the subject.

This study's literature review demonstrates that trust may play a crucial role in the success of a virtual team. Handy (1995) discusses how disaster can speed up progression and adoption of organisational change. This is evident with the COVID-19 pandemic and resulting adoption of virtual teams across industry. The concept of virtual team has been researched in academia since at least the 1980s (Miles and Snow, 1986). Although its definition has evolved over the years, its relationship with trust has remained a key area for research. Early research from Handy (1995) , Mayer et al (1995) and Jarvenpaa and Leidner (1998) provide a sound foundation to extend the research, applying findings through the lens of a post pandemic workplace.

A secondary aim of this study is to identify potential research gaps worthy of additional investigation with respect to the relationship between trust and virtual teams.

3.2 Research Objectives

This research objectives are:

- To understand and quantifiably measure the influence trust plays in the operations of a virtual team.
- To identify to what extent trust has on the success of a virtual team.
- To identify and quantify the relationship between trust and perceived skills of a virtual team.
- To identify and quantify the relationship between trust and the size of a virtual team.

- To identify and quantify the relationship between trust and the age of a virtual team.

3.3 Hypothesis

This study's hypotheses are developed based on prior research and the relevant literature. These are set out below:

Hypothesis 1 (H1): Trust represents a significant and positive relationship with the success of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

Hypothesis 2 (H2): Trust represents a significant and positive relationship with higher skilled virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

Hypothesis 3 (H3): Trust represents a significant and positive relationship with the size of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

Hypothesis 4 (H4): Trust represents a significant and positive relationship with the age of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

3.4 Significance

The study will be based on newly established Irish virtual teams which had previously operated as convention face-to-face teams. These changes will have been brought on because of the COVID-19 pandemic and will focus from the perspective of the team leaders. The shift to remote working over this period is likely to present challenges due to the speed and unplanned nature, responding quickly to a rapidly changing business environment. This will provide organisations with important insights into their virtual teams, applying relevance to what may become a fast-changing field of study.

Chapter 4. Methodology

This chapter begins by describing the research approach, detailing how this was used to perform the literature review. In addition, the process for collecting empirical data is described. This includes how the sample selection of team leaders were chosen, survey components, data collection, application of academic research and data analysis. Finally, the ethical implications, dependability, reproducibility, and validity considerations, and methodological constraints are outlined.

4.1 Research Approach

The research approach chosen has been adapted from the Research Onion of Saunders, Lewis and Thornhill (2019, p. 130) as illustrated in Figure 2.1 below. This should serve as a roadmap for completing the research study accurately and methodically. Each layer of the onion represents an important stage of the research approach. It enables the researcher to have an overview of the whole study and to perform it efficiently to enhance the quality and scope of the investigation.

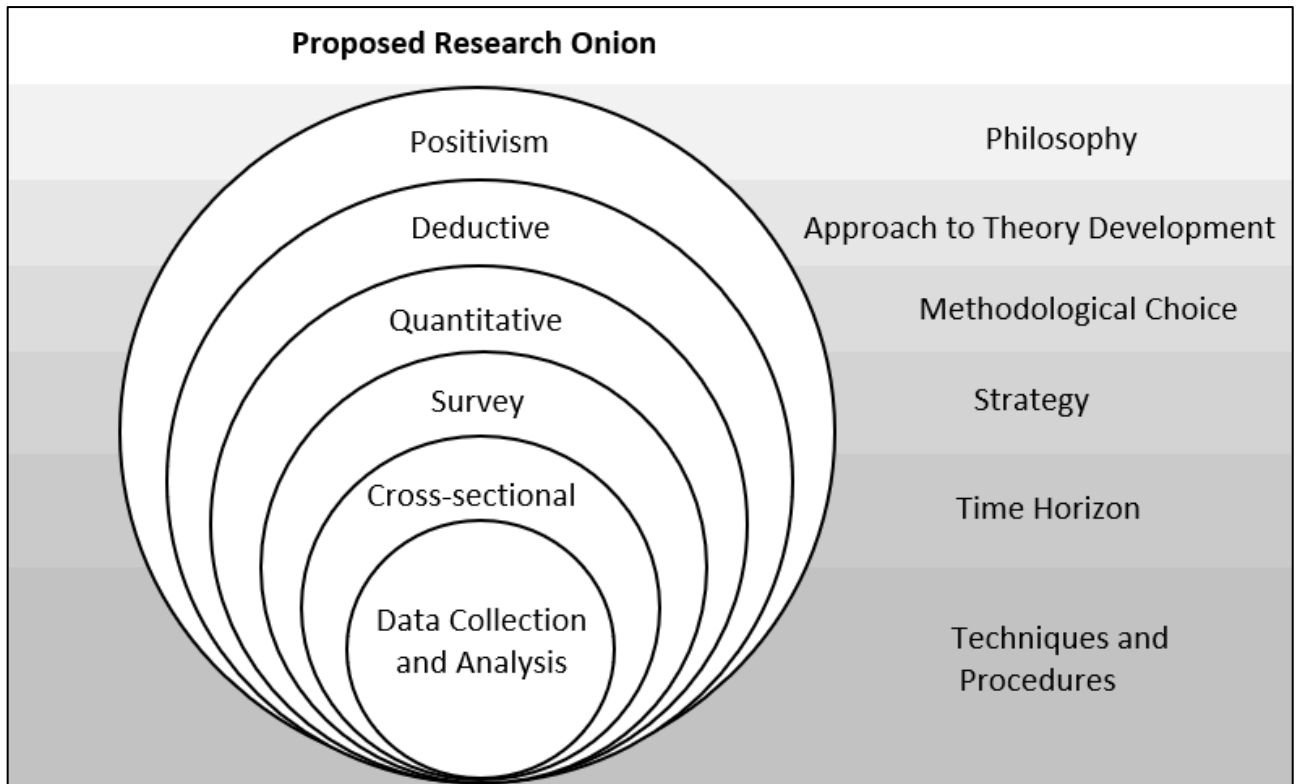


Figure 4.1: Proposed Research Onion

4.2 Research Philosophy

Research philosophy relates to the formation of assumptions and beliefs throughout the development of knowledge, with Saunders et al (2019, pp. 130–131) emphasizing the importance of identifying one before a study is complete. They propose that there are several suitable philosophies to a research question, highlighting that there may be no “best-fit” approach. New research will generate new findings and knowledge on a subject; hence, it is crucial to be aware of the underlying assumptions contributing to the development of this knowledge.

In the context of a research topic, epistemological and ontological concerns are the researcher's perspective of what constitutes knowledge, truth, and meaning. These considerations will steer students toward the theories or paradigms that will form the basis of their study design, data collection, and results analysis (Saunders, Lewis and Thornhill, 2019).

In philosophy, positivism and interpretivism are the two predominant frameworks for scientific study and analysis. With a positivist lens, only "factual" data gleaned by empirical means like observation and measurement can be trusted. In positivist research, the function of the researcher is confined to nomological prediction and explanation. In other words, throughout the study and analysis process, the researcher plays the role of an objective analyst. The study outcomes for these type of investigations are often apparent and are supported through empirical (perhaps probabilistic) rules (Baškarada and Koronios, 2018).

Interpretivism, on the other hand, takes a relativist perspective that interprets reality via intersubjectivity by emphasizing meaning in study and comprehension of social and experiential dimensions. Specifically, only a socially constructed explanation of reality is possible (Junjie and Yingxin, 2022). According to Saunders et al. (2019), due to the complexity of people and social subjects, there is often more than one truth.

Choosing a positivism philosophy allowed the researcher to best comprehend the empirical information collected via the use of surveys. This has enabled the researcher to undertake significant and scientifically sound study. This process is illustrated with the Research Onion in Figure 4.1.

4.3 Approach to Theory Development

The researcher used a deductive approach, conducting research at a particular moment in time and investigating hypothesized relationships between variable factors. It has been considered appropriate to the study's nature given its more rigid methodology which lends better to a positivism philosophy. The details of this research are outlined below.

4.3.1 Literature Review

A literature review is of crucial importance to a thesis, helping to critically examine the existing field of research on the selected topic and gaining a broad understanding of the subject area. With this summary of previous research,

knowledge gaps and theoretical biases may be uncovered to recommend future areas of research. Thus, the researcher examined the literature on virtual teams to synthesize prior studies and identify key topics warranting research.

This involved initially focusing on finding relevant literature applicable to the chosen area, searching with keywords such as “teams”, “coworking”, “trust” and “digital”. Although this provided some seminal papers on the subject, overall, it was far too broad a search criterion. This was further enhanced by adding keywords such as “virtual teams” and “trust in virtual teams”, often combining criteria for more relevant studies.

The college library’s search engine provided the principal source to locate material since it often resulted in superior quality and relevant materials. However, Semantic Scholar and Google Scholar were then used to broaden the search and locate research which would have otherwise been missed. First, the research papers were narrowed down by reading the abstracts and determining their relevancy. They were then extensively reviewed and classified according to how well they related to the issue. Through their references, further research was identified for which a similar process was followed. Finally, a summary of all relevant papers was compiled to provide a basic overview and identify which areas of the study topic had been examined.

4.4 Methodological Choice

In undertaking this study, the researcher has had to choose between a quantitative and qualitative research design. The researcher will be using a quantitative design, which is generally based on positivism or objective epistemology. This uses quantitative measurements to gather and analyse data, for which predictions and generalizations are sought (Yilmaz, 2013).

4.5 Time Horizon

The study has a cross-sectional design and is deductive in nature since it was completed at a single snapshot in time and investigates hypothesized relationships between variables. The unit of observation and analysis is the

individual team leader of the virtual team. The questions address how each team leader perceives trust, success, and ability within their virtual team. The study will aid in establishing strong links to the views, assumptions, and perceptions of the research phenomenon.

4.6 Research Design and Strategy

The study design is based on a quantitative, mono-method approach that employs a survey technique to gather data using an online questionnaire. The objective of the investigation is to conduct an exploratory study. The survey was created with Microsoft Word and delivered by the researcher through emails and an online questionnaire, using Microsoft Forms.

The survey is used to assess both participant experience with virtual teams and the influence of trust on the virtual team. There was a total of fifteen questions, three of them related to general details, seven related to trust and the remaining five related to team success and ability. The general details related to the amount of time spent employed by the organisation, the age of the virtual team, and the size of each virtual team.

Details of the survey including the email communications sent and the questions asked can be found in Appendix A and Appendix B respectively. A reflective journal will also be kept with the intention of improving the research practice (Vicary, Young and Hicks, 2017).

4.7 Data Sample

Probability and non-probability samples are the two major classifications of sampling processes. Each survey response has a non-zero possibility of being included in the researcher's sample via probability sampling, allowing for statistical inferences to be derived. With non-probability samples, questions may arise as to how closely these approximate for representativeness indicating that these samples are not representative, i.e., they are valid, but only within specified boundaries for the population (Adams, Khan and Raeside, 2014).

The researcher will use a non-probability sampling approach since filtering of the data by demographic in their final sampling may exclude participants based on demographic factors which might otherwise be relevant to the study. As a result, the sample will be valid, but only within the bounds set by the filters used; in other words, it will not be representative of the whole population.

The researcher will rely on the help of those in their immediate social circle to help increase the size of the sample pool from which statistically significant results can be drawn. To maximize the number of survey replies, it is acceptable for the researcher to use the snowball method. The researcher intends on using a combination of criterion sampling and purposeful sampling to analyse the survey data. This involved selecting individuals based on the assumption that they had experience leading a virtual team and so can provide valuable insights (Creswell, 2013).

4.8 Data Collection

In this study, the researcher has used the "primary data collection" approach as it allows the researcher to target relevant and reliable information in a timely manner. This form of data collecting gives a great degree of control to the researcher, which is one of the benefits of this procedure.

The participants in this study were team leaders of virtual teams working in Ireland. The criteria for a virtual team was based on a criteria set by Jarvenpaa and Leidner (1998), which refers to a team brought together by information and telecommunications technology, which may transcend time, space and culture. However, it was further constrained to those virtual teams established since the COVID-19 pandemic. Participants were accepted from all industries operating in Ireland capable of remote working.

All correspondence to and from participants was through e-mail using the researcher's personal e-mail and the participants' work or personal e-mail. The search for survey participants began by mapping the researcher's professional network, utilizing LinkedIn as a research tool to identify suitable applicants. This began by contacting virtual team leaders and inquiring about their readiness to

participate in the study. The network of individuals was given permission to distribute the questionnaire to relevant individuals, reminding each of the criteria which should be met. In addition, the survey was posted to the researcher's news feeds and a related LinkedIn community.

The online questionnaire was completed anonymously by participants (Sue & Ritter, 2007; Hirsjarvi, Remes & Sajavaara, 2009), and identifying numbers were generated for each completed questionnaire. Participants completed the survey through an online form, which took about 5 minutes to complete. Each survey participant was noted by the order in which the form was submitted within the study. For example, the first completed survey was identified as "Participant 1," the second as "Participant 2," etc.

A trial of the survey was done to assess the method and questionnaire in a formal capacity. Four individuals performed the trial. For the trial, participants performed the activity and survey as instructed. In addition, the trial contained questions concerning the task and procedure, such as whether respondents understood the purpose of the research and if the information provided was clear.

Participants were also urged to provide questions or comments at the conclusion of the survey. One participant remarked, "I rushed as I did not know whether there was a time restriction on the activity." Another remark noted, "It would be easier and less confusing if all questions had the same scale for answering". To minimize this misunderstanding, the task material was modified so that answers followed a consistent scale. In addition, more clarity around the time needed to complete was added to the survey details.

4.9 Data Analysis

With fifteen questions and a relatively small sample size, it would be challenging to identify statistically significant trends within the results; nonetheless, the data set is still useful since the survey is descriptive and employs open questions. Using a thematic analysis, it can help identify problems, develop solutions, and design mitigants on a small scale that may be

used to establish and develop subsequent studies that investigate these topics in more depth utilising a bigger sample size.

The study will look to quantitatively examine the results of the survey and interpret findings against the objectives of the thesis. The researcher has verified the trustworthiness and validity of the surveyed data, and the data acquired from original sources is real. The researcher has verified the consistency of this data; therefore, it can be claimed that the data utilised in this study are sufficiently reliable.

The replies will give information on the practical issues experienced by the respondents and the strategies they used to mitigate conflict and difficulties. These replies may be compared to the present literature on virtual teams to identify important issues and preventative actions that can be investigated further with a bigger sample size. Responses can help give recommendations for operating within virtual teams that may be broadened and investigated in more depth to contribute to the wider conversation on virtual teams.

4.10 Ethical Considerations

The researcher is satisfied with the ethical implications of the work undertaken. They do not consider the research to pose physical harm, mental stress, or financial issues to any of the stakeholders impacted by the study. Consent is expected to be informed, and the confidentiality of survey participants is expected to be confidential unless agreed otherwise through formal consent. Participants will be provided the right to withdraw from the study at any time. Research will aim to be transparent, honest, and respectful to all stakeholders.

All aspects of the study adhered to an ethical code whose purpose was to protect and uphold the participants' anonymity and informed consent. The emergence of new technologies has aided in providing researchers better tools to achieve this. According to Buchman and Hvizdak (2009), the emergence of new technologies such as online forms have aided in 'providing proper informed consent protocols in an anonymous or pseudonymous environment'. However a widespread suspicion of online surveys and a reluctance to express

thoughts and preferences in a non-traditional setting might have an effect on participants responses (Kaye and Johnson, 1999, p. 334).

Before completing the survey, an online form was presented to each participant to ensure their consent. The form detailed the rights of the interviewee in detail, along with the estimated duration to complete the survey and highlighting the participants right to withdraw from the study at any time. This form also indicated how they might contact us for further information about the thesis or to find out how their interviews were used in the thesis. A copy of this is provided in Appendix A.

Chapter 5. Findings

This chapter outlines the findings of the study, highlighting any challenges, how they were addressed, what preventative steps have been taken, and whether the respondents have any recommendations for others working in virtual teams.

5.1 Preliminary Analysis

Occasionally, a researcher may encounter missing data in the sample, which might pose significant problems for further analytic work. Thankfully, this has not been an issue. This may result from the rigid nature of the survey instrument which made all questions mandatory, while ensuring they were answered appropriately. Reversed questions were converted before analysis to ensure they were interpreted correctly.

5.2 Descriptive Results

Of the 105 survey respondents, over half had been working in their employment for 2 years as can be seen in Table 5.1. This was lower than the researcher expected but may reflect the nature of the roles. Those undertaking project work may be more suitable for remote working. They would also be more likely to be working on short term contracts and therefore skew the distribution to less than two years. This is also in line with the purposive sampling performed which anecdotally appeared to catch a high number of project team leaders.

Time	Participants	Percentage	Cumulative %
Less than 6 months	12	11%	11%
6 months to 1 year	3	3%	14%
1 year to 2 years	27	26%	40%
Greater than 2 years	63	60%	100%
Note: N = 105			

Table 5.1: Employment Duration

All the managers were chosen due to their role in managing teams which were previously conventional face-to-face teams but converted to degrees of virtual following the COVID 19 pandemic. Surprisingly only 43 percent of teams were

converted to remote at the time of the pandemic. This may indicate that respondents did not fully understand the question and may have interpreted it as how long they had worked in the virtual team. Alternatively, it may be a flaw in how the participants had been chosen, targeting those in remote teams which were slower than might be expected to convert to remote. If this was the case, results should be used carefully since this cohort may have had more time and so better planned the transition to a virtual team.

Time	Participants	Percentage	Cumulative %
Less than 6 months	18	17%	17%
6 months to 1 year	9	9%	26%
1 year to 2 years	33	31%	57%
Greater than 2 years	45	43%	100%
Note: N = 105			

Table 5.2: Virtual Team Age

The sample of the virtual teams surveyed were uniformly spread by size with over one third having less than or equal to 10 team members and almost two thirds having less than 20. The number exceeding twenty was quite high at 31 percent which may indicate team members were including members of sub teams. Alternatively, this might be a result of the purposive sampling performed which targeted contacts through LinkedIn. Those working in larger organisations may be more likely to have bigger teams. They may also have a greater online presence due to the size as an employer.

Time	Participants	Percentage	Cumulative %
0 to 5	21	20%	20%
6 to 10	18	17%	37%
11 to 19	33	31%	69%
Greater than 19	33	31%	100%
Note: N = 105			

Table 5.3: Virtual Team Size

5.3 Mean and Standard Deviation

Questions four to fifteen were responded to using a five-point Likert scale. As part of the analysis some questions were reversed when applicable to ensure a consistent metric for ranking. Response values ranged from a 'Strongly Disagree' value of 0.2, increasing in steps of 0.2 to a maximum value of 1 for

'Strongly Agree'. For each question, the mean and standard deviation were then computed, with the results reported in Table 5.4.

Success questions had a computed mean of approximately 0.81, indicating the average response from participants was to agree with success ranking questions. This would suggest that on average the team leaders surveyed considered their virtual teams to be successful. With a standard deviation below 0.19, the results surveyed appear have a low volatility and therefore reliable.

Skills questions had a computed mean of approximately 0.84, indicating the average response from participants was to rank the levels of skills high within the virtual team. This would suggest that on average the team leaders surveyed considered their teams to be well skilled. With a standard deviation below 0.18, the results surveyed appear to be stable and therefore reliable.

Trust questions had a computed mean of approximately 0.72, indicating the average response from participants was to rank the levels of trust moderately high within the virtual team. This would suggest that on average the team leaders surveyed considered their teams to be moderately trustworthy. With a standard deviation below 0.21, the results surveyed appear to be stable and therefore reliable.

The Cronbach's Alpha of all responses was also calculated. This evaluates the internal consistency of the survey items and estimates the items' reliability based on the replies to each question. The rule of thumb dictates that the alpha value should be more than 0.7, and the poll results corroborate this with a value of 0.88.

Subject	Questions	Mean	Std Dev
Success	Q4	0.806	0.170
Skills	Q5	0.783	0.188
Success	Q6	0.806	0.163
Skills	Q7	0.834	0.176
Skills	Q8	0.846	0.180
Trust	Q9	0.720	0.231
	Q10	0.697	0.227

	Q11	0.543	0.261
	Q12	0.709	0.206
	Q13	0.794	0.170
	Q14	0.817	0.155
	Q15	0.737	0.214

Table 5.4: Mean and Standard Deviation

5.4 Correlation Analysis

The relationship between the trust variables were determined through correlation analysis, with the findings provided in Table 5.5

Questions	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Q9	1						
Q10	0.083	1					
Q11	0.286**	0.017	1				
Q12	0.645***	0.241*	0.267**	1			
Q13	0.605***	0.284**	0.461***	0.58***	1		
Q14	0.683***	0.412***	0.396***	0.702***	0.883***	1	
Q15	0.504***	0.175	0.535***	0.603***	0.531***	0.592***	1

Note: N = 105, *** p < 0.001, ** p < 0.01, * p < 0.05

Table 5.5: Trust Correlation Analysis

Applying Pearson's rule of thumb that correlations between variables >.40 indicate a strong positive link and >.70 a very strong positive relationship, the statistical analysis indicates that most variables are strongly connected to each other. Other than questions 10 and 11, all questions passed this criterion with a probability of likelihood more than 99 percent.

Interestingly, this was not as definitive for questions 10 and 11, where the correlation coefficients ranged from 0.01 to 0.46. This may have resulted from how the questions were worded with both questions alluding to trust in a less obvious manner. This may be an example of where an in-person interview would have yielded more accurate results.

Questions	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Q9	1						

Q10	0.083	1					
Q11	0.286**	0.017	1				
Q12	0.645***	0.241*	0.267**	1			
Q13	0.605***	0.284**	0.461***	0.58***	1		
Q14	0.683***	0.412***	0.396***	0.702***	0.883***	1	
Q15	0.504***	0.175	0.535***	0.603***	0.531***	0.592***	1
<i>Note: N = 105, *** p < 0.001, ** p < 0.01, * p < 0.05</i>							

Table 5.5: Pearson Correlation of Trust Questions

This outcome also indicates that multicollinearity is not an issue. If the absolute variable correlations were near to 1, it is possible that the regression coefficient might become unstable, leading to inaccurate statistical results (Kim, 2019).

Where two variables have a strong correlation, they are effectively measuring the same phenomenon.

Looking at the correlation of the consolidated measures of success, there would appear to be a positive correlation to trust. A correlation value above 0.7 is considered to be very strong, so a value of 0.942 and a p value exceeding 99.9 percent would indicate a very strong correlation. The correlation between ability and trust might be considered a moderately positive relationship, with a correlation value of 0.311 and a p value exceeding 99 percent.

The correlation value of 0.042 for team size indicated a lack of correlation with a high p value also indicating a lack of certainty around the analysis. Similarly, the correlation value of team age of 0.005 with a high p value again indicates no correlation to trust with little certainty of the results.

<i>Consolidated</i>	<i>Trust</i>	<i>Success</i>	<i>Ability</i>	<i>Size</i>	<i>Team Age</i>
<i>Trust</i>	1				
<i>Success</i>	0.942***	1			
<i>Ability</i>	0.311**	0.29**	1		
<i>Size</i>	0.042	-0.086	0.119	1	
<i>Team Age</i>	0.005	-0.024	-0.012	-0.072	1
<i>Note: N = 105, *** p < 0.001, ** p < 0.01, * p < 0.05</i>					

Table 5.6: Pearson Correlation of Measures

5.5 Regression Analysis

The purpose of regression analysis is to test all hypotheses to determine which independent variables are closely connected to the dependent variable and to give a foundation for exploring the nature of these connections. This gives insight into which factors serve as predictors of trust in the virtual team.

The conditions for multiple regression, such as normality, linearity, constant variance of the error terms, and independence of the error terms, have been satisfied, hence boosting the reliability of the survey data. Table 5.7 provides the outcomes of this investigation.

Regression assumes that the variable distributions are normal. Non-normally distributed variables (very skewed or with significant outliers) might affect correlations and significance tests. Multiple regression analysis can only assess the link between dependent and independent variables properly if the relationship is linear. If the connection is nonlinear, overestimation (Type I errors) of additional independent variables that share variation with the dependent variable is possible (Osborne and Waters, 2002). These assumptions were confirmed using the outputs of the Excel statistical package software and further validated using R.

Table 5.7's multiple regression analysis highlights the aggregated survey results. Success of the team shares a strong correlation with trust in the virtual team and account for 70% of the variation in virtual team effectiveness.

<i>Consolidated</i>	<i>H1</i>	<i>H2</i>	<i>H3</i>	<i>H4</i>
<i>Dependent Variable</i>	<i>Success</i>	<i>Ability</i>	<i>Size</i>	<i>Team Age</i>
<i>Independent Variable</i>				
<i>Trust</i>	<i>0.7282</i>	<i>0.4995</i>	<i>0.3545</i>	<i>0.0101</i>
<i>R Squared</i>	<i>0.5303</i>	<i>0.2495</i>	<i>0.1257</i>	<i>0.0001</i>
<i>Adj R Squared</i>	<i>0.5257</i>	<i>0.2421</i>	<i>0.1171</i>	<i>-0.0097</i>
<i>F Value</i>	<i>115.158***</i>	<i>33.901***</i>	<i>14.659***</i>	<i>0.01</i>
<i>Note: N = 105, *** p < 0.001</i>				

Table 5.7: Regression Analysis

This research confirms that trust is a key predictor of virtual team success, supporting Hypothesis 1. Further, it presented the strongest correlation of all relationships analysed with a strong positive correlation of approximately 0.728. The value of the adjusted R squared of 0.526 indicates a moderate relationship in explaining the variability of trust within a team, with a statistically significant f value.

This research confirms that trust is a key predictor of virtual team ability, supporting Hypothesis 2. It presented a low positive correlation of approximately 0.499. The value of the adjusted R squared indicates a no relationship in explaining the variability of trust with a team's ability, with a statistically significant f value.

This research confirms that trust is not a predictor of virtual team size, rejecting Hypothesis 3. It presented a low positive correlation of approximately 0.355. The value of the adjusted R squared indicates a low relationship in explaining the variability of trust with a teams ability, with a statistical significant f value.

This research confirms that trust is not a predictor of virtual team age, rejecting Hypothesis 4. It presented no correlation between the variables with a calculated measure of 0.0101. The value of the adjusted R squared indicates a no relationship in explaining the variability of trust with a teams ability, with a statistical insignificant f value.

5.6 Summary of Hypotheses

H1	Trust represents a significant and positive relationship with the success of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.	Supported
H2	Trust represents a significant and positive relationship with higher skilled virtual teams that have been newly established in Ireland during the COVID-19 pandemic.	Partially Supported

- | | | |
|----|---|----------|
| H3 | Trust represents a significant and positive relationship with the size of virtual teams that have been newly established in Ireland during the COVID-19 pandemic. | Rejected |
| H4 | Trust represents a significant and positive relationship with the established duration of virtual teams that have been newly established in Ireland during the COVID-19 pandemic. | Rejected |

Chapter 6. Analysis and Discussion

This chapter examines and explains the data analysis from the survey results and, using logic, attempts to relate these findings to the real-world context of firms using virtual teams. This study offers intriguing insights into the aspects that positively impact the success of virtual teams. This research focuses on trust within virtual teams, understanding the relationships with success, ability, team size and team age. The empirical data offers a foundation for addressing the structures and interventions that businesses may utilise to improve the efficacy and performance of their virtual teams.

6.1 Trust

The literature review identified trust as one of the most widely researched areas within the subject of virtual teams. It was proposed that levels of trust are generally high in virtual teams, even when the teams are relatively new. This is achieved through what Jarvenpaa and Leidner's call a swift trust model (1998), which proposes that where there is little time to create trust, individuals think that others are trustworthy from the outset.

This was indeed the case with the study which showed participants rated trust within their team with an average score of approximately 0.72, indicating the team leader ranked the levels of trust moderately high within the virtual team. This would suggest that on average the team leaders surveyed considered their teams to be moderately trustworthy. With a standard deviation below 0.21, the results surveyed appear to be stable and therefore reliable.

Issues around a lack of trust in teams was found to result in uncomfortable and negative feelings towards managers, as well as damaging collaboration and team relationships (Chen, Sriphon and Kyriakopoulos, 2021). In an environment where a flexible and adaptable workforce is crucial the ability to be able to work virtually is important. Recent research in the subject found that one of the key reasons cited by Irish employers for preventing their employees from working remotely was a lack of trust (McCarthy *et al.*, 2020).

Much research focused on the difficulties in quantifying trust levels (Coppola, Hiltz and Rotter, 2004; Rusman *et al.*, 2010) and this became a challenge in this study. Through adapting questionnaires from studies of Jarvenpaa and Leidner (1998) and Mayer and Davis (1999) the researcher attempted to measure trust using a quantitative analysis. Further the relationships of trust with team success, team ability and team age where all investigated.

6.2 Team Success

The literature review concluded that similar characteristics associated with the success of conventional teams are required for virtual team success (Bergiel, Balsmeier and Bergiel, 2008).

The researcher tested the hypothesis that trust represents a significant and positive relationship with the success of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

Success questions had a computed mean of approximately 0.81, indicating the average response from participants was to agree with success ranking questions. This would suggest that on average the team leaders surveyed considered their virtual teams to be successful.

Further, the statistical analysis identified it as a key predictor of virtual team success, supporting the hypothesis. Further, it presented the strongest correlation of all relationships analysed with a strong and significant positive correlation coefficient.

This would suggest that where trust exists within a virtual team, the likelihood of success in the team increased. These findings might be attributed to some degree on the positive relationship between trust and knowledge sharing within virtual teams (Connelly *et al.*, 2019).

6.3 Team Ability

Individuals highly skilled in areas such as leadership, technology (or digital proficiency) and communication are helping accelerate the transition to a virtual workplace (Jarvenpaa and Leidner, 1998).

Virtual teams tend to create a more difficult environment for understanding and recognizing the behaviour of team members (Purvanova, 2008) implying the need for highly skilled individuals. Further, existing studies compared leadership between both highlight that conventional teams experience relatively more effective leadership (Judge and Bono, 2000).

This study looked to test the hypothesis that trust represents a significant and positive relationship with higher skilled virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

Skills questions had a high scoring amongst survey participants, indicating the average response was to rank the levels of skills high within the virtual team. This would suggest that team leaders surveyed generally considered their teams to be well skilled.

The statistical analysis identified it as a low but positive predictor of virtual team success, partially supporting the hypothesis. Intuitively this seemed sensible as a higher level of skills implies individuals might be quicker to adopt technologies to facilitate virtual working. Tools such as collaboration tools, document sharing, document cocreation, meeting tools, project management tools, and social networking can all be used to improve the efficiency of these teams (Gilson *et al.*, 2015). Further, they may help the process of knowledge sharing which may have a positive relationship with trust within virtual teams (Connelly *et al.*, 2019).

6.4 Team Size

Interestingly the researcher did not find much research on the topic of how trust might be affected by the team size for virtual teams. It was considered that by understanding this relationship the researcher could prescribe guidance on the optimal size to maximise levels of trust.

The sample of the virtual teams surveyed were uniformly spread by size between less than 10, less than 20 and greater than or equal to 20. The number exceeding twenty was surprising and this may indicate team members were including members of sub teams. Alternatively, this might be a result of

the purposive sampling performed which targeted contacts through LinkedIn. Those working in larger organisations may be more likely to have bigger teams. They may also have a greater online presence due to the size as an employer.

The hypothesis tested was that trust represents a significant and positive relationship with the size of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

However, this hypothesis was rejected with low correlation coefficients indicating no relationship between the two variables. This might be explained by the virtual nature of the teams meaning that relationships are formed through technological means and so more scalable than traditional face to face interactions. This might also be a result of Jarvenpaa and Leidner's swift trust model (1998), given it assumes trust will be assumed until it can be validated.

6.5 Team Age

The researcher also did not find much research on the topic of how a team's age might be affected by the team size for virtual teams. It was considered that by understanding this relationship the researcher could prescribe guidance on how to manage virtual teams of age suitably to allow for the different profiles of trust they may exhibit.

The hypothesis tested was that trust represents a significant and positive relationship with the age of virtual teams that have been newly established in Ireland during the COVID-19 pandemic.

However, this hypothesis was rejected with no material correlation coefficients indicating no relationship between the two variables. After much analysis it became clear that this was indeed supported by literature on the subject. In particular it appears to correspond with Jarvenpaa and Leidner's swift trust model (1998). Within virtual teams where there is little time to create trust, the model suggests that individuals think that others are trustworthy from the outset.

6.6 Reflection Research Process

Although this research did not provide substantial findings, it does add to the existing body of knowledge in other ways. This research may, for instance, support the findings indicating a favourable correlation with the success of virtual teams (Furumo, 2008). It may help support findings linking knowledge sharing, to trust within the organisation (Connelly *et al.*, 2019)

Also, it supports the findings of Jarvenpaa and Leidner's swift trust model (1998). This proposes that in contexts where there is little time to create trust, individuals think that others are trustworthy from the outset. In this experiment, Hypothesis 3 and 4 tested the relationships of employment duration and age of the virtual team with the levels of team trust. Both hypotheses were rejected, emphasising that trust had no correlation with these variables. The rapid development of trust between the teams implies that a high degree of trust existed from the start. However, it should be noted that only at the conclusion of the experiment was trust assessed.

6.6.1 Measurements

Concerning the survey, many issues arose. Initially, a few respondents encountered uncertainty about whether and in which context they should answer the questions. Many organisations have complex structures, allowing people to serve on various teams with varying responsibilities. One may, for instance, be the team leader of one team and a member of another team comprised of team leaders in a certain business sector. This may have resulted in some unexpected responses such as the 31% of participants stating that their team size was greater than 19 members. However, this is not expected to materially influence most of the survey findings, since the participants at least acted as team leaders of virtual environments within some capacity. The exception to this may be Hypothesis 5 which looks for correlations between trust and team size.

After sending out the survey, several respondents remarked that the questions were phrased too academically, making some comments difficult to comprehend or requiring careful reading. Nonetheless, a large proportion of the

team leaders surveyed would be expected to have an academic background, so most respondents should be able to grasp the questions.

Some participants commented on confusion around the question concerning the age of the virtual team: "How long has your team worked remotely?" While some interpreted this to mean how long have, they been working remotely in this team others interpreted it as how long has the team worked remotely which may be greater than the individual's employment term. Given that either interpretation would have aligned with the hypothesis in question it was decided to include this in the study. However, this does serve as an important lesson for future studies, in which it will be necessary to be more detailed.

6.6.2 Quality Indicators

This study cannot be extrapolated to all virtual teams since it was carried out only on Irish conventional teams converted to virtual since the COVID-19 pandemic. To maximize the number of survey participants, it was necessary to use the snowball method. The survey was only available for a period of four weeks (14/06/2022 – 14/07/2022) to allow for a thorough analysis of the online questionnaire's findings. Due to a lack of time and resources to perform a probability sample of the full population of Irish virtual team leaders, non-probability purposeful and criterion sampling was used for this study. This may cause the validity of the results to be questioned since they are not typical of the whole sample

Therefore, the study's external validity is relatively poor. Nonetheless, the research provides insights into how success is influenced by team trust in virtual teams within a particular environment, along with the impacts of ability, team size and team age on the levels of trust. These are crucial insights not just for the participating organization, but also for the virtual team research field since they form a basis for future studies.

The study focused on the perspective of the team leader when assessing the levels of trust, success, and ability. These are all subjective measures calculated based on how the team leaders perceive them. Actual quantifiable

measures would have been far more difficult to collect within the study timeframe. Therefore, the team leader was considered the most appropriate individual to assess these. Since the manager would be assessing each of the measures it was expected that any problems with the measures would be consistent for each measure. For example, an individual who underestimated the levels of one measure might be expected to consistently underestimate others, diminishing the impact.

Further, while assessing the results of the individual trust questions it was noted that correlation coefficients for questions 10 and 11, were particularly low with values of 0.01 to 0.46 respectively. This may have resulted from how the questions were worded with both questions alluding to trust in a less obvious manner. This may indicate that more attention should be paid to the wording of questions with future studies, or that in person interviews could be used to help avoid any confusion with questions.

Chapter 7. Conclusion

This chapter concludes the study by providing a summary of the key results and answers to the research question. It ties the results to the research objective, recognizes the study's shortcomings, and makes suggestions for future research.

7.1 Response to Research Question

The primary research aim was to conduct research that would add to the existing body of knowledge and provide organizations with a deeper understanding of the role of trust within virtual teams

The findings reveal that trust has a considerable influence on virtual teams. This is not a surprise, with the literature review identifying it as one of the most widely researched areas of virtual teams. Research as early as 2008 (Furumo, 2008) had proposed a strong correlation between trust and the success of virtual teams. However, there were seen to be significant challenges faced when assessing teammates' trustworthiness (Jarvenpaa and Leidner, 1998).

Under Hypothesis 1, the researcher evaluated the relationship between trust and success in the virtual teams and concluded that there was a strong positive relationship. This would suggest that where trust exists within a virtual team, the likelihood of success in the team increased. These findings might be attributed to some degree on the positive relationship between trust and knowledge sharing within virtual teams (Connelly *et al.*, 2019).

The secondary aim was to identify potential research gaps worthy of additional investigation with respect to the relationship between trust and virtual teams. After completing the literature review the researcher decided to look at the relationships between trust and each of the 'level of virtual team skills', the virtual 'team size' and the 'age' of the virtual team. These were all areas that did not appear to be well researched within existing literature and therefore offered a good opportunity to identify new findings and future areas of research.

Hypothesis 2 evaluated the relationship between trust and higher skills within a virtual team. The study concluded that there was a moderate positive relationship with a high likelihood. Intuitively this seemed sensible as a higher level of skills implied individuals might be quicker to adopt technologies to facilitate virtual working. Tools such as collaboration tools, document sharing, document cocreation, meeting tools, project management tools, and social networking can all be used to improve the efficiency of these teams (Gilson *et al.*, 2015). Further, they may help the process of knowledge sharing which may have a positive relationship with trust within virtual teams (Connelly *et al.*, 2019).

Hypothesis 3 investigated the relationship between trust and the size of the virtual teams. Intuitively it might be expected that smaller teams might have formed stronger relationships and therefore have higher levels of trust. However, this hypothesis was rejected with no relationship appearing between the two variables. This might be explained by the virtual nature of the teams meaning that relationships are formed through technological means and so more scalable than traditional face to face interactions.

Hypothesis 4 investigated the relationship between trust and the age of the virtual teams. One would expect that teams which are older would have higher levels of trust. However, this hypothesis was rejected with no relationship appearing between the two variables. This might be explained by Jarvenpaa and Leidner's swift trust model (1998), which proposes that where there is little time to create trust, individuals think that others are trustworthy from the outset.

7.2 Research Limitations

A survey was used as the research instrument, which has its own constraints. Although every effort was made to formulate questions as clearly as possible, some may still be up to interpretation. This was particularly evident with trust questions 10 and 11 which did not correlate as expected with other trust questions.

This study is based on a relatively small sample of managers leading virtual teams in Ireland. Other than the initial communications no real validation was possible to ensure participants adequately met the criteria. While this is not ideal, this does provide sufficient data to get significant insights into the impact of trust relationships on the success of virtual teams and to further assess how a team's ability, size and age may impact trust levels. Virtual teams are becoming more prominent within organisations since the pandemic, and further study is necessary to acquire a deeper knowledge of the ever-evolving dynamics experienced.

Regarding the survey's limitations, a potential drawback was the sample size, since it was unable to discern patterns and recommendations based on a relatively small sample size and hence lacks statistical power. Although the comments presented are valuable, further study may be undertaken.

Additionally, several validity concerns must be addressed. Since the sample was comprised of volunteers from the researcher's personal network, there is a possibility of participant bias. In addition, since participants were aware that they connected with individuals from the researcher's network, it is possible that social desirability bias had a role in their responses to the survey.

Further, the study is constrained by an Irish viewpoint, since the bulk of research participants were Irish team leaders working in Irish virtual teams. As such, although the replies may be relevant to people from various cultures, more study with a wider population is required to validate findings.

7.3 Future Research

A area for future study would be to expand the number of participants and controls so that participant characteristics, especially those connected to the virtual team, are matched with the variables, which may provide wider findings. In addition, future study should adopt a more valid instrument for evaluating Virtual Team trust to enhance the findings.

This could also be extended to qualitative research, such as semi-structured interviews, to examine the composition, structure, and communication channels

of virtual teams in more detail. Other aspects, such as knowledge sharing, communications, individual motivation and dedication, team member empowerment, and team leadership, may impact the team members and the efficient functioning of virtual teams. An awareness of the organizational cultures in which virtual teams work may help improve comprehension of the factors that influence virtual team performance.

7.4 Organisational Implications

Trust is crucial for organisations with virtual teams since conventional social control is replaced with self-direction and self-management. It is often considered the cornerstone of successful relationships, and for virtual teams to be successful, they must create and cultivate their connections with great care and purpose.

Although many limitations exist with this research, it does provide an interesting insight into the role of trust within virtual teams. Ideally organisations would use this study to better understand how improving trust within a virtual team can help improve the success of the team. Themes like the level of skills, team size and team age should allow team managers build virtual teams that will foster the development of trust. Insights can also be gathered from themes explored through the researcher's literature review such as the role of knowledge sharing, positive leadership, and communications.

Leaders across the organization can supports strategies for developing a trust culture within teams. With the learnings from this study, organisations can continue the rapid progression from conventional to virtual working in a sustainable manner while improving the virtual teams and organisations chances of success.

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Appendix A. Survey Cover Letter

MBA Thesis Questionnaire - Virtual Teams

Dear Sir/Madam

I am currently undertaking a Master of Business Administration at the National College of Ireland. To complete my dissertation, I must conduct research on a certain topic. I have chosen to investigate the role of trust in virtual teams. The purpose of this study is to investigate the effect of the COVID-19 pandemic on virtual teams assessing the influence of trust on the team's success.

I would very grateful if you could complete this survey. Participation is entirely voluntary, and all information supplied will be kept strictly confidential. The data obtained will be incorporated into my dissertation, from which I will draw findings and provide suggestions regarding this issue. You will have the right to withdraw from the study at any point. If you like to view the findings, please contact me at the email address shown below.

This questionnaire may be completed entirely online and should take no more than a few minutes to complete. I would really appreciate it if you could answer all questions by the deadline of 14th of July 2022.

Thank you for your participation,

Appendix B. Survey Questions

B.1 Background Questions

How long have you worked at your company?

- < 6 months
- 6 months to 1 year
- 1 year to 2 years
- > 2 years

How long has your team worked remotely? (Including partially remote)

- < 6 months
- 6 months to 1 year
- 1 year to 2 years
- > 2 years

How many employees work in your team?

- 0 - 5
- 6 - 10
- 11 - 19
- 20+

B.2 Ranking Questions

Adapted from the research of Mayer and Davis (1999)

Capability - Team members are very capable of performing their jobs

- Strongly disagree

- Disagree
- Neutral
- Agree
- Strongly agree

Knowledge - Team members have much knowledge about the work that needs to be done

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Skills - I feel very confident about team members' skills

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Skills - Team members have specialized capabilities that can increase the overall team performance

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Qualified - Team members are well qualified

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

B.3 Trust Questions

Adapted from the research of Jarvenpaa and Leidner (1998) and Mayer and Davis (1999)

I generally wouldn't let other team members have any influence over issues that are important to work deliverables

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

I would be comfortable giving other team members complete responsibility for the completion of important work deliverables

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

I would be comfortable giving other team members a task or problem which was critical to a work deliverable, even if I could not monitor them

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

I can rely on those with whom I work in this group.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Overall, the people in my group are very trustworthy

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

There is a noticeable lack of confidence among those with whom I work

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

Appendix C. Survey Results

C.1 Grouped Responses

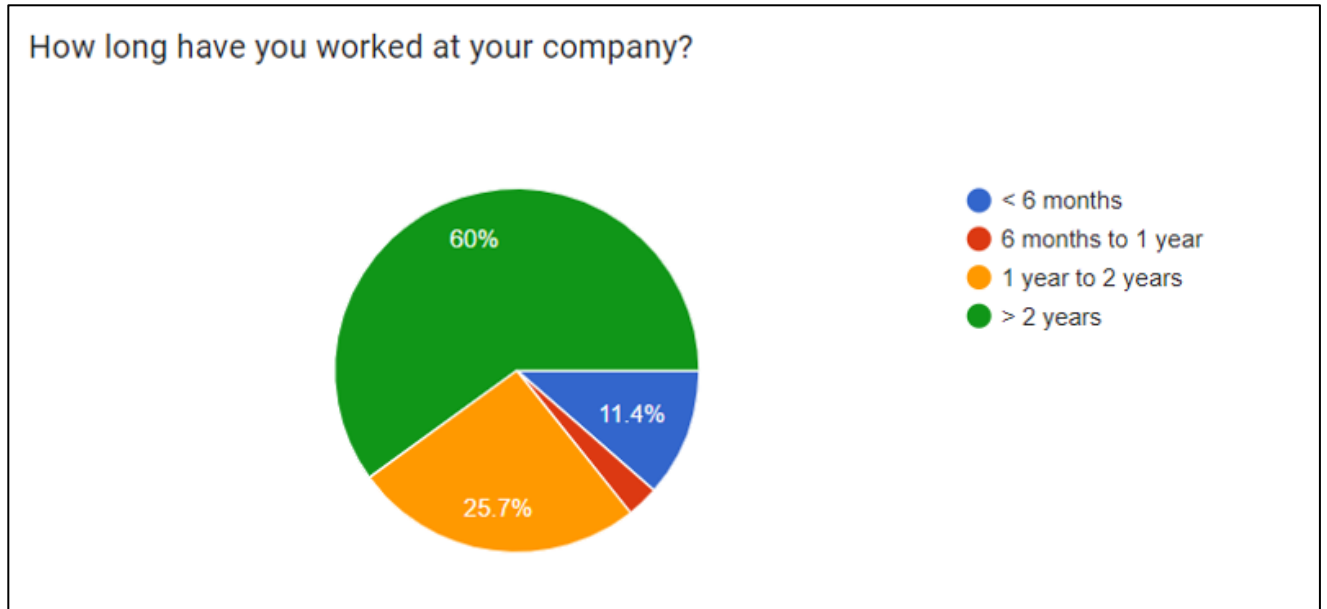


Figure C.1: Experience in Company

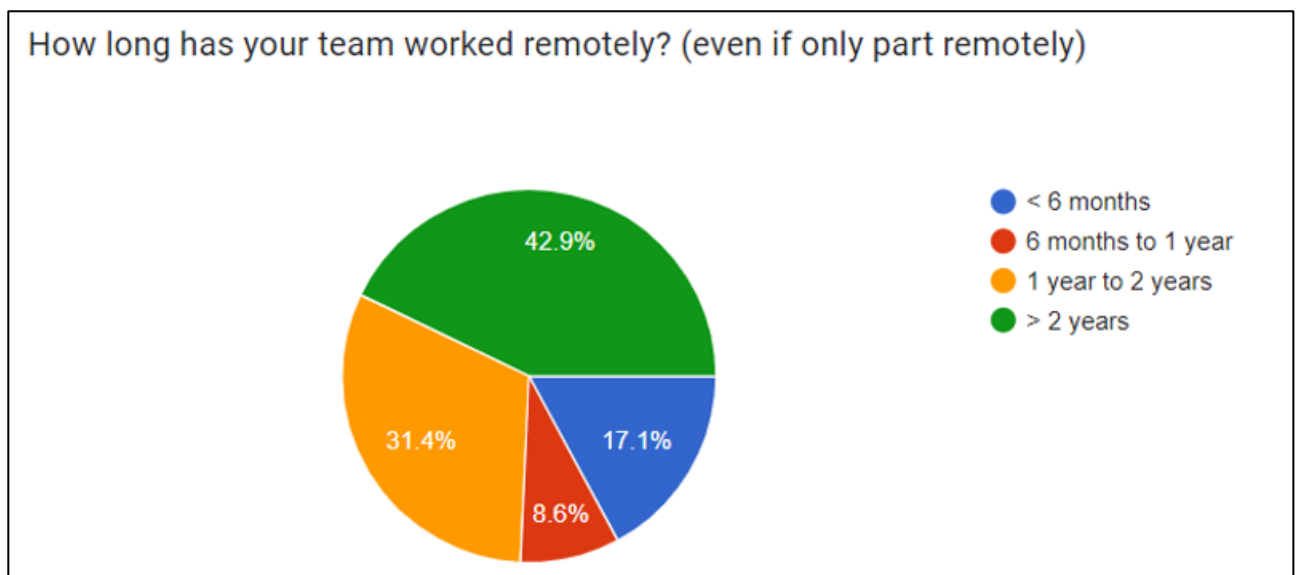


Figure C.2: Experience in Virtual Team

How many employees work in your team?

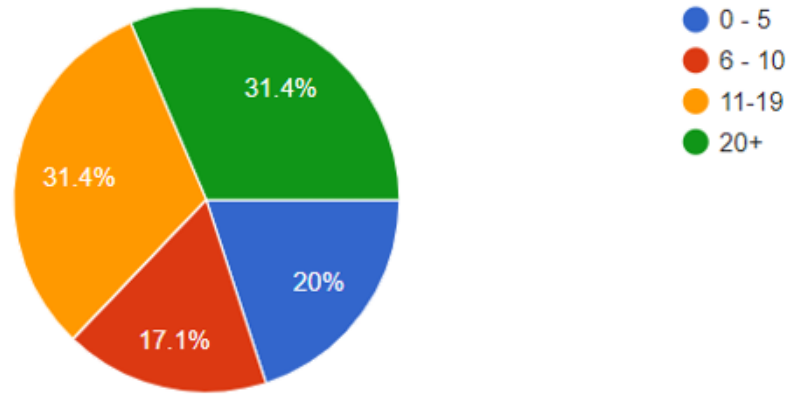


Figure C.3: Size of Team

Team members are very capable of performing their jobs

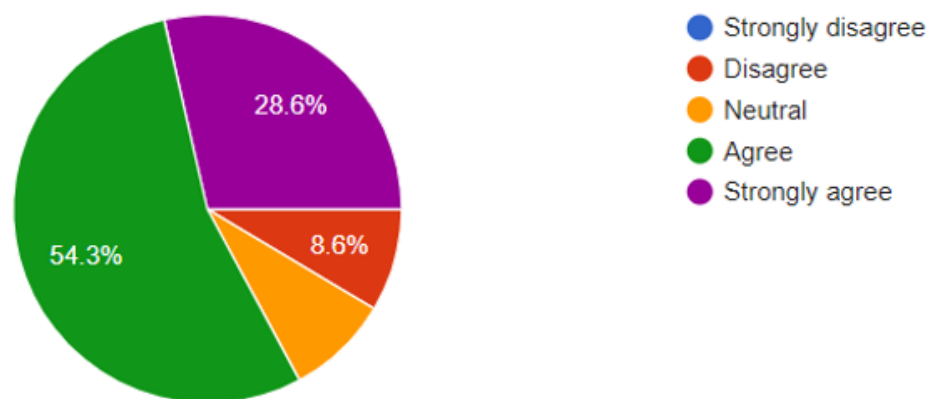


Figure C.4: Team Capability

Team members have much knowledge about the work that needs to be done

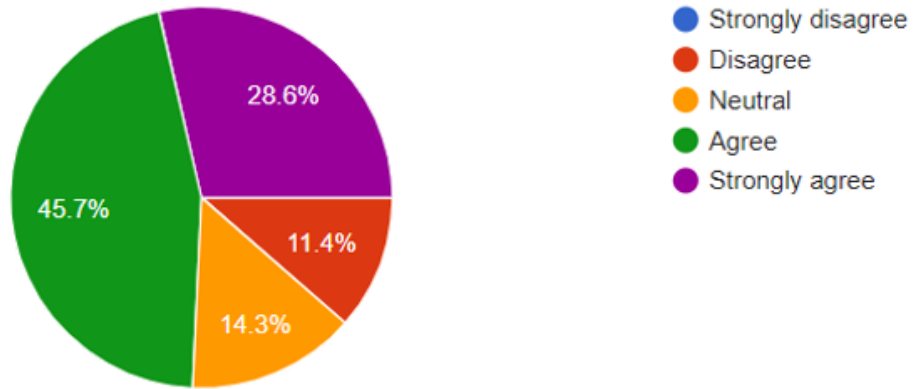


Figure C.5: Team Knowledge

I feel very confident about team members' skills

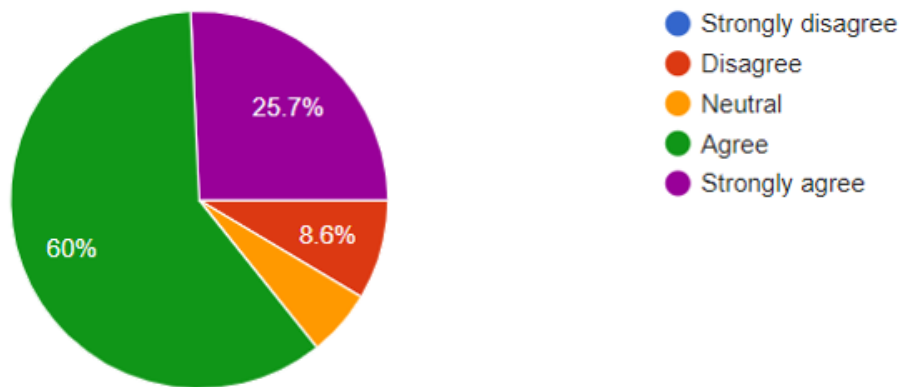


Figure C.6: Team Skills

Team members have specialized capabilities that can increase the overall team performance

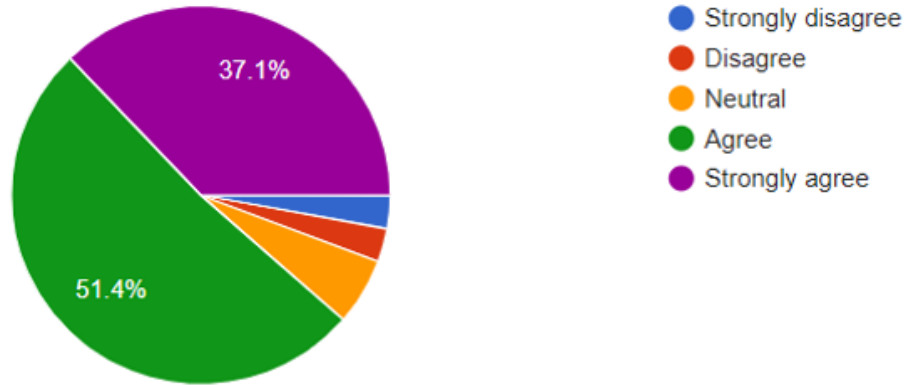


Figure C.7: Team Specialized Capabilities

Team members are well qualified

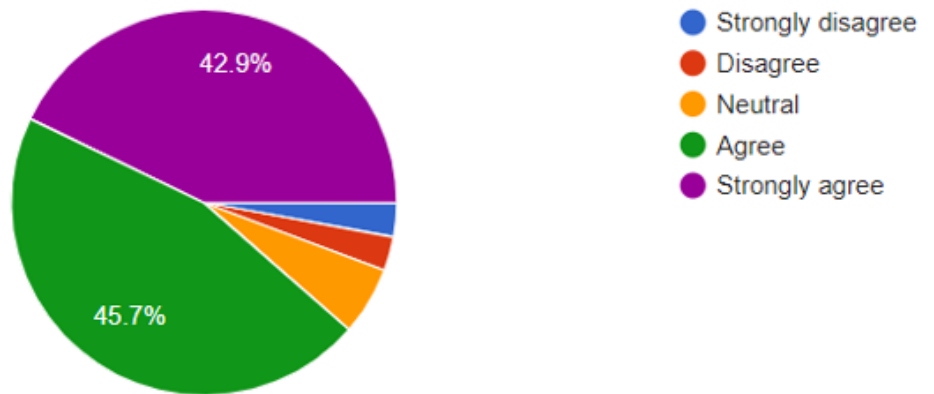


Figure C.8: Team Qualifications

I generally wouldn't let other team members have any influence over issues that are important to work deliverables

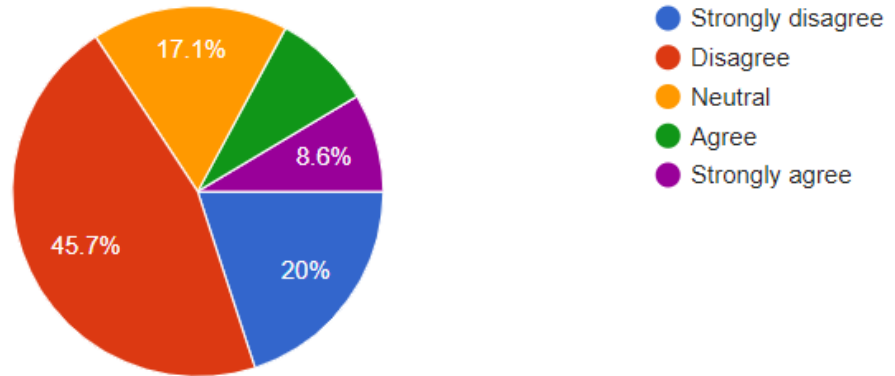


Figure C.9: Trust - Deliverables

I would be comfortable giving other team members complete responsibility for the completion of important work deliverables

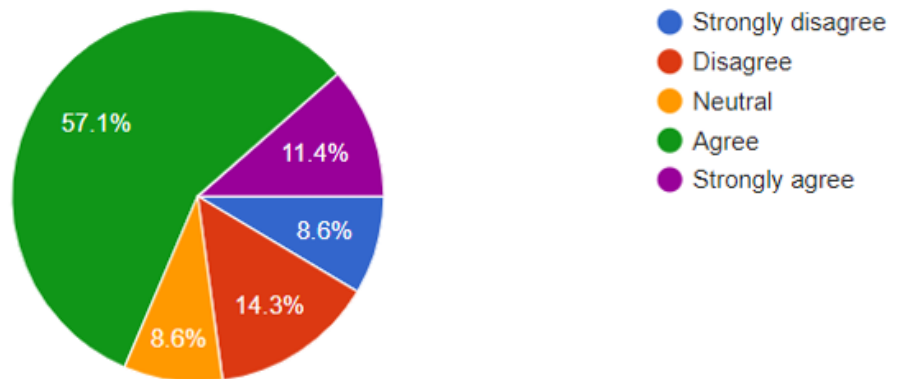


Figure C.10: Trust - Complete Responsibility

I really wish I had a good way to oversee the work of other team members

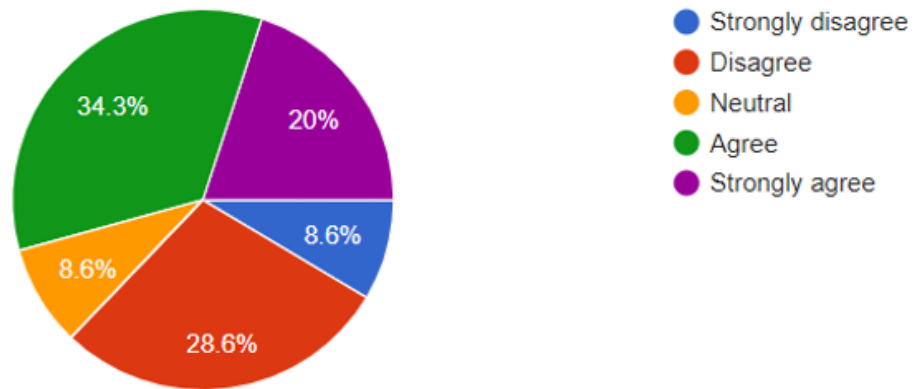


Figure C.11: Trust - Oversight

I would be comfortable giving other team members a task or problem which was critical to a work deliverable, even if I could not monitor them

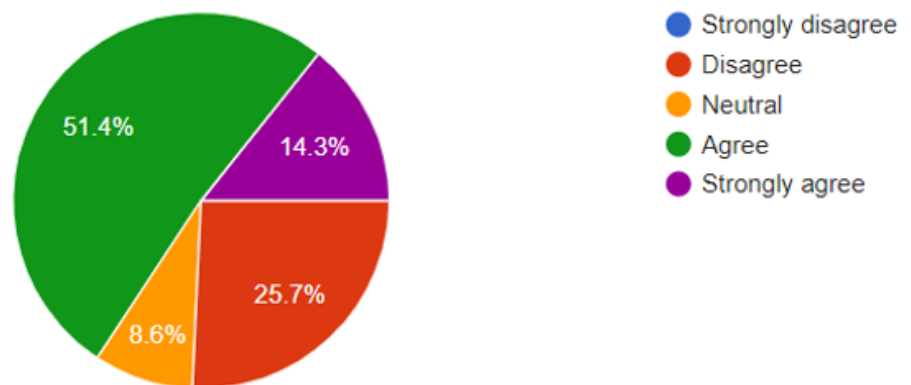


Figure C.12: Trust - Unmonitored Tasks

I can rely on those with whom I work in this group

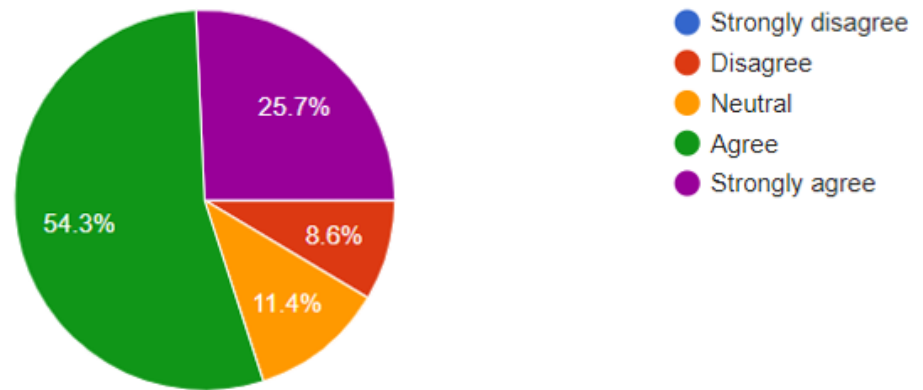


Figure C.13: Trust - General

Overall, the people in my group are very trustworthy

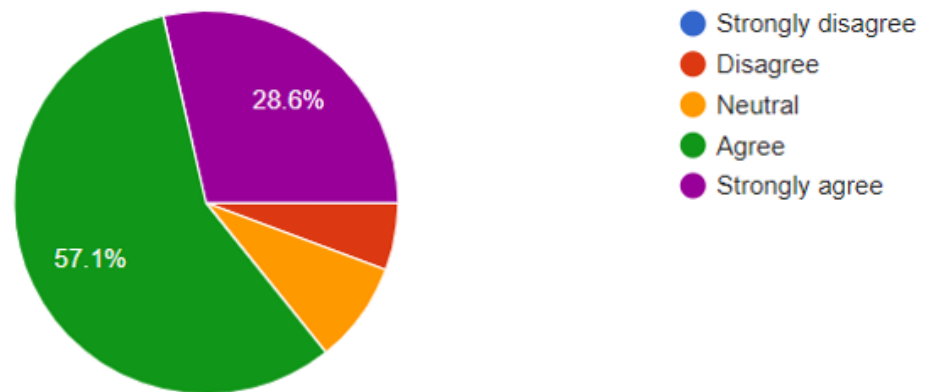


Figure C.14: Trust - Personal

There is a noticeable lack of confidence among those with whom I work

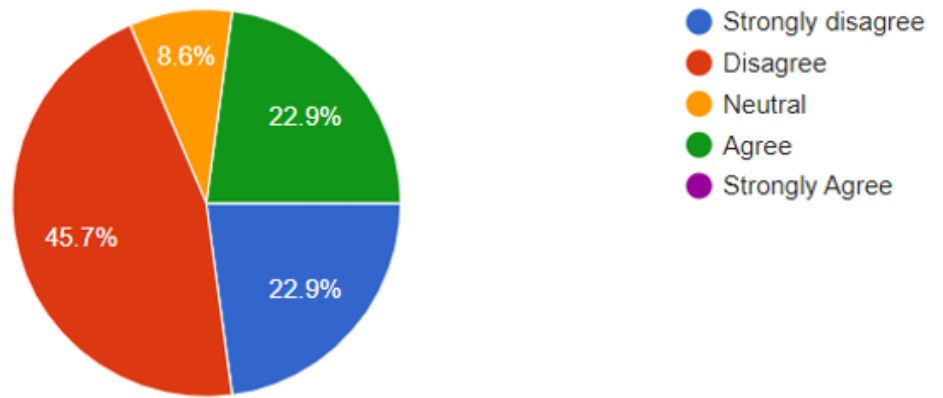


Figure C.15: Trust - Confidence

C.2 Descriptive Statistics

<i>Trust Measure</i>	
Mean	0.716209
Standard Error	0.014625
Median	0.742857
Mode	0.771429
Standard Deviation	0.149141
Sample Variance	0.022243
Kurtosis	0.280846
Skewness	-0.78602
Range	0.6
Minimum	0.342857
Maximum	0.942857
Sum	74.48571
Count	104

Table C.1: Trust Measure

<i>Success Measure</i>	

<i>Mean</i>	0.805769231
<i>Standard Error</i>	0.01532733
<i>Median</i>	0.8
<i>Mode</i>	0.8
<i>Standard Deviation</i>	0.156308708
<i>Sample Variance</i>	0.024432412
<i>Kurtosis</i>	0.900858397
<i>Skewness</i>	-0.983885431
<i>Range</i>	0.6
<i>Minimum</i>	0.4
<i>Maximum</i>	1
<i>Sum</i>	83.8
<i>Count</i>	104

Table C.2: Success Measure

<i>Skills Measure</i>	
Mean	0.821153846
Standard Error	0.014178598
Median	0.8
Mode	0.933333333
Standard Deviation	0.144593892
Sample Variance	0.020907394
Kurtosis	1.887371977
Skewness	-1.256981167
Range	0.6
Minimum	0.4
Maximum	1
Sum	85.4
Count	104

Table C.3: Skills Measure

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	21.16686	104	0.203527	8.44831	2.73E-85	1.252823
Columns	8.17	11	0.742727	30.83019	2.15E-57	1.797006
Error	27.56	1144	0.024091			
Total	56.89686	1259				
	Cronbachs Alpha		0.881633			

Table C.4: ANOVA – Survey Responses