

Running head: AGILE PRODUCT DEVELOPMENT SUCCESS

THE IMPACT OF CUSTOMER COLLABORATION ON AGILE PRODUCT
DEVELOPMENT SUCCESS IN TECHNOLOGY STARTUPS WITHIN THE PACIFIC
NORTHWEST

by

Chad Thompson

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Liberty University, School of Business

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Abstract

While agile software development is being adopted in more organizations recently, many products using the methodology are still failing in the market due to inadequate customer collaboration despite the purported benefits. Within start-ups, where speed and early market penetration can be the death or success of a company, understanding if using agile software development including adequate customer collaboration makes a significant difference is important. A study which investigates the impact of including customer collaboration in the agile product development process could uncover whether or not a product is successful within technology focused start-up's in the Pacific Northwest. This research could allow technology focused start-ups to learn how to emulate success and avoid pitfalls using agile software development to create better, more transformative products for the world. The research question is: how does the inclusion of customer collaboration in the agile product development process by product owners impact the overall success of the product within Pacific Northwest technology start-up companies? This concept paper includes information on the nature of the study, the significance, relationship to cognate, a literature review beginning, and a significant amount of research related to the hypothesis.

Keywords: agile, product development, voice-of-the-customer, Pacific Northwest, startup, stable team, company success, project success, success metrics

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Dedication

I dedicate this work to my wonderful wife Jenn who has endless love and infinite patience with me and my fantastic kids Haley, Alana, and Aiden. May you never give up on your dreams.

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Professionally, thank you to Dr. Maddox for your patience and guidance throughout this entire process, Dr. Powell for your steering, and Dr. Moore for your sage and sometimes humbling feedback.

Personally, thank you to my Mom and Dad for planting a seed of curiosity in me that has continued to grow. Thank you for the years of support and love that I can never repay.

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Most of all, thank you to God for giving me the life and means to pursue this passion for my studies both of this world and spiritually. My only hope is that one day I will hear the words in Matthew 25:21, “Well done, good and faithful servant.”

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Section 1: Foundation of the Study

Information technology (IT) projects are how most companies organize their resources to achieve a specific outcome that will further enhance the organization. The completion of these projects ensures that the company employees have the technology they need to do their job well. Within IT, these various initiatives are grouped into projects and given to a team to drive the completion of those projects. Across the industry however, the success of these IT projects is historically low (Sanchez, Terlizzi, & Moraes, 2017). This study will examine if the success rate improves when Agile software development process, including customer collaboration, is used in conjunction with the project.

The study will review the background of the problem and then outline the general/specific problems, the purpose statement, research questions, the nature of the study, the conceptual framework, definition of terms, implications for biblical integration, relationship to the marketing field of study, and finally a literature review. The literature review will tie back to the variables outlined in the conceptual framework as well as the theory and themes included in the study. At the end of this study, it is expected that the findings will demonstrate whether or not success rates improved when using Agile product development and customer collaboration within the specific audience of technology-based start-up companies in the Pacific Northwest.

Background of the Problem

Start-up companies around the world rely on their speed and innovation to outperform their larger competitors in markets (Lechner & Gudmundsson, 2014). Getting to market fast can make or break companies overnight as the first to a market with a major transformative product can revolutionize the industry. Start-ups need to be able to develop faster than ever before to be first yet still deliver a quality product that the market can consume consistently and effectively.

Since the 1970s when Winston Royce created the first waterfall model, product developers mainly relied on waterfall methodologies for software product development where all requirements were documented upfront and the product went through various stage gates in order to get the product launched (Stoica, Ghilic-Micu, Mircea, & Uscatu, 2016). While this methodology allowed for control of requirements and a structured product launch, it compromised requirement flexibility and speed as making changes in this model was cumbersome. Each change also resulted in significant delays to getting the product out the door as well (Baseer, Rama, & Shoban, 2015).

In today's continually evolving market, software developers have turned to a different methodology in order to increase their effectiveness. Agile started in February of 2001 when 17 software development organizations collaborated to create a more lightweight method to develop projects (Stoica, Ghilic-Micu, Mircea, & Uscatu, 2016). The team created the 12 principles of the Agile Manifesto which represented a significant change to the waterfall software development methodology (Denning, 2015). This new software development methodology has allowed companies to get products out the door faster by allowing developers to produce code in bite sized chunks versus waiting for everything to be complete before launching (Pedersen, 2013).

While this new agile methodology enables companies to get products out the door faster in theory, the speed can potentially come at the expense of quality, reliability, and overall customer satisfaction. There are many risks that also need to be considered when using agile such as technical debt, separation of software developer and operations process, and increased defects, unstandardized tools, and knowledge transfer (Elbanna & Sarker, 2016). How effective

agile software development is can be subjective to the company, leadership, and specific team that is implementing it.

Problem Statement

The general problem to be addressed is the high failure rate of technology based product development projects resulting in loss of revenue and profits. Serrador and Pinto (2015) found that 70% of technology-based projects and programs fail, meaning that the very few actually succeed. Sanchez, Terlizzi, and Moraes (2017) on the other hand found that only 19% of all technology based projects fail. While this is lower than 70%, no executive leader would want to see such a high failure rate. In general, the Standish Group results are that well over half of technology projects are not delivered successfully but the trend continues to improve slightly (Hughes, Rana, & Simintiras, 2017). Agile development processes can improve project success (Williams, Ariyachandra, & Frolick, 2017). The specific problem to be addressed is the failure rate of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest.

Purpose Statement

The purpose of this qualitative, case study is to analyze the impact of customer collaboration on agile product development success within start-up technology companies within the Pacific Northwest. According to Hoda, Noble, and Marshall (2011), lack of customer collaboration was found to be one of the biggest challenges faced by agile product teams within 16 software development companies within New Zealand and India. The intent of the study is to evaluate whether customer collaboration is also a driving indicator of agile product development team success for start-up technology companies within the Pacific Northwest. Results from the

case study interviews will be used to determine if customer collaboration does play a role in start-up technology company success within the Pacific Northwest.

Nature of the Study

To analyze the failure rate of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest, a qualitative study will be used. Creswell (2014) stated that qualitative studies are used to study life experiences and help interpret them using a consistent framework. Alternatively, quantitative studies are more formal and objective with a hard science viewpoint. To effectively study the problem statement and research questions, using a qualitative study will more closely align with the expected outcomes of gaining insight in a deep field with no definitive answers.

The focus of this study is to develop theory based on individual's interpretation of their experiences which is more closely aligned to qualitative studies. According to Stake (2010), qualitative studies can be subjective in nature using observation, inductive reasoning, and a holistic approach to develop a theory about a complex and broad topic. The theory in this case is whether or not customer collaboration impacts product success rates when using agile product development within a specific region, industry sector, and company size.

By employing a qualitative research method to collect data from the participants, individual interviews will be conducted to understand each experience and try to correlate themes from them. According to Bryman (2006), qualitative research is about gathering non-numerical data to gain an understanding of motivations, opinions, and reasons for an experience. There are various reasons that made the researcher use this method. One of them is that it allows evaluation of the subject's experience with greater depth. This is because qualitative research

places less focus on the metrics of data compared to quantitative research. This allows a researcher to have an in-depth analysis of the events.

Another reason for choosing this method is that it allows for a dynamic structure that suits the situation. Gathering of data through this method is based on interviewing people's experiences and observations. This enables a researcher to follow events to try and piece together the soft science of why things happened the way they did. Qualitative research allows incorporation of data complexities into generated conclusions. A researcher can use gathered data to generate conclusions with more accuracy and depth and hence why this study type is beneficial.

Qualitative research was also used for this study because it promotes creativity. This method encourages the researcher to be creative when gathering information. In return, information obtained will lead to better outcomes because it will be more accurate versus trying to fit it into a closed feedback loop of some kind like a survey. Additionally, qualitative research ensures the possibility of attitude explanations which gives the researcher more insight into why something was done.

The quantitative research method was not chosen because it is more objective in nature with more controls. This analysis will be incompatible with a quantitative study because there will be no hard way to use statistics to analyze it. This method requires researchers with hard data for statistical analysis because it is based on scientific discipline. Difficulty in data analysis is the reason why this method was not chosen as a researcher will not be able to take an event and plot it.

Quantitative studies were also not used in this research because they commonly ask questions of how much, where, what, who, and how many. Unlike quantitative methods, case

studies are used in answering questions of why or how. This researcher chose case studies over other methods because in-depth data collection in a natural setting was required. Additionally, the researcher had little control over events and hence making case studies the best method for collecting data.

Qualitative research was used over mixed methods because there is no room at all for a quantitative design. Mixed methods take elements from both quantitative studies and qualitative studies and puts the design together for a more effective analysis. In this case, there is no data available for a quantitative study so doing a mixed method approach will not be beneficial to the study. In addition, a mixed method is more time consuming and expensive to perform as the researcher must collect both qualitative and quantitative data.

Discussion of Design

According to Creswell and Poth (2018), a case study design focuses on understanding a particular situation rather than sweeping statistical survey analysis. Silverman (2016) defined a case study as an in-depth study of a certain situation to obtain data. Case studies were among the first types of research that were used in the qualitative methodology's field. According to Flick (2018), a case study is a general term used in exploring a phenomenon, group, or individual. It is, therefore, analysis and comprehensive description of an individual case. It is used during analysis and description, for example, this study aimed at analyzing the impacts of customer collaboration inclusion during agile product development within start-up technology companies within the Pacific Northwest.

A case study is the most appropriate design for this research as it will allow the researcher to collect information to answer the problem statement of exploring failure rates of technology based product development projects using the Agile software development process,

including customer collaboration, within start-ups in the Pacific Northwest. This problem is very specific to a particular region, customer type, variable, and process. While the findings should be interesting, it will represent one particular group which aligns with the intent of a case study as well.

A case study also makes the most sense as the design because it allows for collection of a lot of details that would not be easily obtained using other research designs. Data collected from using this method is of greater depth and richer compared to using other experimental designs. This approach is qualitative in nature and results in a narrative description of experience or behavior. Researchers do not use it when making predictions or generalizing truths determining, nor when determining cause and effect. Rather, the case study approach explores and describes a phenomenon. Some of the major characteristics of this approach are that it combines both the subjective and objective data to achieve an in-depth understanding, provides a high level of detail, and is narrowly focused. Additionally, case studies simplify complex concepts. This design allowed the researcher to obtain information on the impacts of customer collaboration inclusion with ease by using companies from the Pacific Northwest as case studies.

Another reason why the case study design was chosen over other designs is that it is more flexible and allows the researcher to explore and discover during the research process. In this study, the researcher intends to explore various factors leading to failure of tech start-ups in the Pacific Northwest. Case studies enable the researcher to gather the information needed accurately from the specific subset of users that fits the profile. The researcher is not only interested in the impacts of customer collaboration inclusion in the process of product development, but also other factors that influence clients to participate in agile product development. Using the case study method was necessary to achieve this objective and hence is

the reason why other approaches were not chosen. Additionally, the case study design is necessary for analyzing behaviors of customers toward new products to determine success which can also be subjective.

There are five types of qualitative methods, but case study design was selected over the others. The methods include ethnography, phenomenological, narrative, and grounded theory (Creswell & Poth, 2018). In ethnography design, a researcher immerses themselves in the environment of target participants to understand their themes, motivations, challenges, cultures, and goals. This design was not chosen because the experiences are from various individuals and not something the researcher could immerse themselves in.

The phenomenological design is used in describing a phenomenon or event activity. This design involves using a combination of methods such as visiting places, watching videos, reading documents, and conducting interviews to understand subjects under study. A phenomenological design was not used in the study because it the study must involve someone else's experience using a process within a particular context to understand the impact to a variable. This is not something a researcher could immerse themselves in.

In narrative design a researcher looks for themes, conducts in-depth interviews, and reads documents. The case study was used over this design because narrative design requires a researcher to conduct interviews over weeks, months, or even years. The time for the research was limited and hence this method was not appropriate. In addition, the case study focuses on a very specific group that went through an experience which a narrative study does not isolate.

Grounded theory is another type of qualitative research method. In this method, a researcher provides a theory or explanation behind the events. This is possible through the use of existing documents and primary interviews to build a theory. The case study was used over

this design because the grounded theory is difficult to manage since it produces large amounts of data due to larger sample sizes and is not specific to a finite set of variables. The intent of this research is to isolate a specific profile with a specific experience, while research questions have been generated, the intent of the research is to review the narratives and build theories around what best explains the experiences as a case study.

Summary of the nature of the study.

While an argument can be made for using both qualitative and quantitative methods, the qualitative method was chosen to specifically develop a theory using a case study. Other methods such as ethnography, phenomenological, narrative, and grounded theory were not selected as a case study design will best help develop theory to explain the problem statement given the specific profile of the researched. Overall, a qualitative method using a case study will be most effective to develop a theory and provide a subjective framework to examine if there is relationship with failure rates of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest.

Research Questions

In order to guide the research, the study will focus on understanding the impact of customer collaboration on agile product development success within start-up technology companies within the Pacific Northwest. The research will measure product success with the input of customer collaboration as part of the agile product development process. This cause and effect relationship on project success rates are the main focus of the study which ultimately produces the below research question including the regional, company size, and industry parameters.

RQ1. How does the use of customer collaboration within the Agile software development process affects project success rates within start-up's based in the Pacific Northwest?

A fundamental tenant of the research is how technology start-ups within the Pacific Northwest define project success. While on-time completion may be valued at a larger company, at a start-up, if the project does not produce enough revenue to continue paying employees then it would not be deemed a success for example. Closing on this definition, which will shift by company, is important for framing the impact on the success rates.

RQ2. How do technology companies define project success?

In order to probe for other impactful variables, the third research question will attempt to isolate other elements that may have been more impactful than customer collaboration. This more open ended question allows the interviewee to express their own thoughts on other elements that were key to the project success. By having both questions around customer collaboration and other key elements, the research should discover a holistic view of what contributed to the higher project success rates.

RQ3. Are there other elements of the Agile software development process that affected project success rates more significantly than customer collaboration within start-up's based in the Pacific Northwest?

Conceptual Framework

There are a large number of concepts and variables that could potentially lead to a product's development success or failure. While customer collaboration in the development phase is certainly one aspect of a product's success, there are several other concepts that must be considered. The three concepts that will be examined here are shared mental models' theory,

stakeholder theory, and coordination theory. Measuring the effectiveness of customer collaboration in the agile product development process in isolation will be difficult at best as a product success could be due to other factors such company promotion or just dumb luck. Alternatively, product failure could be attributed to the economy, disaster, executive scandal or numerous other reasons apart from customer collaboration being omitted. By using a grounded theory design framework, a theory can be created based on the findings if there are other variables that more closely align to the success or failure of a product.

There are many potential variables that dictate product success however customer collaboration in the agile product development process is expected to be one of the main indicators. Ylimäki (2014) found that incorporating customer feedback in a dynamic way allows companies to build long-term success and also build a funnel for new product development collaboration leading to new product development. On the other hand, Tsai's (2009) research indicated that an increasing number of studies have found that customer collaboration networks lead to inconsistent results for product success. This research will ideally provide more definitive results and clarity based on the research question posed. In addition to variables, three main concepts will be examined in relationship to the study.

Shared Mental Models Theory

In cognitive psychology, there is a theory called shared mental models which explores the relationship between shared understanding and team performance (Yu & Petter, 2014). The theory suggests that effective teams operate as a unified information processing unit. With a shared understanding of the work, the team can be more efficient and effective at accomplishing goals regardless of what input was used. The closer aligned the team is, in theory, the more productive the team will be.

Shared mental model's theory explains and predicts these phenomena as individuals can understand their world better by building working schemas. When those schemas are shared with the team, it makes it easier for everyone to get the information they need when it is needed (Maynard & Gilson, 2014). This theory allows team members to move faster because they have a common understanding of the pertinent information as well as make predictions and take action (Johnson-Laird, 1983). This study relates to existing knowledge as if an agile team is able to think the same way, the decision making process is accelerated resulting in products that are more aligned to a common vision.

Agile product development allows teams to align mental models as they have a shared understanding of the work that needs to be done as the team meets daily to review progress, dependencies, and roadblocks (Mckew, 2018). Whether or not the team is incorporating relevant customer feedback, the Agile team will have a common understanding of the goals as set by the product owner. Once these goals are identified and the team iterates to accomplish them, the team can potentially produce higher quality results as there is no misalignment.

Stakeholder Theory

Stakeholder theory suggests that a team's performance depends on how key decision makers address stakeholder interests holistically (Haines, Idemudia, & Raisinghani, 2017). The theory implies that if customer needs are not considered or managed, then the team will have a lower performance towards their goal of product success. This theory can be used in an agile context because how well a team does sometimes depend on the support they receive from key decision makers within an organization. If the decision makers dictate the outcomes to the agile team, then the team will lose valuable input from their true customer base resulting in a product that is misaligned.

Stakeholder theory explains and predicts these phenomena as when all stakeholders are working in unison on a project, they most likely will achieve better results than not (Freeman, Phillips, & Sisodia, 2018). The theory is grounded on dialogue between the stakeholders, participation from the stakeholders, and a procedural justice to ensure the stakeholders are doing what they established they would be (Richter & Dow, 2017). When applied to agile product development, if the stakeholders are integrated into the process, then there should be fewer surprises resulting in a product that most closely aligns to the original need. The study of this theory relates to existing knowledge as agile product development consists of an integrated take of cross-functional owners that come together to work towards a common goal, ensuring all stakeholder needs are integrated into the process is important for the success of the product (Annosi, Foss, Brunetta, Magnusson, & Maskinkonstruktion, 2017).

Agile teams that do not address managerial, customer, stakeholder and other interests could end up not receiving the support or the success they need to continue developing. With iterative releases every sprint, the teams can pivot directions based on latest priorities to follow a changing market or customer direction. Stakeholder theory is common to all Agile teams as each must survive in an often political environment that could change the rules at any point.

Coordination Theory

Coordination theory pertains to how communication flows between software developers and dependencies (Pikkarainen, Haikara, Salo, Abrahamsson, & Still, 2008). This task-resource dependency allows for a consistently defined resource for every task that is being performed. If the software developer understands each piece of what they are doing and why, then agile product teams can ensure that the output is as expected by the end consumer.

Coordination theory explains and predicts this phenomena by attempting to harmonize a team by ensuring there are no gaps in need, no duplication of work, and that teams are achieving objectives in incompatible ways (Clarke & Campbell, 2018). Using this theory, Agile product development teams can work faster and with more efficiency as all efforts are being orchestrated when they need to happen. This allows teams to better align to the central objectives, which should be to provide the customer with a product that they will consume and love.

In Agile development, the better defined the work is with clear linkage of tasks and subtasks, then the less confusion will exist in the outcome. By managing scope clearly and consistently an agile team can produce a higher quality output. The team structure of the Agile product development team allows for more coordination than traditional distributed teams not working in Agile methodologies.

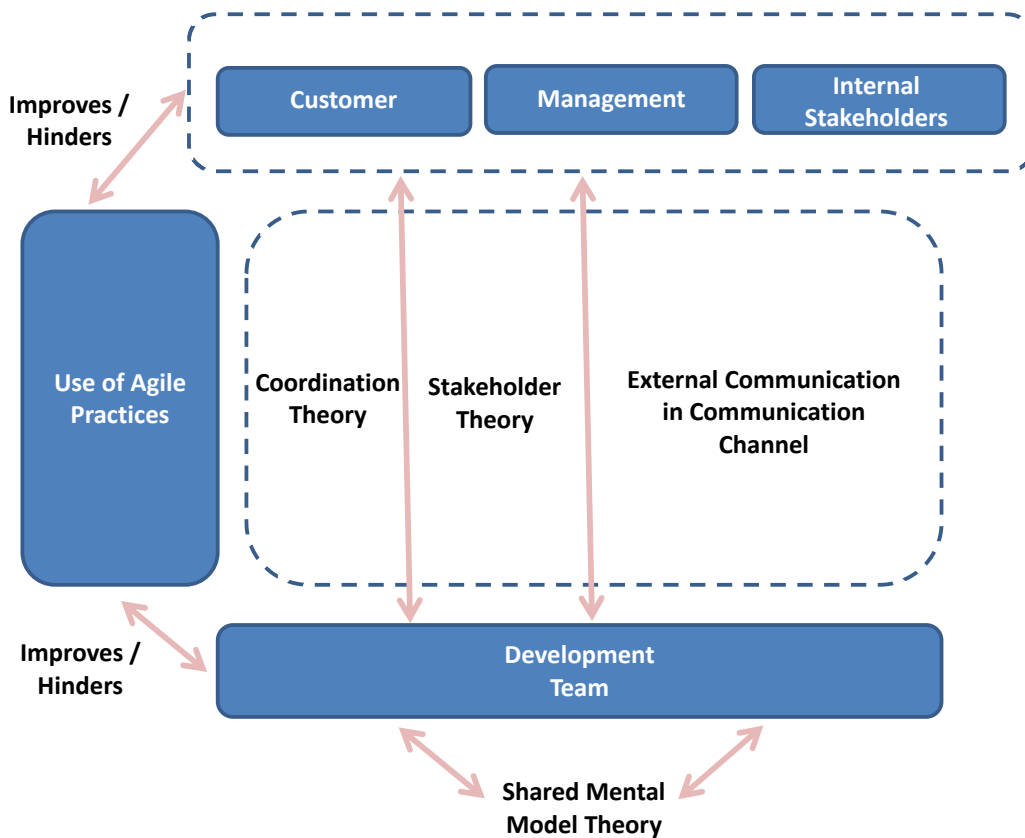


Figure 1. Relationships between concepts.

Discussion of relationships between concepts.

How well an Agile team coordinates between management, customer requirements, internal development objectives and with internal stakeholders is interdependent. The specific use of Agile practices also has a large impact on the success of the team as they may not have developed a consistent practice resulting in the lack of a shared mental model. If a team does not coordinate between many groups and their stakeholders, then they may not receive the support that they need to develop, or they may not align on one objective therefore their product will demonstrate split objectives. Customers may also sense this resulting in lack of product sales and success.

Identifying all relevant product success variables, including customer collaboration in the agile product development process, is important as it allows company decision makers to be clear on indicators or variables to isolate to help ensure product success. Mapping the variable relationships and also quantifying how customer collaboration inclusion influenced the product success results needs to be handled delicately as there are many correlations to consider. As outlined in Figure 2 below, the conceptual framework is an attempt to identify all variables and relationships that will need to be mapped together to perform the appropriate research to examine if there is any correlation or not.

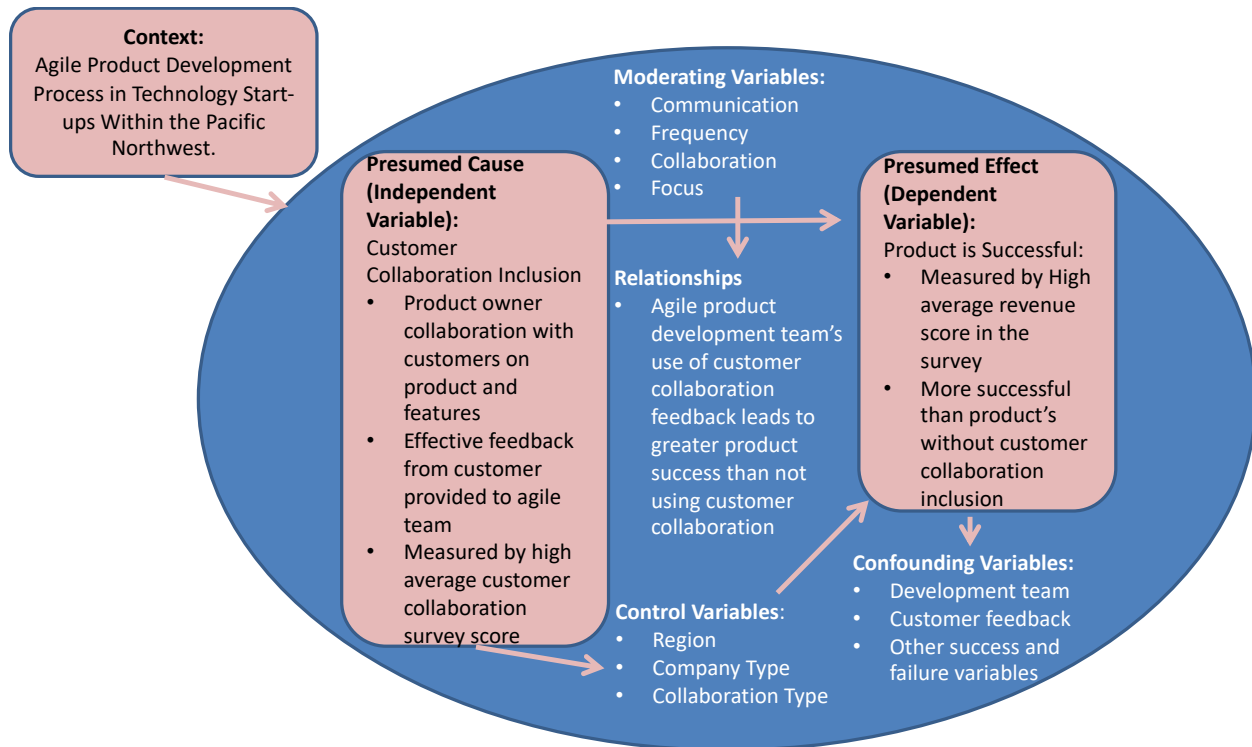


Figure 2. Relationships between variables.

Summary of the conceptual framework.

There are a large number of concepts and variables that could potentially lead to a product's development success or failure. The three concepts identified common to any Agile product development team are the shared mental model theory, stakeholder theory, and communication theory. These concepts are very interrelated as they each work in conjunction with the team's purpose to build a product that will delight customers and be successful as shown in Figure 1. In addition, there are a number of other independent, dependent, moderating, control, and confounding variable relationships that need to be considered as shown in Figure 2.

Definition of Terms

Agile software development can be defined as a set of software development methodologies that utilizes short and iterative development cycles to produce working code (Cooper & Sommer, 2018).

Start-up can be defined as a small company that is newly created with less than fifty employees (Paternoster, Giardino, Unterkalmsteiner, M., Gorschek, . . . Blekinge Tekniska Högskola, 2014).

Assumptions, Limitations, Delimitations

In order to provide an appropriate scope to the study, the below section will outline potential assumptions, limitations and delimitations associated with the research. By identifying these components, the study can be better bounded and understood for future research or to allow generalizations of the findings. Overall, it is the hope that this research can be useful to the industry at large in order to shed light on one variable's effectiveness on product success within the stated scope.

Assumptions

One assumption of the research is that the participants do align with the scope of the study and that they are answering truthfully. If for example a respondent says they work with Agile but do not, then their response should not be applicable to the research but the researcher will never know. Another example is if the participant works in a Southern state and not the Pacific Northwest but responds to the research, again, the researcher will not know unless responses are provided within the questionnaire that can be verified but even then, a participant can potentially answer incorrectly. There is no definitive way to mitigate this except by ensuring enough responses such that if any false responses come in, then they are minimized in the study.

It is assumed that the researcher can obtain enough interview responses from Agile start-up practitioners in the Pacific Northwest by soliciting participation in region specific Agile user groups, professional networking events, Agile software communities, and other events focused on Agile software development. This may serve as a challenge as many practitioners in this specific field may be too busy to respond or lack the interest. It will be up to the researcher to network enough in the right forums to collect enough responses.

Another assumption is that the researcher has a way to identify, reach, and get start-up companies to respond to an interview. Given these companies are usually very focused on creating a product, they may not want the distraction of taking part in research. One potential mitigation is to offer incentives to the companies or allow them to have a copy of the final study for their own reference.

Finally, an assumption is that the data is valid and truthful. Participants will be asked to take part in the interview and it is assumed that they will answer to the best of their ability. With accurate data, meaningful results can be discussed. If, however the questions are poorly worded, or the participants are rushed for time, then they may not provide the level of data integrity needed to draw meaningful conclusions.

Limitations

Perhaps the largest potential limitation of the study is that the sample size may be too small to generalize for the industry. Being specific to the Pacific Northwest, start-up companies, in technology, using Agile that the researcher can get interview results from could end up being a small number. The researcher will have to evaluate the number of responses received and decide if that is enough to generalize to a broader subset or not. If not enough responses can be

gathered, then the researcher may potentially need to widen the scope of the study in order to get more responses.

The inherent limitation with a grounded theory study is that the results can only be used to describe the specific context described in the study. It will be very hard to draw universal truths from the study as the results will describe state in a very narrow context. The data will also be prone to bias as all data can be. The difference is that the bias may be magnified with the narrow focus if many of the participants come from the same background and region.

Another limitation is that it will be very difficult to draw a direct correlation from one factor to the success or failure of a product. There are many variables to consider and while customer collaboration is a large one, other factors due to the market or the company could override any customer collaboration effects thus skewing the data. The study will not try to identify the root cause of the product success or failure, but simply examine the effect of one variable which could limit the usefulness of the study.

Delimitations

The bounds of the study are first regional in nature being limited to the Pacific Northwest. This refers to the states Washington, Idaho and Oregon. Second, start-up companies will be explored meaning that companies must have been founded within the past five years with fewer than fifty employees. Third, the scope of the start-up companies is that they must be a technology oriented company. If the business of the company is to produce anything that will enhance technology, then it will be considered a technology oriented company. Lastly, the company must be actively employing Agile product development. This means that if a company is using any other technique like waterfall, then they will be out of scope for the study.

Significance of the Study

In practice, applying Agile software development (ASD) with integrated voice-of-the-customer feedback can have significant benefits. Schön, Escalona, and Thomaschewski (2015) studied 175 participants from the IT industry using agile practices, they found that collaborative development of product related ideas contributes to a better understanding of the product and produce outcomes for a business consuming the solution including higher revenue, market adoption, and higher customer satisfaction. Businesses using agile practices are also more likely to be successful in new markets according to Ince (2015). Measurements of success can encompass many aspects of a business and ultimately it is up to the business to decide what the key performance indicators are to measure success.

By incorporating voice-of-the-customer early in the development cycle, Aguwa, Monplaisir, and Turgut (2012) found that partner customers had significantly higher customer satisfaction scores. Higher satisfaction scores can be attributed to customers more closely resonating to the product because they have had input into the development throughout the agile journey. As their feedback was integrated into the product development, the resulting solution more closely met their needs as it was built on their feedback. These higher scores lead to higher revenue and ultimately a better experience back to the customer leading to better loyalty. When scaling ASD with input aligned from the customer, companies can be much more successful than those that are not using ASD or voice-of-the-customer input.

Reduction of Gaps

There is currently no research on how the inclusion of customer collaboration in the agile product development process by product owners impacts the overall success of the product within Pacific Northwest technology start-up companies. Currently, over 75% of venture capital

backed start-ups fail and 50 percent of new businesses make it five years or more, with 33 percent still in business 10 years or more (DeMers, 2018). By reducing this research gap as to why start-ups are failing, new studies can focus on other industries, company sizes, or other variables that could impact the success of agile product development on a particular product. While the amount of research on agile product development is vast, specifying the research on the Pacific Northwest within agile start-ups in technology should yield interesting conclusions.

Implications for Biblical Integration

Beyond listening to customers from a business perspective, Keller and Alsdorf (2012) suggested that we need to be listening for an opportunity to show others the will of God as well. Christian's have a responsibility to be responsive and agile to today's culture by adapting God's word into a way that can be understood by those in need today. By being good stewards of our bodies on this earth and showing Christ through example, Christians can differentiate themselves as well to show the dark world the light.

Just as it is important that a product owner lead their team to meet objectives, Christians likewise have a duty to help those in the community to be as successful as possible. Success in spiritual terms is not about how much money a company makes, but if the leader is tending to the team's spiritual needs. Keller and Alsdorf (2012) suggest that our entire purpose for working is simply to further God's will on this earth. How can Christians do this in a world that is becoming more afraid to talk about God? By breaking down perceived barriers and talking about God! Christians should lead non-Christians to Christ. The only way to do this is to coach them on what their soul needs, which is God. Only God can save a soul, but Christians have the responsibility to sow the seed as found in Matthew 13.

Training agile teams and product owners about how to be highly effective in secular work is simply not enough. Christians are held to a higher standard. How terrible it would be to stand before God one day and have to explain why we did not spread His word to those in need. Beyond organizational/executive coaching, Christians need to remember the true reason they are on this earth, and that is to “Go therefore and make disciples of all the nations, baptizing them in the name of the Father and of the Son and of the Holy Spirit” (Matthew 28:19, New King James Version).

One specific example from the Bible that demonstrates how Jesus helped coach is found in the account of Jesus when He walked on the water with Peter found in Matthew 14:22-33. In this passage, Jesus displays two coaching traits very well. The first is that Jesus was a risk-partner to Peter. In Matthew 14:28-32 the Bible reads that:

And Peter answered Him and said, ‘Lord, if it is You, command me to come to You on the water.’ So He said, ‘Come.’ And when Peter had come down out of the boat, he walked on the water to go to Jesus. But when he saw that the wind was boisterous, he was afraid; and beginning to sink he cried out, saying, ‘Lord, save me!’ And immediately Jesus stretched out His hand and caught him, and said to him, ‘O you of little faith, why did you doubt?’ And when they got into the boat, the wind ceased.

Jesus was defying what Peter thought was possible and guiding him through a potentially perilous situation. “Coaches can question whether the fears identified by their client may be dated, whether unthinkable options may in fact be thinkable, and those ‘worst case scenarios’ not too likely nor lethal” (Bergquist & Mura, 2011, p. 39). Jesus understood the risks and encouraged, then helped Peter to overcome his fears to be successful just as product owners should be doing for their agile teams.

Relationship to Field of Study

In agile product development, the product owner plays a key role as they identify the voice-of-the-customer feedback, sets the strategy for the team, and helps the scrum master set the team up as efficiently as possible to accomplish their goals within a two-week sprint (Bass, 2015). This product owner is usually a product manager within the technical marketing group in a company. While marketing is usually thought of in macro corporate marketing terms, the product owner is responsible for understanding their customer well enough that they can translate the business and technical needs of the customer into something that can be developed by engineers (“What is a Product Owner,” 2018). If a product owner does not understand their customer, then they will guide the agile team to create a product that has no buyers. By using and incorporating voice-of-the-customer research into the agile product development process, product owners can have a better chance of being successful in their product development. Ultimately this leads to higher revenue, market share, and customer outcomes being achieved.

Marketing as a function within the organization can have a large impact to the process of agile product development. Rumelt (2011) found that product development without market insight is futile. To develop a strategy, company leadership must have a firm understanding of internal and external environments, the market, competitors, and where the opportunity lies for the firm. By creating a premeditated plan that anticipates the next move in the market, a firm can capitalize on its resources for a concentrated focus on winning in a particular space. Marketing as a function drives the gathering of that data that then can be used to create the business strategy itself.

In addition, marketing can also impact the process of product development execution. To effectively execute the development of a new product, Gamble, Peteraf, and Thompson (2017)

suggests that a company should (1) Build an organization capable of good execution, (2) Allocate resources to critical activities, (3) Institute supportive policies and procedures, (4) Implement continuous improvement processes and activities, (5) Install information and operating systems allowing for the execution of the strategy, (6) Leverage rewards and incentives to promote better strategy execution, (7) Instill a culture that promotes good strategy execution, and (8) Show executive leadership of the strategy execution process. The largest way marketing can help in the product development and execution according to Slater, Hult, and Olson (2010) is by identifying strategy-critical activities such as defining the go-to-market strategy, creating a proper value proposition with differentiation, and ensuring the product/solution/service is future ready as presented in the below sections.

Schuhmacher, Kuester, and Hultink (2018) found that go-to-market product development as part of the overall business strategy development was an important role for the marketing organization. The authors go on to say that especially for new technology and innovation, a company must be very well aligned to the target market and niche that the innovation can solve. This does not mean trying to use this new technology to solve all problems, but by identifying the specific customer market where the problem can be best solved and attacking there. By ensuring that a company knows exactly where to focus its resources, a better business strategy can be developed and thus executed.

Friis, Holmgren, and Eskildsen (2016) likewise found that there are only so many internal resources available to meet the market demands and that companies should use their marketing function to help identify where best to apply those constrained resources. While the nature of creating a new product can be complex, appropriate focus needs to be on how to focus to meet short term company objectives while developing capabilities to meet long term business

objectives. The authors created a model consisting of five areas to help divide up marketing roles in the creation of new strategy content (productivity, flexibility and innovation) and strategy process (execution and culture). By getting marketing involved early in each of these phases, go-to-market of the business can be better aligned to the strategic direction of the firm resulting in better strategy development and execution.

Kang and Montoya (2014) also found that marketing organizations can affect the product development process by creating and positioning a product portfolio through understanding and making key decisions on how the product should be developed including how to enter a market. By developing a solid go-to-market strategy, business strategy development becomes easier as key strategic questions are answered upfront to ensure that the portfolio aligns closely with the outlined strategy to provide the best value proposition to the customer. The authors study evaluated the short-term and long-term financial impacts that product development strategy has on market entry strategy. Their findings highlighted that marketing planning upfront was essential in creating both a product development strategy and executing a company's market entry strategy.

Creating a strong value proposition upfront with clear differentiation is another marketing role that can help a company build their product strategy and execute it. Chrisman, Chua, De Massis, Minola, and Vismara (2016) found that execution is done using marketing management processes by educating their workforce on the value of the product, who it serves, and how to win. Creating a clear differentiation understanding of how this solution is different than all other competitor's solutions is a key component for a business strategy to work well in the field. The marketing organization organizes key stakeholders and critical activities that must be executed in the market so that the differentiation strategy and execution can be successful. The authors say

that it is important to have teams like marketing involved to identify key issues, problems, and obstacles that the company should overcome to achieve its objectives.

Chrisman, Chua, De Massis, Minola, and Vismara (2016) go on to say that marketing can affect the product development and execution process by defining marketing management processes and defining the “how” a strategy gets executed. They suggest that marketing can define the required tasks, owners, delegation of tasks, sequence of actions, and drive accountabilities with deliverables. With marketing owning the management process for defining and creating a clear differentiation strategy, the authors found that companies can create solutions more aligned to market needs. If marketing also creates performance measurement tools from the field, then the function can help evolve the business strategy and execution process over time as well with continual feedback.

In the product development process, many companies use indicators such as loyalty, market share, price, premium and customer lifetime value to decide if their company is successful or not (Davicik & Sharma, 2015). Marketing researchers need to deal with large databases to be able to track this information over time and report back to the company with findings. Davcik and Sharma (2015) found that if marketing professionals can effectively track these indicators though, they can report back to the organization where the opportunity is and how to adjust their differentiation strategy to more positively increase their key performance indicators.

Davicik and Sharma (2015) go on to say that marketing investments have a large effect on brand equity and product differentiation. These factors make marketing an important party to include in the formation of business strategy development and in the execution. The authors suggest that the continual monitoring of performance is a value add that marketing can help

fulfill as it allows companies to dynamically react to changing market conditions. Quickly adapting means that the company can create a more differentiated solution than competitors as they are adapting the product real time. By disrupting themselves, a company can continually stay ahead of the market if they have their resources (including marketing) aligned to support that strategy.

Summary of the significance of the study.

In practice, applying ASD with integrated voice-of-the-customer feedback can have significant benefits to the industry, research, and Agile development practice. Currently, over 75% of venture capital backed start-ups fail and 50 percent of new businesses make it five years or more, with 33 percent still in business 10 years or more (DeMers, 2018). The significant of this study is that the research can help make more of these companies successful. Marketing as a function within the organization can have a large impact to the process and execution of agile product development. Beyond listening to customers from a business perspective, Keller and Alsdorf (2012) suggested that we need to be listening for an opportunity to show others the will of God as well. Finally, this study can help researchers close a gap in understanding if one variable in the agile product development process can affect the success of the product within the Pacific Northwest technology startup.

A Review of the Professional and Academic Literature

As a way of introduction, this literature review first discuss the methodology used for the review, a brief history and overview of Agile software development, an overview of customer collaboration, a deep dive on the dependent, independent, and mediating variables, and theory in the conceptual framework. The intention of this literature review is to give the reader an overview of the existing literature related to IT project success rates and their impact by using

Agile software development with customer collaboration. While there exists a good body of research on each of these variables independently, there is no literature that ties together elements into a cohesive study. With regard to theory, Agile software development relies on a team producing code quickly and efficiently. For this reason, theory behind the Agile software development was explored by evaluating stakeholder theory, coordination theory, and shared mental model theory.

The first part of this study reviews existing literature on agile product development among technology start-ups and the importance of customer collaboration during the process. The impact of customer collaboration inclusion on product's success during agile product development in firms within the Pacific Northwest are assessed using variables found in the literature. The first one is customer collaboration (Independent Variable). Customer collaboration is important in ensuring the success of new products in the market. This variable was assessed using three dimensions: company type, region, and collaboration type. Collaboration, focus, frequency, and communication were used in assessing the mediating variables of the study. Product's success was also assessed (Dependent Variable). The study found that the success of a product in the market is dependent on customer collaboration inclusion. While product/project success is relative based on the perspective of the company, there are many opinions supported in the literature that will be examined. The last part of this section summarizes the major findings of the review.

Literature Review Methodology

First, this research analysis is topical in nature focusing on the history, application, and significance for agile product development and utilizing voice-of-the-customer feedback within companies. Specifically, trends are captured in each of these areas from various authoritative

sources and examined within each section. It is the intention of the research analysis to draw out the most relevant points versus outlining every possible point of interest in the categories. Agile product development utilizing voice-of-the-customer feedback is most widely used by software developers, however, this research analysis will provide examples of generic use cases, and not just those pertaining to pure-play software development.

In addition to ensuring generic use cases of agile software development, mostly peer-reviewed scholarly journals were used in this analysis to ensure quality research from authoritative sources on agile product development and voice-of-the-customer feedback tools. Research analysis from authoritative scholarly works from agile product development and voice-of-the-customer tool experts in the field covering process, implementation, and use cases were examined. The research reviewed was only permitted in the literature review if it met scholarly standards.

In short, it is the intention of this research analysis to examine scholarly works that outline the key points for agile product development and voice-of-the-customer feedback tools, whether positive or negative. These points will be used for contemplation and analysis for a company considering whether or not the agile product development and utilizing voice-of-the-customer feedback methodologies may be an appropriate process optimization technique for their particular use case. The analysis is objective and made without bias from the research.

Justification.

This literature review is comprehensive because sources used are from expert authors. For instance, Woojung Chang and Steven Taylor (2016) work on “The Effectiveness of Customer Participation in New Product Development: A Meta-Analysis” at Illinois State University as professors of marketing. Their article addresses the importance of customer

participation in the process of developing new products. The authors found that engaging new customers in the new product development process help in improving performance. Furthermore, the authors discussed several managerial and theoretical implications about when to involve clients in the innovation process.

Anna Cui and Fang Wu (2016) are also experienced authors who work at the University of Illinois, Chicago. Their journal article, “Utilizing Customer Knowledge in Innovation: Antecedents and Impact of Customer Involvement on New Product Performance,” addresses how tech start-ups can utilize customer knowledge in innovation. The two authors conducted an in-depth study to examine the impact of customer involvement in the new product development process. The findings showed that customers play a vital in the process of developing new products.

The article “Customers' Participation in Product Development Through Crowdsourcing: Issues and Implications” by Djelassi and Decoopman (2013) was used because these authors conducted detailed research about how customer collaboration inclusion impacts the process of agile product development. The book also focused on how clients can participate in the process of new product development through crowdsourcing practices. The authors recommended that customer participation in the agile development process is important and hence tech start-ups should engage when developing new products.

The authors Fidel, Schlesinger and Cervera (2015) of the article “Collaborating to Innovate: Effects on Customer Knowledge Management and Performance” work at the department of marketing and research at the University of Valencia. This source was chosen over others because it addresses how customer collaboration inclusion facilitates detection of new

market opportunities and improves innovation. The journal article also explores the role of customer collaboration in designing products that match the needs of the consumers.

The article “Key Challenges in Early-Stage Software Startups” by Giardino, Bajwa, Wang, and Abrahamsson (2015) was reviewed because it addresses key challenges that face tech start-ups. These authors work at University of Boen-Bolano and Norwegian University of Science and Technology. They have written various papers about ways of ensuring the success of software start-ups. The article identified a lack of customer collaboration as one of the key challenge facing software start-ups. It thus recommended that tech start-ups should engage customers when developing new products for them to grow fast and be successful.

Michael Jensen (2017) in “Value Maximization, Stakeholder Theory and the Corporate Objective Function” explores stakeholder theory and value maximization. His article discusses roles played by various stakeholders in the process of developing new products. According to the author, customers play a crucial in the process of agile product development and hence it is necessary for firms to engage them to ensure their success.

The journal article “Customer Involvement in New Product Development in B2B: The Role of Sales” by La Rocca, Moscatelli, Perna and Snehota (2016) was chosen because its authors are experienced in the field of the agile development process. They have written various journals and work at different universities. The authors argue that customer involvement goes beyond getting information from customers to develop products that meet the expectations of consumers in the market. It is thus important for tech start-ups to engage customers when developing new products.

The article “Supplier and Customer Involvement in New Product Development Stages: Implications for New Product Innovation Outcomes” by Moon, Johnson, Mariadoss, and Cullen

(2018) describes the role of customer and supplier involvement in the process of developing new products. It explored how the participants of the supply chain relate during various stages of developing new products. Their findings revealed that customers and suppliers play a significant role in ensuring the success of products of tech start-ups firms in the market. It is thus important for these companies to engage various stakeholders when developing new products.

Overall, selected peer-reviewed articles are included because the authors have proven depth in research and subject matter expertise in their particular fields. Authors were not chosen if they were relatively new and did not have community based support for their research or area of expertise. By building a literature review on these premises, a solid groundwork can be laid for insight into the agile product development and the associated research questions.

History.

In 1970, Dr. Winston Royce published a paper called ‘Managing the Development of Large Software Systems’ which started an exploration effort in the industry to find more efficient ways that software development process should work that achieved the appropriate business outcomes (Bulajic, Sambasivam, & Stojic, 2013). In 1982, McCracker and Jackson proposed an “evolutionary software development method” (Misra, Kumar, V., Kumar, U., Fantasy, & Akhter, 2012, p. 973) that would provide a software development lifecycle for the variety of stages involved in getting code produced that aligned to the customer need (early voice-of-the-customer feedback). By modifying code through continuous iterations, quality was found to be higher than if the code was written once and left as complete. These methods were still immature however, but the foundation was there for modern agile software development (ASD).

Since the rise of globalization in the early 1990s, companies have been competing with other companies around the world to have the best value proposition for their solutions. This

means having an extremely high amount of innovation and quality at the lowest prices available. The industry continues to disrupt itself with new technologies, tools, and process to keep their competitive edges. Ojala (2016) suggested that incorporating agile methodologies that aligned to unspoken voice-of-the-customer feedback would be the only way entrepreneurs could survive living in a constant state of uncertainty.

This exploration for best practices has continued to evolve as 17 software practitioners wrote a set of principles to guide Agile Software Development (ASD) in its current form. Twelve principles make up the agile manifesto which were published in 2001. These principles are intended to guide a culture that welcomes continuous improvement, maximizes simplicity, reduces overhead, and fundamentally trusts self-organizing teams to get the work done (Dingsoyr, Faegri, Dyba, Haugset, & Lindsjorn, 2016). These principles are the guiding development techniques of software developers globally incorporating real feedback from voice-of-the-customer analysis and partnership.

Instead of developing code in isolation and hoping that the end result meets the need, agile is fundamentally different as it allows customers to experiment with early versions of the code for a continuous feedback loop. Dingsøyr, Nerur, Balijepally, and Moe (2012) found that by incorporating voice-of-the-customer feedback, developers can take advantage of global best practice agile principles such that they blend both theoretical and practical frameworks to produce a quality outcome. The alternative is to develop in isolation from the customer, only to find at the end of the development, the customer would have preferred to have a different solution altogether.

The agile approach to product development has been there for many years in various forms. Dingsøyr and Lassenius (2016) argued that agile product development helps firms in

discovering ways to build a product and ensure that customers' needs have been considered. The dominance of agile came after many years of failed products in the market because customer knowledge and needs were not taken into account when developing those products. This study explores a timeline of some major events that led to the use of the agile approach to developing products. Even though there are many more contributions in the field, major events are discussed below.

The history of agile product development dates back to 1620 when Francis Bacon used the Scientific Method during the development of products (Stake, 1978). His approach sounds like an agile mindset because it involved posing a question, gathering information, forming a hypothesis, testing the hypothesis, and sharing knowledge. After this approach, Walter Shewhart came with the Plan Do Check Act (PDCA) in 1930. This was similar to the Scientific Approach, the difference was that the "Act" component was added to the approach to enable integrating knowledge to form a cycle. Additionally, an agile approach to developing new products was also used in the Toyota Production System in 1950, which was a precursor to Lean Manufacturing. The aim of this system was to eliminate waste to ensure the conservation of resources. People who used this approach learned to identify expenditures of time, effort, and material that have no value generation to customers (Hayashi, Aoyama & Kobata, 2017).

In 1950, Edward Deming came up with Plan Do Study Act (PDSA). This was similar to PDCA, but its aim was to bring more attention to an analysis by studying. He replaced "Check" with "Study" because its emphasis was on inspection rather than analysis. Agile approach to the development of products was also used by Tom Gilb in 1976 in Evolutionary Project Management. The materials used by Tom had a clear flavor of adaptive, light, and agile iteration with quick results. He found that the success of complex systems is only possible if small steps

are used in implementing it and if "retreat," as well as a measure of successful achievement, were incorporate in those steps. This approach was cited in Software Metrics (Guaragni, Schmidt & Paetzold, 2016).

In 1985, Barry Boehm came up with A Spiral Model of Software Development and Enhancements (Boehm, Egyed, Kwan, Port, Shah, & Madachy, 1998). This approach was made prominent and formalized with the need of using risk assessment's discrete steps and a concept of risk-driven iterations. Items that were perceived to be of higher risk were prioritized and were worked on earlier compared to lower risk items. In 1986, Ikujiro Nonaka and Hirotaka Takeuchi invented the New Product Development Game (Takeuchi & Nonaka, 1986). This approach was taken implemented by product developers within companies with the following features: organizational transfer of learning, overlapping development phases, self-organizing project teams, "multi-learning", built-in instability, and subtle control (Hostettler, Böhmer, Lindemann & Knoll, 2017).

Another approach to agile product development was used in 1990 by James Martin (1991) known as Rapid Application Development. This approach to software development placed more emphasis on the adaptive process and less emphasis on planning (Levy, Short & Measey, 2015). The teachings by Martin recommended using of prototypes in place or in addition to design specifications. In 1995, Jeff Sutherland and Ken Schwaber presented the Scrum framework at Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA) Conference (Sutherland, Patel, Casanave, Miller, & Hollowell, 2012). This framework allowed using various techniques and processes. It is guided iterative, incremental approach and empirical process control theory to control risk and optimize predictability. In 1999, Kent Beck explained eXtreme Programming (Beck, 1999). The framework intended to

introduce checkpoints and improve productivity by adopting new customer requirements. It also emphasized sustainable developer-oriented practices, testing, simplicity, and communication (Hostettler et al., 2017).

In 2001, 17 organizational developers met in Snowbird for three days to produce software in an incremental and iterative manner as opposed to using agile methodology (Ambler & Lines, 2012). These developers forged an Agile Manifesto with twelve operating principles and four key values that captured the essence of their methods. The latest development to use the agile approach to developing products was in 2007. The discussion of Kanban was a lean method to improve and manage work across human systems. The approach aims at managing work by improving the handling of system-level bottlenecks and balancing demands with available capacity (Lei, Ganjezadeh, Jayachandran & Ozcan, 2017). From the above discussions, application of the agile approach to developing new products has been around for many years. Its roots continue to grow into a function of industries that aim at improving the innovation process and extend far beyond Information Technology.

Agile Product Development.

Agile product development is based on iterative and incremental software development methodologies which requires that solutions evolve through collaboration between self-organizing, cross-functional teams (Thilak, Devadasan, & Sivaram, 2015). This contrasts quite differently between the previous de facto standard for product development which was based on waterfall product development processes. In waterfall, requirements and set up upfront, churn to requirements is minimized, and the software development team delivers a solution based on the original requirements in one swoop. Furthermore, there is little collaboration on an ongoing basis between developers and customers which makes development more static. Finally, once

the development has begun, making changes is extremely difficult limiting the ability of the waterfall development process to map to new or evolving customer needs.

According to Sommer, Dukovska-Popovska and Steger-Jensen (2014), agile product development is creating products with agile techniques and processes. They are usually software products, hardware products, or a combination of the two. The two types of product development have clear distinctions, but software is embedded in hardware and hardware contains software. For many technology start-ups in the Pacific Northwest, the alignment of software and hardware development is crucial is managing a stable agile environment. It is critical for these start-up firms increase predictability, visibility, and respond quickly to changes in the business environment for them to be competitive in the future. Sommer, Dukovska-Popovska and Steger-Jensen (2014) argued that agile is mostly used in software and not hardware, but it can also do well in hardware development.

Abrahamsson et al. (2017) claimed that as start-ups grow, agile product development helps them in making them successful. The success or failure of many tech start-ups is influenced by the way they utilize agile product development. Great ideas and passion combined with sound product development methodology can determine whether the start-up will live or die. Abrahamsson et al. (2017) further claimed that it is important for the tech start-ups to examine the product that the company needs to build to be successful. It is thus essential for start-ups to try something, analyze the results, and learn from it quickly.

Customer collaboration during software product development are important because they help in coming up with the best way of developing products to be successful. Hakansson (2015) posited that the reason why many start-ups have failed is not that they do not use agile product development, but they fail to include customers and their feedback in the process of developing

their products. Hakansson (2015) further claimed that continuous stakeholder or customer involvement in the software development cycle is necessary to ensure that the company collects all the requirements concerning product development. Various issues will arise during the process of developing agile products and hence customer involvement in agile product development helps in ensuring that tech start-ups address those issues.

Paternoster et al. (2014) claimed that the interaction of individuals within a software development team is necessary for ensuring that tasks are accomplished successfully. Collaboration during the cycle is given more emphasis because team members come together to solve the problems. It is also important for tech start-ups to prioritize people or personnel empowerment during the process. Conforto et al. (2014) found that firms that respond to changes quickly in the process of agile product development are successful. It is also important for companies to include various stakeholders during the process as they will help in ensuring the success of the products in the market.

Giardino, Wang and Abrahamsson (2014) pointed out various factors that affect agile product development among start-up firms. One of them is limited communication during phases of product development. People working in start-ups can stick to their own work and hence no knowledge and skills are added to improve the process. Inadequate information about how to develop a product that will be successful in the market has hindered many tech start-ups in the Pacific Northwest from progressing. These firms thus need to be flexible and include all necessary stakeholders to ensure the success of their products. Customer collaboration inclusion plays a crucial role in agile product development.

Customer Collaboration.

In today's world where speed, adaptability, and flexibility are king, ensuring that the software that is produced aligns to the market need is an aspiration many companies continue to research. Voice-of-the-customer feedback is one component of quality function deployment (QFD) and Lean Six Sigma which allows product development to be audited against what the customer originally asked for (Found & Harrison, 2012). This ensures that the quality software development outcomes are produced that can be traced to market and customer needs.

Fidel, Schlesinger and Cervera (2015) argued that customer collaboration inclusion helps to ensure that the focus of the business is not its products, but on the client's business problem. Customers of a company do not buy products but instead, they buy solutions to their problems. A firm will not be able to provide solutions to customers unless it understands the problem that needs to be solved, which is only possible if a business holds a useful conversation with its clients. A solution provided by a company should meet their needs. This can be achieved by providing the company's sales team with systems and intelligence to stay on top of the client's ever-changing needs. Firms that truly understand customer's challenges and problems are ahead of others in the market (Fidel, Schlesinger & Cervera, 2015). It is thus recommendable for companies to engage customers in their agile development processes to ensure that their needs are met.

Yau and Murphy (2013) argued that collaboration is not limited to team members alone, but also other stakeholders such as customers are necessary. Customer collaboration inclusion helps in including requirements and information that might not have been available at the beginning of the cycle to ensure that product meets requirements in the market. According to Giardino et al. (2015), unpredictable scenarios usually occur during agile product development

cycle and hence it is necessary for tech start-ups to include customers to help in giving necessary information so that firms can make appropriate adjustments.

In a bid to stay impartial, Dingsøyr and Moe (2014) claimed that it is hard for a company to build a successful product without getting feedback and support from customers. Creating a culture that ensures that all the stakeholders of a company including employees and customers are included in the process of agile product development help in ensuring that a company succeeds in future. Abrahamsson et al. (2017) argued that working collaboratively with the customer is like telling them that the company does not know all the details of getting a perfect product, but its mission is developing a successful product and the company wants them to be involved.

Rigby, Sutherland and Takeuchi (2016) argued that new product development's power lies in the potential for one's firm to meet client's needs. The key to developing a successful product is thus involving customers in the process of agile product development. Customer involvement inclusion helps in increasing their loyalty, strengthening the relationship with them, the provision of mutually beneficial service, and meeting customer needs (Hoda, Noble & Marshall, 2013). It is important to let customers give feedback about the process of product development to help in ensuring that their needs are met. Failure to involve clients in the cycle may lead to the development of poor-quality products and hence disappointing customers. Tech start-ups in the Pacific Northwest should involve customers in the agile product development because the benefits of involving them outweigh the risks.

According to Gandomani, Zulzalil, Ghani, Sultan, and Nafchi (2013), it is important for tech start-ups to understand customers' markets and work in partnership with them. Customer collaboration inclusion helps in ensuring that a firm meets their needs. Hoda, Noble and Marshall

(2013) suggested that it is valuable to include clients especially if they possess complementary technical and market expertise, and complementary technology. Additionally, involving customers in the process of agile product development helps in developing a strong relationship with them. Customer collaboration inclusion as the independent variable was assessed using three dimensions namely:

- a. Company type
- b. Product owner collaboration with customers from different regions on product and features
- c. Collaboration type

Company type

Company type influences the success of new products in the market. According to Djelassi and Decoopman (2013), a company can be a corporation, a partnership, public limited company, limited liability, or a sole proprietorship. Structures of these different company types differ and hence affecting customer collaboration inclusion. Involving customers in the process of agile product development is more necessary in large companies than in small companies. Most small start-ups in the Pacific Northwest do not include customer collaboration in the process of agile product development and is the reason why most of them have faced unsuccessful launches (Djelassi & Decoopman, 2013).

Porter and Heppelmann (2015) argue that small companies such as sole proprietorships and private partnerships rarely get feedback from customers when developing their products. This is an indication that users of the products are not involved in different phases of product development. These types of companies normally do not give chances for clients to air their views concerning how products should be developed. The literature suggests the lack of

customer involvement can be a reason why some small companies fail in their product development process.

Dingsøy and Moe (2014) found that large companies usually involve customers when developing new products. These types of firms collaborate with clients when selecting components for new products and incorporating ideas from customers in developing agile products. Large companies often use OpenSource software development, which requires high levels of development skills from customers (Giardino et al., 2014). While the code is free in OpenSource, it requires a lot of specialized support skills from the development team to use and operate effectively. Corporations also give chances for clients to make modifications to products that are commercially available in the market to ensure that they serve them best. Porter and Heppelmann (2015) found that most tech firms in the computer game industry employ this technique to ensure that they are ahead of their competitors. Customer collaboration inclusion is the reason why some large tech firms have succeeded in developing acceptable products in the market.

Product owner collaboration with customers on product and features

Bass (2015) argued that customers are key sources of input when developing new products. The author goes on to say that it is important for tech start-ups to understand customer needs when developing their products. Bass (2015) claimed that even though customer involvement may not always lead to the desired results, interacting with clients from various regions help in developing foresight to meet their future needs and reduce uncertainty. Customers from various regions have different needs and hence involving them in product development help in ensuring that those needs are met.

Sterrett et al. (2017) found that global markets with a large number of clients need different efforts to understand their needs when developing new products. The aim of any tech start-up is to satisfy its customers and one of the ways of meeting this aim is by involving customers from various regions. Millard et al. (2014) found that Lenora Systems is the fastest growing company in the Pacific Northwest because it normally collaborates with customers from various regions when developing new products. Lenora Systems provides project management services, software development, and IT consulting (Sterrett et al., 2017). Customer inclusion from various geographical areas has helped in ensuring that their needs are met.

According to Ylimäki (2014), Apple and Samsung companies have been at the top in the tech industry because they engage customers in the development of their products. Apple products have always been designed to address the day-to-day needs of customers. Belderbos, Carree, Lokshin and Sastre (2015) claimed that the most powerful products for a company are the ones clients love to use. Samsung and Apple help their employees to collaborate with customers and solve their problems creatively. According to a statement by Steve Jobs in 2015, collaboration is a large part of Apple's business processes and strategy. This is the reason why customers are loyal to the iPhone and Apple. Ylimäki (2014) further argued that in the marketplace of today which is dynamic, understanding clients' needs is crucial in ensuring the success of agile products and hence is the reason why successful companies engage customers when developing their products.

Blueprint Consulting Services likewise has also benefited from involving customers from various parts of the world when developing its products (Ozawa, 2017). The company aims at collaborating with clients and other firms to create their next big thing. Comments from customers have helped the firm in modifying its products and ensuring that the needs of clients

from different regions are met. Millard et al. (2014) argued that involving customers from diverse regions brings new ideas to the company and hence is the reason why Blueprint Consulting services have been the fastest growing private company in Washington.

Collaboration type

According to Chang and Taylor (2016), in the business world of today, knowing the right technique to approach customers with and recognizing their needs is a true asset. Firms can collaborate with customers using various forms of collaboration (Ozawa, 2017). One of the most common techniques is crowd-sourced (low-end collaboration). This form of collaboration involves developing a new product that has been completely outsourced to customers. Group achievement is another form of collaboration whereby ideas are developed using teamwork. Most large companies such as Pepsi use this type of collaboration when developing new products (La Rocca et al., 2016). Co-creation is another type of customer inclusion collaboration. In this form, firms work closely with customers when creating new products.

Gemser and Perks (2015) argued that co-creation is suitable for tech start-ups. The reason why co-creation is advisable to be used by companies is that the speed at which a firm gets feedback is high. This form of collaboration involves inviting customers into the firm's creative process and hence making them active participants in the process of agile product development. Witell, Gustafsson and Johnson (2014) argue that companies in the Pacific Northwest have started embracing this form of collaboration to excel in the marketplace and develop products that meet the needs of the clients. Co-creation gets consumers to take part in the development and creation of new services and products.

Tango Card is an example of a tech firm that has successfully used co-creation method (Cui & Wu, 2016). The company offers rewards that allow its customers to send e-gift cards,

fund an account, and brand email templates. The reason behind the success of the company is because it allows customers to take part in the creation of new services. Involving them in the feedback loop, development of new services, and product creation has helped in ensuring that their needs and those of others in the market are met.

Mediating Variables.

Mediating variables influences customer collaboration inclusion in determining the success of new products in the market. According to Rubera, Chandrasekaran and Ordanini (2016), the mediating variable explains the relationship between the independent variable and the dependent variable. The study reviewed the following mediating variables:

- a. Communication
- b. Frequency
- c. Focus
- d. Collaboration.

Communication.

The way a business communicates its new products determines whether customers will respond or not (Yagüe et al., 2016). Communication plays a crucial role in attracting clients to participate in agile product development. Pike 13 has been successful in ensuring customer collaboration inclusion in agile product development because it effectively communicates with them (Yagüe et al., 2016). The communication strategies used by the firm catch clients' eyes. Pike 13 uses digital devices such as tablets to attract customers to contribute to agile product development process. This technique has helped the company in developing products that meet the needs of its customers.

Effective communication during agile product development is essential in ensuring product's success. Belderbos et al. (2015) claimed that effective communication plays a role in employee management, customer relations, and product development. If customers are well engaged and informed, the probability of meeting their needs becomes high. Effective communication helps a firm to know what customers are expecting from their products. Clear communication is thus useful in managing their expectations and delivering the best goods and services to them. Ylimäki (2014) added that effective communication helps in building strong relationships between a company and its clients. This is because communication boosts trust and loyalty thus leading to positive outcomes. Communicating effectively also creates a suitable climate for customers to freely air their expectations and participate in the process of agile product development. This will benefit the company because it will ensure that the needs of the customers are well-addressed.

Kudaravalli, Faraj and Johnson (2017) argued that keeping customers informed during an agile product development process helps in increasing the participation. Tech start-ups firms should inform their customers about the progress of agile product development to win their participation. Santos, Goldman and De Souza (2015) claimed that clients will give more information on ways of improving products to meet customers' needs when they are constantly informed during an agile product development process. Responding to customers also ensures that they don't get worried about the process of product development. This strategy is useful because it helps in ensuring that the needs of the customers are addressed properly.

The type of communication used by a firm also influences customer collaboration inclusion (Vijayarathy & Butler, 2016). A firm can communicate to its clients using emails, video calls, or instant messaging. Vijayarathy and Butler (2016) claimed that companies that

use emails have high customer inclusion in agile product development. Even though it is a somewhat impersonal tool for communicating, email enables firms to attach dozens of files and send them to many customers. Pike 13 also uses emails when communicating to its clients and using this tool for customer collaboration is among the reasons behind the success of the firm.

Frequency.

Frequency affects customer collaboration inclusion in agile product development.

Krishnan (2015) argued that continuous interaction with customers help in ensuring that clients collaborate with the company. Also interacting with customers continuously ensures that they give feedback that will help in modifying or improving products or services to fit their needs. According to Krishnan (2015), regular feedbacks are necessary to improve the quality of services or products offered by tech start-ups with the Pacific Northwest.

Wu et al. (2015) posited that frequency influence success of agile products among tech firms. Frequently interacting with customers is crucial towards ensuring that their needs are met. Companies that frequently conduct market research and information about what their customers like have succeeded in the market. A good example is Google Inc. because it interacts frequently with its clients and continuously modifies its products and services to ensure that they match client needs. Wouters and Kirchberger (2015) claimed that frequency at which customers login into firm's product also determine its success. The more the number of users who log in, the higher the probability of product's success.

Lindsjörn et al. (2016) argued that Sophus IT Solutions offers quality services to its clients because it frequently interacts with its clients. Frequent interaction with customers helps in developing a strong and deep relationship with them. Frequent interaction boosts customer collaboration inclusion leading to improved efficiency when serving them. Lindsjörn et al.

(2016) argued that the more the company knows its customers, the better it serves them.

Communicating with customers on a frequent basis is thus necessary for informing to about the progress of agile product development and hence winning them to participate in the process.

Usman, Mendes, Weidt, and Britto (2014) found that frequent communication with customers makes collaboration with customers easier. Sophus IT Solutions has also been able to adapt to changes in the environment because it communicates with its clients frequently.

According to Usman et al. (2014), regular interaction with customers helps in ensuring that a company is aware of the changes taking place in the environment and hence adopting quickly to them to be competitive.

Focus.

Focus is also another important factor affecting customer collaboration inclusion. Giardino et al. (2016) argued that firms that are focused on maintaining good relations with their clients are more likely to win their clients to participate in product development than those that do not maintain close contact with their customers. Many tech startups have understood the importance of focusing on web pages and collaborative documents that help in keeping good contacts with clients (Stayton & Mangematin, 2016). This is because focusing on customer collaboration inclusion helps in bringing customers to give the comments that will help in improving agile products. Focus also help in turning customers into promoters of the firm's brands.

According to Melton and Hartline (2015), focus involves the ability to pay attention to factors that will help in meeting clients' needs. Firms need to focus on ways of effectively interacting with their customers to ensure that their products meet those needs. To ensure product's success, a business needs to focus on taste and preferences of customers, and what

customers need to be changed on firm's products. Frow, Nenonen, Payne and Storbacka (2015) argued that without good focus, a company won't be maximally efficient and productive because it will be wasting time making products that might not attract customers in the market. Focusing effectively is thus crucial in thinking effectively.

Giardino, Wang and Abrahamsson (2014) argued that Amazon still focuses on customer collaboration and retention despite its huge success in the market. The firm engages its clients by rewarding them through desirable deals and offers benefits such as Amazon Prime Days. Engaging customers in day-to-day activities of the company is important in promoting their chances to participate in agile product development. The authors go on to suggest that is the reason why successful companies such as Amazon focus on building relationships with their clients.

Collaboration.

Conforto et al. (2014) defined collaboration as working jointly rather than independently when accomplishing tasks. Firms in the Pacific Northwest that have worked with their clients very closely have succeeded in winning them when it comes to making them participate in agile product development (Moniruzzaman & Hossain, 2013). Working closely with customers in day-to-day operations of the company help in making them feel that they are part and parcel of the firm's success. As a result, they will do everything possible to ensure that the company succeeds. Customers that give appropriate feedback will help in improving firm's agile products.

Wouters and Kirchberger (2015) claimed that identifying and meeting the needs of customers in the market is the foundation of any firm's success. It is, therefore, important for companies to include clients in their processes of agile product development. Collaboration help in ensuring that psychological considerations of customers are taken into account because it

helps in understanding how customers feel, reason, think, and select between different alternatives. Wu, Huang, Zhao and Hua (2015) argued that collaborating with clients during the promotion and development of a product is the best way to emphasize their needs. Customer service and interaction not only ensure the building of a strong relationship with clients but also offer firms valuable information that will help in designing products that meet their needs. Customer collaboration inclusion is thus essential for firms if they are to succeed in the market.

Pike 13 is also a good example that has worked closely with its customers and hence has been able to make them participate in agile product development process. This is evident because the firm receives a lot of customer feedback when developing their products. Pike 13 has a feedback tool that collects comments from the clients and saves them as issues to be reviewed by the company's management (Abrahamsson et al., 2017). The agile product developers of the firm go through the comments and find out the number of similar feedbacks raised by the clients. This feedback is incorporated first which is a proof point for how customer collaboration has helped the company in ensuring its success.

Pike 13 also uses Slack as a team collaboration tool (Paternoster et al., 2014). The tool is used by the firm to communicate internally with its staffs and with its clients. Using Slack has enabled the company to easily manage the conversations between it and the customers in open channels. The tool is similar to Twitter and allows searching for chat history (Paternoster et al., 2014). It also has a user-friendly interface that has aided communication and collaboration between the firm and its clients. Collaboration has thus promoted customer inclusion in agile product development when tools like Slack are incorporated.

Product's Success - Dependent Variable.

This element measures how successful the product is as a result of customer collaboration inclusion. Two factors were used to determine the success of the product: the success of the product without customer collaboration inclusion and high average revenue from customer collaboration inclusion. Sommer, Dukovska-Popovska and Steger-Jensen (2014) argued that customer collaboration inclusion has played a crucial role in ensuring the success of products developed by companies. A company can use feedback from customers to improve its products because engaging clients in agile product development helps in pointing out an aspect of a firm's product that needs to be improved (Zahay, Hajli, & Sihi, 2018). The team members of the company might not see imperfections in the product being developed but, customer inclusion help in identifying areas that the company should improve on. Customer collaboration inclusion thus helps in ensuring the product's success because it ensures that a firm develops products that suit clients' needs (Cooper, 2018).

Hoda, Noble and Marshall (2013) claimed that customer collaboration inclusion in the development of agile products helps in convincing them to come back for more. Allowing clients to point out on areas that need to be addressed to make the product to be successful help in ensuring that they come back for more products. Additionally, reviews from customers help in designing products and services that will impress them and hence making the come back for more quality products and services.

According to Stare (2014), the inclusion of customers in the development of new products lead to the creation of innovative and new products. A company can use information collected from various clients to improve its existing products and develop new ones. Witell, Gustafsson and Johnson (2014) argued that it is difficult for firms to retain buyers and hence the

creation of new products is the most important way of making clients come back to the company. Additionally, those companies that are responsive to customer feedback address customer needs on time leading to client satisfaction. Customer inclusion thus helps in ensuring the success of new products in the market.

Chang and Taylor (2016) found that listening to feedback from customers helps in making the customers feel important and involved in the firm's activities. When a company asks clients to provide feedback about its products, it makes them believe that the company truly values their opinions. Furthermore, companies that listen to clients helps create positive connotations with firm's brand and direct the customer's good experience back to the company. Blue Print Consulting services have made its products and services to be successful in the market because it listens to customers' feedback and incorporates the findings (Cui & Wu, 2016).

Moon et al. (2018) also argued that engaging customers in the development of agile products help to acquire new customers. The authors advise tech startups to survey their website visitors and customers about their reactions and opinions to incorporate the changes as quickly as possible. Negative experiences can sometimes become very public via internet forums available to customers today. Incorporating feedback from customers in time help in ensuring preventing bad reviews. According to Fitzgerald, Stol, O'Sullivan, and O'Brien (2013), 90 percent of clients read online reviews before purchasing a company's products or services. Customer inclusion will thus help in eliminating negative reviews and hence ensuring the success of products in the market.

Kumar and Reinartz (2018) argued that product development has no market focus and is sometimes technology-driven. It is important to focus on new product development on client needs. While most firms do some research before developing new products, it is essential for

them to involve customers in their early stages. A product is more likely to succeed if a company can create client dependency on its products. Developing products to meet customers' needs is crucial in ensuring the success of those products. It is thus recommendable for firms to understand the needs of customers and ways of meeting those needs.

Tech firms that have engaged customers during the development of new products have succeeded. As mentioned earlier, Apple and Google are good examples of companies that engage clients when developing new products. The two firms always anticipate and meet client demands. Nyadzayo and Khajehzadeh (2016) argued that successfully developing products that meet the needs of customers helps in ensuring the success of those products in the market. A firm is likely to increase dependency on its products by customers if it anticipates and meets customer demands. It is thus advisable for tech firms to engage clients when developing new products to ensure that they succeed in the markets.

According to Levy, Short and Measey (2015), customer collaboration inclusion during the process of developing new products will help in improving the firm's competitive performance. This is because engaging customers will help a company to understand customers' markets. Knowing what the client needs help in developing products that match those needs. It is thus recommendable for tech start-ups to engage customers when developing new products if they are to succeed in the current competitive markets.

To ensure further collaborations in the future, firms need to find out what motivates customers to participate in the processes of new product development. Clients contribute their energy and time to address the company's needs and hence there is a need for understanding what motivates them to do so. According to Batra, Xia and Zhang (2017), three factors motivate customers to participate in the process of product development: relatedness, competence, and

autonomy. These needs must be met and realized if customers are to successfully collaborate in the process of new product development. Firms should thus put in place factors that will internally or externally motivate clients to participate in the process of developing agile products.

Grudin (2017) argued that it is difficult for any product to succeed in the market without involving customers. Collaborating with customers is the most effective way of developing products that respond to customers' needs and preferences. It also helps the firm to survive in the competitive global markets because they will keep inventing new products that match the needs of their clients. Carbonell, Rodríguez-Escudero & Pujari (2009) argued that the inclusion of customers in product development helps in making new products attractive and effective.

Chen, Chen and Lin (2015) claimed that the power of agile product development lies in the potential for a firm to meet the needs of customers in the market quickly with rapid adaptation to moving targets. Without customer inclusion in new product development, the chances of the product being successful in the market are low (Chen, Chen & Lin, 2015). Engaging clients when developing products provides a service that is mutually beneficial as it increases customers' loyalty and strengthen relationships with them. The authors go on to suggest that failure to involve customers when developing new products may lead to the development of products of poor quality that will extremely disappoint clients. Customers normally consider the quality of products when purchasing them, therefore, without their inclusion, products will be less likely to be successful.

Project Success Definition

According to the various literature, how a company defines whether or not a project is successful can vary widely. Serrador and Pinto (2015) found that 70% of technology-based projects and programs fail, meaning that the very few actually succeed. In the context of their

research, a project could be considered a success on the basis it was ‘on time’ and ‘on budget’ from an engineering point of view, but if the project could not sell, then it would be deemed a massive loss even if it achieved other successful indicators.

IT project success will not be the same across companies and needs to be defined at a higher level. The literature does not point out a common standard for how to designate a project as a success or failure, instead it provides numerous examples of where each project had its own specific success factors outlined at the onset of each project. Aranyossy, Blaskovics, and Horváth (2018) suggested that the IT community should be getting together to solve for a consensus on what defines success and failure. While normal projects fail about 18% of the time (, they go on to say that is a project is twice as difficult, then the failure rate doubles and goes to 40% (Standish Group, 2015; Kappelman, McKeeman, & Zhang, 2006). This universal set of project success and failure criteria could be very useful if companies could create a standard. The likelihood of that is low though as the authors go on to suggest that each individual IT project has its own uniqueness and that a model may not solve for 100% of the needs that the project has.

Sanchez, Terlizzi, and Moraes (2017) on the other hand found that only 19% of all technology based projects fail. The authors go on to say that failure means that the IT project did not fulfill the strategic objectives set by the company for the project. While this may be universally true, the details of what these objectives mean could differ wildly based on the company itself. A start-up company may have much less ambitious objectives than a Fortune 500 company, but success can be defined in meaningful terms that the companies can act on to motivate their teammates that they can achieve those goals.

In general, the Standish Group results are that well over half of technology projects are not delivered successfully but the trend continues to improve slightly (Hughes, Rana, & Simintiras, 2017). Hughes, Rana and Simintiras (2017) say that causal relationships between failure factors could be developed via a mathematic-based method to allow companies more insight into what failure means in their specific environment. Such a model could help companies around the world assess what both success and failure look like to ensure they start projects knowing what the end looks like.

Agile development processes can improve project success (Williams, Ariyachandra, & Frolick, 2017). The authors go on to say that project success is determined by the objectives set at the beginning of the project. Those objectives are not locked forever and can be modified, but it needs to be done in a way that the entire team is aware of the changes and are able to track to the new success objectives. With this fluid perspective of what success and failure is, companies will continue to have wildly different opinions but as long as they hold themselves to a standard with an accepted change process, defining success and failure becomes more obvious.

Potential Themes and Perceptions

One theme found in the literature is that there are benefits of using Agile software development over traditional projects. According to Amjad et al., (2018):

Research benefits of agile over traditional projects can be summarized as increase in success rate by a huge improvement of 29% in cost, 71 % in schedule, 122% improvement in performance, 75% improvement in quality and 70 % improvement in customer satisfaction, but still there exists some challenges and issues in agile that lead to project failure. (p. 5825)

While these results are not standardized throughout the literature, the theme is certainly that Agile software development is worth using because of some of the benefits it brings.

Another theme found in the literature is that there are many variables that can and will impact project success within the Agile software development process, more than just customer collaboration. Dikert, Paasivaara, and Lassenius (2016) identified 29 success factors in 11 categories that contributed to the overall success of the project. The authors goes on to suggest that all success is a culmination of many factors that come together versus attributing all success to one factor and ignoring the rest. This finding is a common theme throughout the literature as many other studies highlight multiple critical success elements. It is expected that this is a theme that will continue once the study is complete as well.

One perception that may need to shift is the perception that all customer collaboration is a good thing. When a company goes all in with a customer's feedback, they really need to hope that the customer is guiding them down the right path. Companies need to be smart enough to identify their most common use cases and start there. Lowry and Wilson (2016) found that while customer collaboration was generally good, there can be a saturation point to where single threaded collaboration negatively influences the outcome of the project. One way to guard against that is to ensure the company is collaborating with a diversified set of customers to get a more rounded view of feedback. The authors go on to say that deciding which feedback to follow and which to ignore is also another key consideration. This perception that all collaboration is good may need to be corrected as the study progresses as well.

Base Theories for the Study's Conceptual Framework

This paper adopted three base theories to aid in explaining the philosophical context that relates to the theoretical and practical aspects of the study. The theories explored in this study are

stakeholder theory, coordination theory, and shared mental models. The literature review will adopt base theories to explain the philosophical context in relation to the research's theoretical and practical aspects.

Stakeholder Theory

This theory is used in understanding the role played by different stakeholders in ensuring products' success. Stakeholder theory suggests that a team's performance depends on how key decision makers address stakeholder interests holistically (Haines, Idemudia, & Raisinghani, 2017). This theory is important in closing the gap between theory and empirical research. According to Freeman, Harrison and Zyglidopoulos (2018), anyone affected by the company and its activities is a stakeholder of that company. To ensure positive growth, firms should ensure that their stakeholders are satisfied according to Hörisch, Freeman and Schaltegger (2014). The reason for this is that the company will cease to exist without stakeholders. Customers are among stakeholders of a firm. It is thus important to ensure that their needs are satisfied. Engaging them in new product development helps in ensuring that products developed match their expectations. Stakeholder theory is thus useful in the understanding role played by customers in ensuring product success.

Stakeholder theory looks at how an organization relates to others in its external and internal environment. When developing new products, stakeholders play a crucial role in ensuring the success of those products because they can affect or be affected by a company. Stakeholders can come from outside or inside the business. Examples include the local community, government, non-profit groups, suppliers, stockholders, employees, and customers. Managing firms' stakeholder relationships effectively helps a business to be successful and survive longer (Jensen, 2017). Customers are the major stakeholders of any company and hence

including them in the process of developing agile products will help in ensuring the success of those products in the market. Stakeholder theory helps in understanding the importance of every stakeholder in ensuring company's success. Developing certain stakeholder competencies is vital in ensuring products' success.

Stakeholder theory also stresses that firms should not only create value for shareholders but also stakeholders. The communities, investors, employees, suppliers, and customers are major stakeholders of a company (Jones, Wicks & Freeman, 2017). There are interconnected relationships between these stakeholders and a business. The theory also argues that customers play a crucial role in ensuring the success of a company. The authors go on to say that firms should treat them fairly by ensuring that products given to them are of high quality. Involving customers in the product development process helps in ensuring that their needs are addressed leading to improved referrals or retention from happy clients. Applying this theory is useful in ensuring that all stakeholders are satisfied and hence ensuring the overall success of the company. The theory supports customer collaboration inclusion when developing new products.

Cordeiro and Tewari (2015) argued that failure to implement stakeholder theory in any project can result in pure disaster. A company cannot survive without stakeholders and hence is the reason why including them in decision making and development of agile products will help in ensuring success. It is recommendable for firms to consider stakeholders who are directly affected by the company's activities. Jones, Wicks and Freeman (2017) came up with steps for the successful implementation of the stakeholder theory. The first step is defining stakeholders of the company by listing all the people involved in product development and promotion. The second one is rating stakeholders of the firm based on their influence on the product's success. The third step is rating stakeholder knowledge by determining contributions of each stakeholder

to the project success. The last step is stakeholder decisions. Every stakeholder should be part of the product development process and their inclusion may result in products' success.

Coordination Theory

Coordination theory pertains to how communication flows between software developers and dependencies (Pikkarainen, Haikara, Salo, Abrahamsson, & Still, 2008). The authors state that this mapping between stakeholders and dependencies is important as how quickly information can get to where it is most effective can rapidly accelerate product development. By ensuring that information is flowing quickly, product teams can iterate faster resulting in a higher likelihood that their end product closely maps to the needs of their customers.

Crowston (2015) defined coordination theory as a body of principles that coordinate the activities of various actors to ensure that organizational goals are achieved. In every firm, stakeholders such as suppliers, customers, employees, and others play a crucial role in ensuring the success of a company. There is a need for coordinating these stakeholders, especially when developing new products. According to the theory, allocating resources to different actors, assigning actions to individual actors or groups, and sub-dividing goals into actions help in ensuring the success of agile products. Since every stakeholder plays a crucial role in determining the success of company's products, it is important to involve all of them and coordinate them properly, especially customers because they are the ones who will purchase the products. Proper coordination of all stakeholders will help in ensuring that products produced match customers' expectations.

According to Levitt (2015), customers influence the success of new products in the market and hence involving them in agile product development is necessary. The theory also investigates the role played by customers in service processes. Customer collaboration inclusion

in product development is becoming increasingly important in tech firms. Levitt (2015) goes on to argue that engaging clients in the process of agile development will improve their satisfaction and hence leading to the success of the products. This is achievable when relational coordination between the customers and the company is very high. Coordination theory is used in understanding the importance of customer participation in the agile development process.

Coordination theory considers customers as actual active participants in the process of coordination. Coordination also stresses the importance of including a broader network of participants in ensuring the success of products in the market. According to Tan & Li (2017), firms can hinder or trigger participative behavior of customers. Coordination theory helps in understanding why customers participate in company's activities. Five antecedents are used in understanding customer participation: customer willingness, customer ability, role clarity, role awareness, and role size. According to the theory, increasing customer participation in the process of developing new products helps in ensuring the success of those products (Lesser & Corkill, 2014).

Buckley and Ghauri (2015) argued that customers may be involved at different stages of developing agile products. Early customer involvement helps in ensuring that the company is moving on the right path from the start. Firms that have involved clients in the process of new product development have enjoyed various benefits such as improved financial returns. Most people believe that new product development is inventing something new, but in reality, it is modifying existing ideas or products. Howison, Rubleske and Crowston (2015) argued that the power of newly developed products lies in their potential to meet clients' needs. Coordination theory helps in ensuring that customers are involved when developing new products. Coordination also provides service that is mutually beneficial, increases customers' loyalty, and

strengthens relationships with them. It is thus important for tech firms to ensure that they let their customers evaluate their new products before launch.

Shared Mental Model

In cognitive psychology, there is a theory called shared mental models which explores the relationship between shared understanding and team performance (Yu & Petter, 2014). This theory is useful in facilitating team performance and coordination in an agile product development process. According to Maynard and Gilson (2014), teamwork improves the success of the company's products in the market. Engaging clients when developing new products help in bringing in new ideas and hence ensuring that products meet market's needs. Shared mental models support the idea of giving chance to customers to express their ideas concerning areas that require improvement in the development of agile products. Firms need to have excellent teamwork skills for them to ensure that all stakeholders are engaged in the company's operations (Stout, Cannon-Bowers & Salas, 2017).

Hanna and Richards (2016) argued that the reason why some products succeed in the market while others do not is that of teamwork. Designing a team where all the members of the company and those affected by activities of the company help in ensuring the product's success. Customers are among the people affected by the company's activities because they buy products leading to revenue generation. Collaborating with them is crucial in ensuring that products meet the needs of customers in the market. Deliberate management is necessary for ensuring that customers are included in product development process according to the authors. This theory helps in understanding the importance of customer collaboration to ensure the success of the firm.

Teamwork can be enhanced in various ways. One of them is establishing user groups. It is recommendable for tech firms to form these groups to build a sense of community and encourage feedback. Customers will use the groups to discuss issues as future development, standards, performance, and quality. Effective groups should include customers from various regions to ensure that valuable feedback on new products is provided and identification of needs that can be met through the development of new products (Schiff, Miele, McCollum, Li & Connolly, 2018).

Teamwork also involves inviting clients to evaluate new products before their launch. Zoogah, Noe and Shenkar (2015) argued that most firms in the software industry have succeeded because they allow customers to evaluate their new products. Customer evaluation helps in ensuring that they test upgraded versions or new products for any problems before they are released into various markets. This is crucial in providing valuable feedback on the performance of new products before they are released to consumers.

Shared mental model also emphasizes working in partnership with customers. Stout, Cannon-Bowers and Salas (2017) argued that working jointly with specific clients to develop new products help in ensuring the success of new products because their needs will be met. This approach is effective when clients possess technical expertise and complementary technology. More effective results will be produced when a company works in partnership with customers. Furthermore, collaborating with clients when developing new products will help in strengthening relations with them. It is thus recommendable for firms to apply the shared mental model to ensure that teamwork is enhanced during the development of new products.

Summary of the Literature Review.

As a way of summary, this literature review first discussed the methodology used for the review, a brief history and overview of Agile software development, an overview of customer collaboration, a deep dive on the dependent, independent, and mediating variables, and theory in the conceptual framework. The intention of this literature review is to give the reader an overview of the existing literature related to IT project success rates and their impact by using Agile software development with customer collaboration. While there exists a good body of research on each of these variables independently, there is no literature that ties together elements into a cohesive study. With regard to theory, Agile software development relies on a team producing code quickly and efficiently. For this reason, theory behind the Agile software development was explored by evaluating stakeholder theory, coordination theory, and shared mental model theory.

The first part of this study reviews existing literature on agile product development among technology start-ups and the importance of customer collaboration during the process. The impact of customer collaboration inclusion on product's success during agile product development in firms within the Pacific Northwest are assessed using variables found in the literature. The first one is customer collaboration (Independent Variable). Customer collaboration is important in ensuring the success of new products in the market. This variable was assessed using three dimensions: company type, region, and collaboration type. Collaboration, focus, frequency, and communication were used in assessing the mediating variables of the study. Product's success was also assessed (Dependent Variable). The study found that the success of a product in the market is dependent on customer collaboration inclusion. While product/project success is relative based on the perspective of the company,

there are many opinions supported in the literature that will be examined. The last part of this section summarizes the major findings of the review.

While the literature is both excessive on topics like agile software development holistically, it is also lacking in the correlation of variables to the success of the process, within a project in a specific location with a specific company type. Agile product development gives start-ups a framework to start with in an attempt at not becoming a failure statistic. Customer collaboration inclusion allows for a better chance that the company can come up with the best way of meeting the needs of consumers in the market and hence making its products to be successful. One potential reason why tech start-ups have failed is that they fail to engage customers when developing their products. Communication is also another important aspect of ensuring the success of the newly developed product. Tech start-ups should constantly communicate with customers if they are to succeed in the markets (Sanchez, Terlizzi, & Moraes, 2017). Communicating with clients also helps in winning them to participate in agile product development.

Support and feedback from customers are useful in making necessary modifications and improvements to ensure that the product matches customers' needs in the market. A company cannot exist without clients and hence it is important for tech firms to engage them when developing new products. The success of the product in the market is also depend on the company type and those firms that involve customers in their process are likely to be successful. Companies such as Blueprint Consulting Services, Tango Card, and Sophus IT Solutions have ensured the success of the products by engaging customers in the process of agile development. Working closely with clients ensure that necessary changes are made before products or services are made available in the market leading to customer satisfaction and hence transforming to

product's success. It is thus important for tech start-ups in the Pacific Northwest to engage customers in the process of agile product development.

Transition and Summary of Section 1

Agile product development has been in existence for many years. Its history dates back to the 17th century. More recently, various companies have been using this approach. Agile product development is crucial in ensuring the success of tech start-up firms in the Pacific Northwest. Engaging customers during the development of new products is useful in many ways. Companies come up with the best way of developing their agile products when they interact with the customers throughout the process of developing agile products. On the other hand, if they include customers, their chances of failing are high because there will be no feedback and hence the likelihood of making errors in the final products is high.

Collaborating with customers helps in ensuring that the company serves the needs of its customers instead of concentrating on its business product. The reason behind the failure of many tech start-ups in the Pacific Northwest is that they do not engage customers when developing their products. The power of newly developed products lies in the firm's potential to serve the needs of its clients. Customer collaboration was assessed using the following dimensions: company type, regions, and collaboration type.

The first section outlines that customer collaboration inclusion is influenced by four mediating variables. One of them is communication. Response from the customers is determined by the way firms decide to communicate its new products to them. Effective communication is essential in ensuring products success. Frequency is another dimension. It is important for companies to interact continuously with its customers. Collaboration also influences customer inclusion. Firms should work jointly with customers for them to accomplish their tasks. The last

dimension is the focus. Focusing on customer retention and collaboration helps in ensuring products success in the markets.

Three theories were used for the conceptual framework. The first one is the stakeholder theory. This theory was used in understanding roles played by different stakeholders, especially customers, in ensuring the success of products. The second one is the coordination theory. The theory emphasizes on coordinating various stakeholders when developing new products. The last one is the shared mental model. The theory is useful in coordinating the process of agile product development and facilitating team performance.

Agile software development that takes into account voice-of-the-customer input is here to stay. Masoudi, Cudney, and Paryani (2013) found success in the tourism industry by developing differentiated software that addressed the total quality management for their consumers. Agile software development has risen in popularity due to its common-sense design, team empowerment, and ability to take customer feedback and turn it into something innovative. With global competition only getting more intense, companies must adapt or be cannibalized in the current culture. The methodology provides the tools, techniques, and mindset that can let small or large companies differentiate themselves so that they stand-out in the global market.

Section 2: The Project

This section will describe the project with the intent of outlining the purpose of the project, the role of the researcher, the participants, the research method and design, the population from where the data will come from, the sampling procedures, how the data will be collected, how the data will be analyzed, and finally a description of reliability and validity. This section should also make it clear how the purpose statement will be researched and with an indication of how the variables will be analyzed. Overall, the researcher will gather the data necessary via an interview and provide analysis in a scientific fashion to provide theories in response to the original research questions posed.

Purpose Statement

The purpose of this qualitative, case study is to analyze the impact of customer collaboration on agile product development success within start-up technology companies within the Pacific Northwest. According to Hoda, Noble, and Marshall (2011), lack of customer collaboration was found to be one of the biggest challenges faced by agile product teams within 16 software development companies within New Zealand and India. The intent of the study is to evaluate whether customer collaboration is also a driving indicator of agile product development team success for start-up technology companies within the Pacific Northwest. Results from the case study interviews will be used to determine if customer collaboration does play a role in start-up technology company success within the Pacific Northwest.

Role of the Researcher

The role of the researcher will be to identify and contact participants, conduct interviews and analyze findings. Due to the specificity of the case study, care will need to be taken by the researcher to ensure that only participants are interviewed that are in technology-based start-ups

within the Pacific Northwest. In addition, the researcher will need to ensure that the participant has experience with agile product development and can talk to success criteria as well as any variables, including customer collaboration, that impacted the success of the project.

The researcher will also need to develop interview questions such that participants can be interviewed in a methodological fashion such that sufficient responses can be provided to perform the project. While the project will attempt to isolate the impact of customer collaboration on agile product development success, care will need to be taken to define success relative to the definition of the participant as success definitions could vary significantly. In addition, the researcher will need to ensure that the participants have sufficient insight into the agile product development process within their company or the interview will not be meaningful. The researcher may also need to probe the participants further if insufficient detail is provided for the project. The researcher will need to be able to have responses ready for all of these potential outcomes as without due diligence upfront on the participant, bad data may be gathered that will not be usable for the project.

Participants

The researcher plans to gain access to the participants by attending Agile conferences, going to Agile product development meet-up events, and using LinkedIn to identify/message participants that are performing Agile product development in the Pacific Northwest within start-up technology companies. After contact is made, the researcher plans to form a working relationship with the participant by explaining the purpose of the project and that it is for a dissertation to see if the participant is willing to be interviewed. It is the hope of the researcher that by scheduling a call and talking to the participant briefly to provide more context and background, the participant will feel more comfortable doing an interview.

In addition to receiving consent to do an interview, the researcher will explain that in no way will the participant's personal information, responses, or any identifying attributes be included in the report. The researcher will explain that the project will be completely anonymous by using coding techniques and that any findings will be presented for academic purposes only. By allaying any fears around the project and identifying information, it is the hope of the researcher that the participant will agree to having an interview conducted.

Research Method and Design

To analyze the failure rate of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest, a qualitative study will be used. Creswell (2014) stated that qualitative studies are used to study life experiences and help interpret them using a consistent framework. Alternatively, quantitative studies are more formal and objective with a hard science viewpoint (Violante & Vezzetti, 2017). To effectively study the problem statement and research questions, using a qualitative study will more closely align with the expected outcomes of gaining insight in a deep field with no definitive answers.

The focus of this study is to develop theory based on individual's interpretation of their experiences which is more closely aligned to qualitative studies. According to Stake (2010), qualitative studies can be subjective in nature using observation, inductive reasoning, and a holistic approach to develop a theory about a complex and broad topic. The theory in this case is whether or not customer collaboration impacts product success rates when using agile product development within a specific region, industry sector, and company size (Battistella, De Toni, & Pessot, 2017).

By employing a qualitative research method to collect data from the participants, individual interviews will be conducted to understand each experience and try to correlate themes from them. According to Bryman (2006), qualitative research is about gathering non-numerical data to gain an understanding of motivations, opinions, and reasons for an experience. There are various reasons that made the researcher use this method. One of them is that it allows evaluation of the subject's experience with greater depth. This is because qualitative research places less focus on the metrics of data compared to quantitative research. This allows a researcher to have an in-depth analysis of the events.

Another reason for choosing this method is that it operates within structures that are fluid. Gathering of data through this method is based on interviewing people's experiences and observations (Sandvik, McCormack, University of South East-Norway, Porsgrunn, & Queen Margaret University, 2018). This enables a researcher to follow events to try and piece together the soft science of why things happened the way they did. Qualitative research allows incorporation of data complexities into generated conclusions. A researcher can use gathered data to generate conclusions with more accuracy and depth and hence why this study type is beneficial.

Qualitative research was also used for this study because it promotes creativity. This method encourages the researcher to be creative when gathering information (Qin, Fan, Tappmeyer, Freeman, Prentice, & Gao, 2017). In return, information obtained will lead to better outcomes because it will be more accurate versus trying to fit it into a closed feedback loop of some kind like a survey. Additionally, qualitative research ensures the possibility of attitude explanations which gives the researcher more insight into why something was done.

Discussion of design.

According to Creswell and Poth (2018), a case study design focuses on understanding a particular situation rather than sweeping statistical survey analysis. Silverman (2016) defined a case study as an in-depth study of a certain situation to obtain data. Case studies were among the first types of research that were used in the qualitative methodology's field. According to Flick (2018), a case study is a general term used in exploring a phenomenon, group, or individual. It is, therefore, analysis and comprehensive description of an individual case. It is used during analysis and description, for example, this study aimed at analyzing the impacts of customer collaboration inclusion during agile product development within start-up technology companies within the Pacific Northwest.

A case study is the most appropriate design for this research as it will allow the researcher to collect information to answer the problem statement of exploring failure rates of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest (Ridder, 2017). This problem is very specific to a particular region, customer type, variable, and process. While the findings should be interesting, it will represent one particular group which aligns with the intent of a case study as well.

A case study also makes the most sense as the design because it allows for collection of a lot of details that would not be easily obtained using other research designs. Data collected from using this method is of greater depth and richer compared to using other experimental designs (Koivu & Hinze, 2017). This approach is qualitative in nature and results in a narrative description of experience or behavior. Researchers do not use it when making predictions or generalizing truths determining, nor when determining cause and effect. Rather, the case study

approach explores and describes a phenomenon. Some of the major characteristics of this approach are that it combines both the subjective and objective data to achieve an in-depth understanding, provides a high level of detail, and is narrowly focused. Additionally, case studies simplify complex concepts. This design allowed the researcher to obtain information on the impacts of customer collaboration inclusion with ease by using companies from the Pacific Northwest as case studies.

Another reason why the case study design was chosen over other designs is that it is more flexible and allows the researcher to explore and discover during the research process. In this study, the researcher intends to explore various factors leading to failure of tech start-ups in the Pacific Northwest. Case studies enable the researcher to gather the information needed accurately from the specific subset of users that fits the profile (Ridder, 2017). The researcher is not only interested in the impacts of customer collaboration inclusion in the process of product development, but also other factors that influence clients to participate in agile product development. Using the case study method was necessary to achieve this objective and hence is the reason why other approaches were not chosen. Additionally, the case study design is necessary for analyzing behaviors of customers toward new products to determine success which can also be subjective.

Summary of research method and design.

The qualitative method was chosen to specifically develop a theory using a case study. Other methods such as ethnography, phenomenological, narrative, and grounded theory were not selected as a case study design will best help develop theory to explain the problem statement given the specific profile of the researched. Overall, a qualitative method using a case study will be most effective to develop a theory and provide a subjective framework to examine if there is

relationship with failure rates of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest.

Population and Sampling

This section will discuss the participant population pool, definitions of the pool, and knowledge characteristics that will be required. In addition, this section will outline the sampling method, size, and type using appropriate methodology. Finally, this section will discuss the number of participants required and what will happen if the required number of participants cannot be obtained.

Discussion of Population.

The population from which the sample will be drawn is technology start-up companies in the Pacific Northwest. While the Pacific Northwest can be loosely defined, for the purposes of this study, this region will be defined as Washington, Idaho, and Oregon (Milosavljević, Esser, & Crowder, 2016). Companies that are founded within this region will be considered eligible for the study. Technology companies will be defined as companies that manufacture electronics, create software, computers or products and services relating to information technology (Frankenfield, 2018). Finally, start-up companies will be defined as companies that are less than three years old, generating revenues below \$20 million, have less than 80 employees, and remain in the control of the founder (Robehmed, 2015).

In addition to the mandate that participants work for a technology company founded within the Pacific Northwest, the eligibility criteria for the study participants will require them to have first-hand knowledge of variables that impacted agile product development success. While many participants could have generic knowledge of how an agile process works within a

company, few will have expert knowledge on how variables affected the process to a successful outcome. Specifically, the study will be isolating the impact of customer collaboration on agile product development success which will require the participant to understand what role customer collaboration played on the project. If the participant has expert information on the agile product development process but cannot determine the relevance of customer collaboration alongside other variables that potentially made the project successful, then the participant will not be eligible for the study.

Discussion of Sampling.

Purposive expert sampling will be used as the methodology for identifying who to interview. The subset of the population sampled will only include employees of technology start-up companies in the Pacific Northwest. Start-up companies are defined as companies that are less than three years old, generating revenues below \$20 million, have less than 80 employees, and remain in the control of the founder (Robehmed, 2015). As race, gender, or participant age has no bearing on the study, those criteria and other personal factors will be omitted from consideration of the population subset.

In addition however, the subset will include any employee with key knowledge on the agile product development process and the variables that contributed to a project's success. With a narrow population subset and expert information required with deep insight into the agile product development process, the researcher will be making a very deliberate selection of the informant based on the knowledge they possess (Tongco, 2007). Since this information is not widely available and most will not have knowledge of agile product development, random sampling will not be successful (Etikan, Musa, & Alkassim, 2016). The researcher plans to gain access to the participants by attending Agile conferences, going to Agile product development

meet-up events, and using LinkedIn to identify/message participants that are performing Agile product development in the Pacific Northwest within start-up technology companies.

In quantitative studies, power calculations determine which sample size (N) is necessary to demonstrate how one variable may have influence another. For qualitative interview studies however, no similar guideline for assessment of sample size exists (Malterud, Siersma, & Guassora, 2016). In substitution of power calculations, qualitative studies require the study meet a *saturation* point in which new participants to the study did not change the researcher's analysis. The *saturation* concept was first created by Glaser and Strauss (1999) as an element of comparison as part of a grounded theory framework. There is very little definitive information on when saturation is reached within a study so it is the expectation of the researcher that participants will continue to be brought into the study until the analysis is not changing at which point the researcher will deem that saturation has been achieved. Alternatively, if participants with adequate expertise cannot be located to reach a saturation point, the researcher will use fewer participants and do a deeper inquiry per individual.

Summary of population and sampling.

The researcher has a narrow pool of expert participants that will need to be identified and interviewed which could take a fair amount of time and patience to bring together. In addition, the researcher will need to vet the participants to ensure they have the knowledge and characteristics required to appropriately help answer the purpose statement of the study. Leveraging purposive sampling methodologies, the researcher can seek those qualified and eligible to participate in the study.

Data Collection

This section will discuss the instruments to be used in the qualitative study for data collection. In addition, this section will outline the data collection technique that will be used for the study. Finally, the section will document the data organization technique that will be implemented in the study.

Instruments.

The role of the researcher will be to identify and contact participants, conduct interviews based on an interview guide and analyze findings. Due to the specificity of the case study interview, care will need to be taken by the researcher to ensure that only participants are interviewed that are in technology-based start-ups within the Pacific Northwest. In addition, the researcher will need to ensure that the participant has experience with agile product development and can talk to success criteria as well as any variables, including customer collaboration, that impacted the success of the project.

An interview is the only instrument that will be used for the study. The researcher will utilize the interview guide in Appendix A to conduct the interview. The introductory statements include a welcome, introduction to the researcher, expectation setting on the time for the interview, consent to record the interview, confidentiality statements, and a review of the specific problem that the study is addressing. Overall, the purpose of the introductory statements is to allow the participant to understand the process, that their identity/data will be protected, and make them generally comfortable with the interview that is about to begin. Once the introductory statement is completed and any questions addressed, the researcher will begin the interview.

The first four questions in the interview guide focus on qualifying the participant for the study as the questions confirm the type of company, the size of company, the region of the company, and the knowledge requirements for the study. The specific problem to be addressed is the failure rate of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest. The first questions allow the researcher to gain confidence that the participant can meaningfully participate in the study if they meet the parameter requirements.

The fifth question in the interview guide is specifically answering RQ2 from the study. How a company defines a project's success is important as it serves as a baseline for understanding the perspective of the company and why they may have focused on some variables over others. By probing into the metrics that were used to define success, the researcher will come away with a more comprehensive view of the company's and participant's perspective on success.

The sixth question in the interview guide is aligned to RQ3. RQ3 is about understanding if there are other elements of the Agile software development process that affected project success rates more significantly than customer collaboration. By having the participant think of all variables and then putting some type of priority order on them, the researcher can better understand a more comprehensive picture of their perspective before introducing one particular variable to isolate on (customer collaboration). By starting more open-ended with the participant, the researcher can approach the outcomes in a more unbiased way. If instead, the researcher started asking about customer collaboration, the results of the interview could be skewed so a more open ended question is asked first.

The seventh question in the interview guide is trying to answer RQ1 in the study which is where the researcher is particularly focused. RQ1 is asking how the use of customer collaboration within the Agile software development process affects project success rates within start-up's based in the Pacific Northwest. The interview guide question is trying to bring out the perspective from the participant on how customer collaboration within the agile product development project affect success. This is the key point for the study so the researcher will probe further here to understand how the customer feedback was incorporated into the agile product development process and how the team acted on the feedback specifically. By the end of this question the researcher should have a better understanding of whether this was an important component of the project's success or not.

The eighth and last question of the interview guide is asking an open ended question to the participants if there is anything else they would like to share about their experience. By this time, the participant will have discussed how the success of a project is defined, the variables that contributed to that success, and then some insight into the role of customer collaboration. This discussion may have triggered other thoughts that the researcher may not have been able to ask so the point of this interview question is to allow the participant to share any final thoughts or insights with the researcher.

Finally, the interview guide ends with a closing statement. This section informs the participant that the interview is complete and thanks them for their participation. The researcher then has an opportunity to discuss next steps which will optionally include a copy of the dissertation being sent to the participants (with data anonymized). In addition, the researcher will then ask for any referrals for other qualified participants that the researcher may be able to

contact for an interview. Lastly, the researcher thanks the participant for their time again and encourages them to stay in touch.

Data collection techniques.

The data will be collected by the researcher conducting an interview (via telephone or in-person where possible) and then having the participant's responses recorded for transcription. The researcher will also need to develop interview questions such that participants can be interviewed in a methodological fashion such that sufficient responses can be provided to perform the project. While the project will attempt to isolate the impact of customer collaboration on agile product development success, care will need to be taken to define success relative to the definition of the participant as success definitions could vary significantly. In addition, the researcher will need to ensure that the participants have sufficient insight into the agile product development process within their company or the interview will not be meaningful. The researcher may also need to probe the participants further if insufficient detail is provided for the project. The researcher will need to be able to have responses ready for all of these potential outcomes as without due diligence upfront on the participant, bad data may be gathered that will not be usable for the project.

Data organization techniques.

The data will be collected and recorded in the order of the research questions shown in Appendix A. The interview will begin with reconfirming the qualifications of the participants in questions 1-4 outlined in Appendix A. Before asking about anything related to variables in agile product development, question 5 will be asked to baseline what success looks like for the specific participant in their company. This will allow the researcher to have a common understanding of the context for which the participant is creating their response.

Questions 6-7 in Appendix A is the crux of the case study and this is where the majority of the interview time will be spent. The researcher will request details for all variables that impacted an agile product development project's success with a general understanding of their relative priority (from the probing question listed). After all of the variables are discussed, the researcher will specifically dive into trying to understand how the use of customer collaboration within their agile product development project affected success. The probing questions in question 7 will attempt to uncover how customer collaboration was performed within the company and then how that feedback was integrated into the project. Understanding both the variables, their relative priority, whether customer collaboration played a role, and what that process looked like will greatly benefit the researcher in answering the problem statement of the research. Finally, the question 8 is fairly open-ended allowing the participant to provide any more detail on their experience with agile product development, variables, and how they impacted a project's success.

After all of that data is collected, the researcher can then review all interview responses to identify themes and consistently code throughout all participant responses. These themes will be cataloged and then be researched to achieve better insight into how the responses help provide insight into the research questions outlined in Section 1. The data will be secured on my personal laptop which is requires both a password and fingerprint to access. The disks are also encrypted which means the data will be protected as much as possible.

Summary of data collection.

This section discussed the instruments to be used in the qualitative study for data collection. In addition, this section outlined the data collection technique that will be used for

the study. Finally, the section documented the data organization technique that will be implemented in the study.

Data Analysis

For a qualitative study, coding is one of the most popular methods for analyzing qualitative research. Creswell said that “coding is the process of analyzing qualitative text data by taking them apart to see what they yield before putting the data back together in a meaningful way” (Creswell, 2015, p.156). This allows the researcher to follow a process for methodologically understanding the seemingly unorganized data that has been collected.

For this qualitative study, the inductive coding methodology will be used to analyze all data collected. Inductive coding allows the researcher to use the actual findings from the interviews as a basis for the coding rather than trying to define a codebook in advance (Christians & Carey, 1989). This methodology differs from deductive coding as in that process, the researcher will develop a codebook as a guide as it is expected the researcher can predict the paths the study will go (Christians & Carey, 1989). With such a broad set of variables that could potentially impact the agile product development process, the researcher has decided to allow the participants to shape the codebook from scratch to form a narrative about the research.

Once the interview is transcribed, the researcher will do an initial coding by reading through the data to get a familiarization with the broad ideas that are found (Elliott, 2018). Ideas from the participant will at a high level consist of how the project success is defined, variables involved in the success of an agile product development project, and whether or not customer collaboration played a role in the project success. These high level codes (or first level coding) will be recorded and then the researcher will go through a line-by-line indexing exercise to develop codes at a micro level. Micro-codes will be defined as specific supporting artifacts that

are used in the building to their conclusions. For example, if a participant says that customer collaboration did contribute to the project's success but only because of the iterative feedback loop used to relay the information, then iterative feedback loop would be a code supporting customer collaboration success. These micro-codes will be aggregated and categorized for organization in order to provide substance as to why a particular conclusion was reached. Within each category, the researcher will then look for potential themes that can be identified (Elliott, 2018). For example, if many participants comment that an iterative feedback loop between the customer and engineering is what made a project successful then that would be a theme that would be recorded. On the other hand, if many participants say that a strong project manager was more important, than that too will be noted as a theme from the research and coded appropriately.

Once all themes have been identified within a participant's interview responses, these themes will then be categorized for consistency across all other themes found in the study from other participants. It is the hope that the researcher will then begin to be able correlate common themes into defined patterns. It is expected that across various interview responses, common threads will arise that support a particular theme which the researcher will identify. These patterns will then be used to draw conclusions about the study, problem statement, and research questions. The coding process will be consistently applied across all interview responses and aggregated across the ideas, micro-codes, themes, and patterns to draw insight from the participant into how they got to the conclusions they did. The researcher will evaluate all responses to code any meaning that identified more specifically how an answer was reached with correlation back to the themes and patterns across all research. The patterns will be discussed with a focus on understanding how they tie back to the overall ideas found by the researcher.

Summary of Data Analysis.

By doing a line by line coding index of the data, coding categorizing, identifying code themes within a response, and then creating coding patterns across all participant data, the researcher expects to be able to draw conclusions from the data. Once the pattern coding is complete with all participant data included, the researcher can begin to provide unity and ideally clarity to the research discoveries. Conclusions from the data will be drawn by discovering common patterns across each participant's interview responses and providing some insight into whether or not technology start-up companies within the Pacific Northwest find that customer collaboration impacts agile product development project success.

Reliability and Validity

This section will discuss how the researcher intends to make the study both reliable and valid. Reliability will be employed by utilizing the consistent approach found in the interview guide and pre-screening questions. By asking the same questions in the same way, the results of the interview will have reliability. Validity will be addressed by the researcher ensuring there have been enough participants interviewed so that a saturation point is reached. Secondly, validity will be obtained by conducting the interviews with different people, over a period of time, and in different companies to provide a richer perspective and triangulation on the data for more applicability to the industry at large. With both reliability and validity employed, the researcher expects that the data can be used as reference for other studies or to validate that the results are based on sound research practices.

Reliability.

In order to ensure reliability, the interview guide will be used. If the researcher follows the same scripts, with the same order of questions, the same questions/probing questions, then

more confidence can be placed in the reliability of the study. The consistency of the interview guide allows the researcher to minimize concern of getting large fluctuations in responses from the participants. This methodological practice allows the researcher to ensure a normalized interview with the participants which should lead to a more reliable study (Hong, Gonzalez-Reyes, & Pluye, 2018).

In addition to the consistency of the interview guide to improve reliability of the results, the pre-screening questions allows the researcher to make sure only participants with the right background and knowledge level are admitted into the study. Without the right participants that have first-hand knowledge of agile product development within startups in the Pacific Northwest, the results may vary wildly as the participants could start conjecturing on what they believe versus what they observed. It is the goal of the researcher to ensure that the participants are qualified to also ensure reliability is improved.

Validity.

The results of this study can contribute to the overall effectiveness of agile product development but only if the study results show high validity. Validity refers to the accuracy of the findings (Cyr, 2018). While reliability highlights the consistency of the study, validity focuses on making sure that the results are correct based on the study.

The first way that the researcher will check for validity in the study is to ensure that enough participants are interviewed to hit a saturation point. Saturation is when enough interviews have been conducted that the researcher is no longer finding meaningful differences in the results (Bahramian, Mohebbi, Khami, & Quinonez, 2018). At this point, the results are no longer changing because most typical outcomes have been documented which would allow the study to have a higher degree of validity. In the case of this study, if participants only start

discussing variables that the researcher already has documented, then it is an indication that saturation may have been reached. While this is a blurry line, the researcher would not expect to reach a saturation point until the interviews are not meaningfully changing the data in the study.

The second way that the researcher will check for validity in the study is to ensure that data triangulation is also reached. Triangulation is about ensuring not only that validity has been met, but that a multi-perspective approach has been used to add richness to the study (Natow, 2019). By conducting the interviews with different people, over a period of time, and in different companies the researcher is expecting that triangulation will be employed. By utilizing these different variables of people, time, and companies the researcher will be able to triangulate on a broad perspective to make the results of the study valid to the industry as a whole.

Summary of reliability and validity.

This section discussed how the researcher intends to make the study both reliable and valid. Reliability will be employed by utilizing the consistent approach found in the interview guide and pre-screening questions. By asking the same questions in the same way, the results of the interview will have reliability. Validity will be addressed by the researcher ensuring there have been enough participants interviewed so that a saturation point is reached. Secondly, validity will be obtained by conducting the interviews with different people, over a period of time, and in different companies to provide a richer perspective and triangulation on the data for more applicability to the industry at large. With both reliability and validity employed, the researcher expects that the data can be used as reference for other studies or to validate that the results are based on sound research practices.

Transition and Summary of Section 2

This section described the project with the intent of outlining the purpose of the project, the role of the researcher, the participants, the research method and design, the population from where the data will come from, the sampling procedures, how the data will be collected, how the data will be analyzed, and finally a description of reliability and validity. This section also made it clear how the purpose statement will be researched and with an indication of how the variables will be analyzed. Overall, the researcher will gather the data necessary and provide analysis in a scientific fashion to provide theories in response to the original research questions posed. The next section will address the results from the study and not only the application to professional practice, but the implications for change within the industry.

Section 3: Application to Professional Practice and Implications for Change

This section will discuss an overview of the study that was completed, the findings from the interviews as they relate to the research questions, and how the themes discovered relate to the literature. The section will also discuss how the findings can be applied to professional practice of Agile product development for both start-up and larger companies in any region. Finally, this section will include recommendations for action, further study, and reflections from the researcher based on the research concluded.

Overview of the Study

The researcher conducted thirty interviews representing thirty different companies over the course of ten weeks averaging about three a week. Finding participants that met the stringent requirements of having worked in a technology-based start-up for at least a year with direct experience in Agile product development in the Pacific Northwest proved to be difficult. The researcher polled over two-thousand potential participants via various advertisements to get to thirty that could participate in the interview. Most of the participants volunteered from various Agile meet-ups, LinkedIn posts for advertisements, or acquaintances to the researcher through referrals.

Once a participant was identified, an interview was setup at the earliest convenience that the researcher and the participant could accommodate. The interviews averaged about 30 minutes following the interview guide (Appendix A) and were conducted in-person, over the phone, or via Cisco's WebEx video conferencing system. Each interview was recorded, transcribed, and then coded based on patterns or themes that came up in the responses. The findings from the themes and relationships to the literature are presented in the next section.

Presentation of the Findings

Based on the interview guide, the questions asked map directly to a research question so the results will be presented by theme within each research question. All themes will be presented, summarized, and related to the literature with pertinent quotes from the anonymized participants where relevant. Any outliers will be discussed in the context of the data collected as well. Conclusions formulated and presented will also be objective and strictly based on the data gathered. Where these conclusions differ from the literature, the researcher will point out such differences and address any potential saturation or triangulation differences between the studies to uncover where the discrepancies are coming from. Overall, the findings will be discussed thoroughly and objectively including all data from the interviews.

Research Question 2.

Before the researcher talked about anything concerning the participants specific experiences, the researcher would start by asking how their technology-based start-up defined their Agile project's success. Logically, this was the best place to start the interview which is why the second research question is actually explored first in the study/interviews and therefore the data will be presented for RQ2 first as well. How do technology companies define project success? The results from the research is presented in the below *Figure 3, RQ2 Project Success Criteria Theme Results* and *Figure 4, RQ2 Project Success Criteria Detailed Results*:

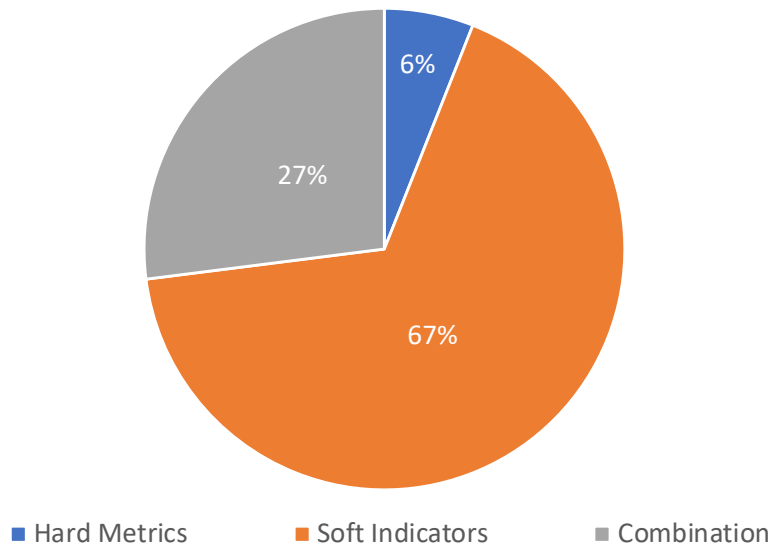


Figure 3. RQ2 project success criteria theme results.

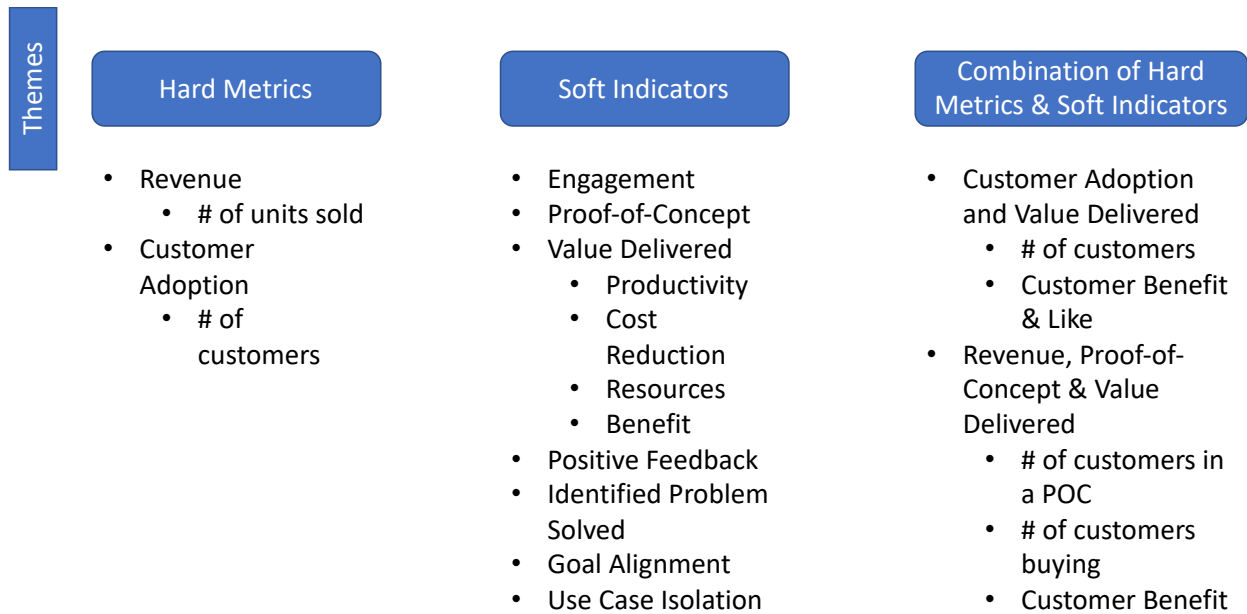


Figure 4. RQ2 project success criteria detailed results.

The raw data can be summarized with the above figures. The first observation to notice is that only 6% of the participants said their technology-based start-up used hard metrics to

define project success (Figure 3). Of the 6%, the two metrics cited was the revenue from the project (defined as the # of units sold x purchase price) and the # of customers that used the product/service. These companies relied on hard data in the terms of revenue or customer adoption to decide if the project was successful. The two participants that responded that their company used hard metrics said that if revenue was not \$100,000 in the first year then the project would be redirected or killed. The other participant said that if the project did not obtain 10 customers within the first half of the year, then the customer would be redirected or killed. If the numbers were not hit, then the project was continually redirected until it did achieve its success criteria or the project was terminated.

The second observation is that the majority of the participants relied on soft indicators to define the Agile project's success (Figure 3). When the start-up participants discussed soft indicators, they did not give a specific measurement (like having two customer meetings a week) but rather that their customer base was engaged in their product and wanted to learn more. Other soft indicators from the participants included: whether the customer at some point wanted to conduct a proof-of-concept (POC), whether the customer felt that value was delivered to them in some way (the customer felt they were more productive, that cost had been saved, that resources were more efficient, or that they just felt good using the product/service), what positive reinforcement the customer gave the company about the product, whether it identified a new problem or isolated an existing problem, and whether the goals of the product aligned with the customer need (Figure 4). There was no specific measurements given for these indicators and it was more the participants feeling that the product was getting closer to meeting their customer needs in some way or that the customer showed interest in the solution.

The participants stated that while these soft success indicators could not be measured quantitatively, participant 5 referenced “we are just excited that they liked the product” and participant 18 referenced “moving to a proof-of-concept validated that there was a real need by the customer and that we have a potential solution to help solve their problem” as a measure of success. These participants said that “we didn’t care that they didn’t buy the product immediately, we were just happy to see they were considering because it met a need they had.” The conclusion the researcher took out of these interviews is that the technology based start-ups focused on isolating a problem to solve and ensuring they had some type of momentum to solve it with the customer, even if they had no standard by which to measure their own progress.

The last group of companies combined both hard metrics and soft indicators to define success. This group wanted to see hard metrics like: revenue growth of \$100,000 (every revenue number varied by participant company), closing five POCs in a quarter, obtaining ten new logos a quarter, growing a pipeline to \$500,000 a year, showing that 75% of customers they approached had the problem the company was trying to solve for, winning 10% of all customers approached, or increasing customer adoption increase 15% quarter over quarter (Figure 4). Additionally, they wanted the same soft indicators such as: customer perception of the product being positive, having customers move into a POC, ensuring that the customer was happy with a demo, or that the problem was being solved by their solution (Figure 4). This group of companies required both sets of indicators to be met in order to declare success.

This group of companies would make adjustments to the project and/or team if both sets of hard metrics and soft indicators were not being met. If the customer liked the product, but no revenue was coming in, then they would realign the project until both sets of hard metrics and

soft indicators were achieved. One quote from participant 25 summarized this well by saying that:

Cash is king. We are NOT a non-profit, we need the cash quick and if our current solution doesn't bring in anything, but the customer does like it, we will find ways to tweak the product until the customer is ready to pay.

Overall this group, while only representing 27% of the companies interviewed, seemed to employ a hybrid soft indicator and hard metric strategy to define their project's success (Figure 3).

The overall theme the researcher took away here is that start-ups are less interested in monetary success initially and more interested in ensuring that their product is meeting a real need of the customer. Their philosophy is that if the product is solving an important need of the customer, then the money will follow (Battistella, De Toni, & Pessot, 2017). The start-ups are laser focused on making sure they fully understand what the customer is struggling with and then seeing if that pattern is consistent with a broader market. If the customer presents many problems, the participants noted that the start-ups would focus on the problems that were common denominators between many customers so that they knew their solution would be applicable to others. The researcher did feel that saturation was reached on this research question as the participants repeated many of the same answers in different ways. While some customers focused on harder metrics, the majority was focused on making life better for the customer in some way.

This result aligns with the research in that start-ups are not actually looking to sell a large amount of product from day one, but they are looking to better understand their market in order to develop a product that can sell a lot of product over a period of time. Ylimäki (2014) found

that long-term success is about building a broad funnel for companies. By loosely defining success in the initial stages of a technology start-up, the founders are allowing for exploration of what product could be most effective in solving a large suite of problems and thus increasing their funnel size that later could be converted into revenue for the company.

This theme also ties back to coordination theory as discussed in the conceptual framework. Pikkarainen, Haikara, Salo, Abrahamsson, and Still (2008) accurately reflected that companies' success largely depended on the coordination of the company to its customers. In this case, the very way the majority of the start-up companies define success is related to their interaction with customers in terms of understanding their needs and requirements. By loosely defining company objectives with hard metrics, start-ups are confirming that employees also be loose in finding broad solutions. Instead of working as quickly as possible to get one feature out the door for the customer, a more exploratory approach is taken which confirms Crowston (2015). Crowston (2015) stated employees would ensure activities are aligned to achieve organizational goals, start-ups are looking to explore a market for the biggest advantage its product could bring to it and RQ2 responses reflect that.

Overall, RQ2 data responses reflect a start-ups inquisitive nature of the market and where they can make the biggest impact. The fact that the vast majority of participants did not use hard metrics to define success at all allow the start-up employees to take the time to truly understand the environment and then create a product that could best meet the identified use cases (Figure 3). While hard metrics like revenue or customer adoption are sometimes tracked by the minority of start-ups, the focus is on ensuring that solution that the start-up is providing is aligned to the need and that it is resonating well with the customer.

Research Question 3.

Once the researcher understood how the participant's technology-based start-up in the Pacific Northwest defined their Agile project's success, the researcher would start to probe on what was the most important variables that determined that success per the interview guide (Appendix A). Intentionally, the researcher asked a very open-ended question on which variables affected success and which variables were most important. By not mentioning any variables from the beginning, the researcher allowed the participant to provide independent thoughts on what truly helped with their project's success.

In order to probe for other impactful variables, the third research question (RQ3) will attempt to isolate other elements that may have been more impactful than customer collaboration. This more open ended question allows the interviewee to express their own thoughts on other elements that were key to the project success. By having both questions around customer collaboration and other key elements, the research should discover a holistic view of what contributed to the higher project success rates.

RQ3 is about understanding if there are other elements of the Agile software development process that affected project success rates more significantly than customer collaboration. By having the participant think of all variables and then putting some type of priority order on them, the researcher can better understand a more comprehensive picture of their perspective before introducing one particular variable to isolate on (customer collaboration). By starting more open-ended with the participant, the researcher can approach the outcomes in a more unbiased way. If instead the researcher started asking about customer collaboration, then the results of the interview could be skewed so a more open ended question is asked first. The researcher never mentioned customer collaboration specifically in order to allow

all variables to be captured first, then weighed by priority later in probing question follow-ups.

The results from the research is presented in the below *Figure 5. Variables that Affected Project Success* with definitions of the variables found in *Figure 6. Definitions of variables found to impact project success:*

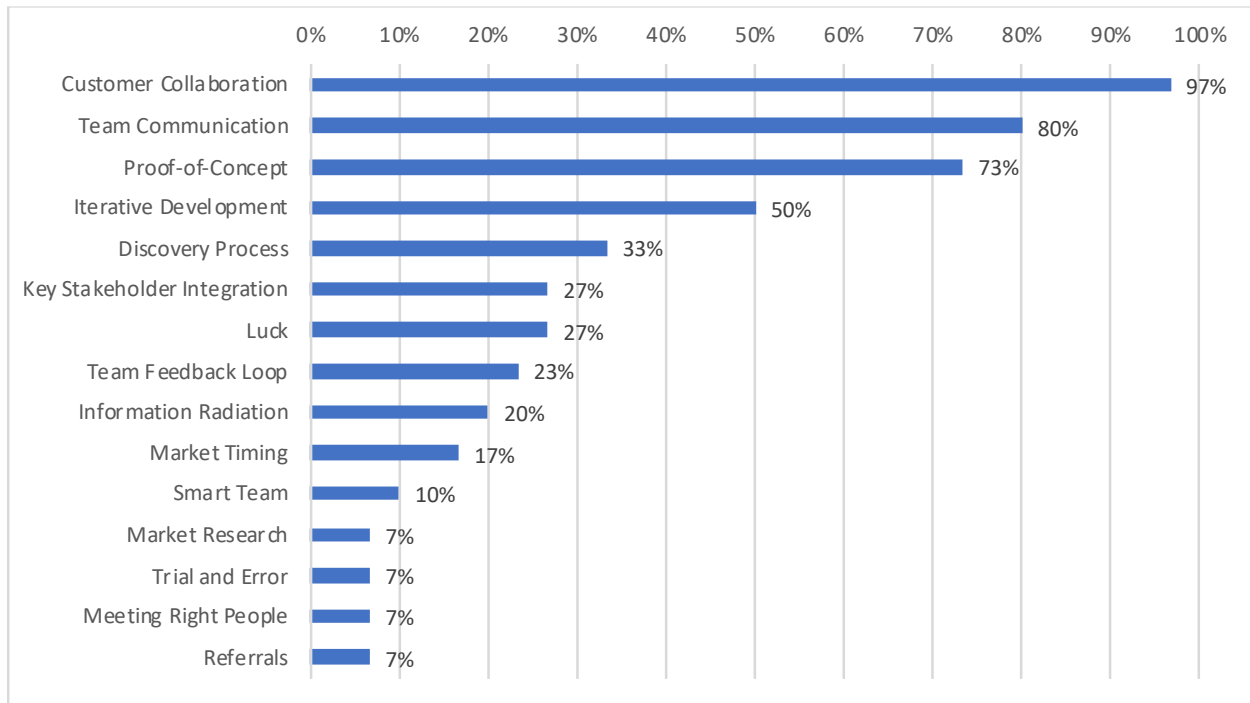


Figure 5. Variables that affected project success.

Customer Collaboration

Working with the customer on a regular basis to ensure the team is on the right track.

Team Communication

Ensuring that the team is communication each other effectively on needs, priorities, definition, and customer requirements.

Proof-of-Concept

Providing the customer with a trial version of the solution so that they can test it out, despite it not being in a final state.

Iterative Development

Making small incremental changes to the product/services and then validating that with the customer to ensure they are creating the right solution.

Discovery Process

Working with the customer or a set of customers to determine what their pain points are before trying to create a solution.

Key Stakeholder Integration

Making sure that decision makers both internally to the company, and externally to the team with the customer has the right people involved to make accurate decisions.

Luck

Random circumstances that results in a positive outcome for the team, despite the team never counting on that possibility happening.

Team Feedback Loop

Making sure that the team understands what the customer desires as those iterative touch points are made within the team.

Information Radiation

Making sure the team is communicating transparently with each other and that everyone on the team is sharing what they know.

Market Timing

The point of time that the solution/service was created relative to an overall shift in customer sentiment in the market.

Smart Team

Hiring the most brilliant people in their fields to ensure that they fully understand what the customer is saying and can translate that into a solution.

Market Research

Conducting a thorough amount of research upfront so that the market was well understood before a product/service was created.

Trial and Error

Creating a solution and then reworking it because it was not quite right in a particular way. Repeating this until the solution was right.

Meeting Right People

Networking with the right connections that allowed the team to make breakthroughs or meet the right customers with the problems they are trying to solve.

Referrals

Getting leads from 3rd parties that reference a customer that may have a need for the product/solution being created.

Figure 6. Definitions of variables found to impact project success.

All variables from the participants fit into these categories as demonstrated in the figures. Definitions were created by summarizing input from the participants. The table was sorted in terms of priority from the participants and also the frequency of which the variable came up was added to the table as well. The percentage shown reflects how many of the participants mentioned the variable as a factor that affected project success.

Customer collaboration came up in every interview except one. Additionally, when probing about where it fit in priority relative to the other variables, in all cases it came up as the most important variable. While other variables were also weighted as important like communication between the team and implementing a successful proof-of-concept for the customer, customer collaboration continued to hold the highest weighting of value for variable that contributed to Agile project success. Participants said customer collaboration “allowed the team to focus on their pain points and when the customer was absent, the team lost sight.” Another participant stated that it was of “paramount importance” and that in a “market of uncertainty, our customer was our guiding light.”

Figure 7 below groups the variables into four main categories which are customer collaboration, team communication, iterative development, and simply luck. These four categories comprise the highest weighted and most frequently mentioned variables that positively impact technology start-up Agile project success within the Pacific Northwest. Interestingly, the fourth category of luck came up time and time again. This was the belief that the start-up stumbled upon success simply by hitting the market timing at a great point or putting together a great team. This category is a bit more nebulous to define however 27% of participants believed luck played a key role in their Agile project’s success.

	Responses	% of Participants
Customer Collaboration	29	97%
Proof-of-Concept	22	73%
Discovery Process	10	33%
Key Stakeholder Integration	8	27%
Team Communication	24	80%
Team Feedback Loop	7	23%
Information Radiation	6	20%
Iterative Development	15	50%
Luck	8	27%
Market Timing	5	17%
Smart Team	3	10%
Market Research	2	7%
Trial and Error	2	7%
Meeting Right People	2	7%
Referrals	2	7%

Figure 7. Grouped variables that affected project success.

The finding that customer collaboration strongly correlated to the success of a technology start-up company was corroborated in the literature but not as strongly. Djelassi and Decoopman (2013) found that customer participation in the product development process positively affected the project but not necessarily the success. Sometimes, customer inclusion can lead a team down the wrong path and end up with something too specific to make a sustainable business from. Fidel, Schlesinger and Cervera (2015) also found that customer collaboration allows companies to create solutions that match the need of customers however other variables were equally as important. The research found in the study concluded that customer collaboration is the most important variable which is a notable difference than the Fidel, Schlesinger and Cervera (2015) which had multiple variables at equal weighting. This study also differs from Djelassi and Decoopman (2013) as the research found that the participants suggested that their projects were more successful versus just improving the product development process itself.

Furthermore, Moon, Johnson, Mariadoss, and Cullen (2018) describes the role of customer in the process of developing new products but does not emphasize how critical a function they play for companies like start-ups. They also believe suppliers play a critical role in the development of a new product which is not found in the research that was concluded. This is an interesting omission in the data and the researcher believes this is due to the scope of the research. When focusing on start-ups, these companies are searching for what is going to do well in the market overall which is why there is so much emphasis on the customer. In bigger companies, many times the customer base has been long established meaning that suppliers may play a bigger role in new product development.

In a similar study, Dikert, Paasivaara, and Lassenius (2016) identified 29 success factors in 11 categories that contributed to the overall success of the project. The authors believe success is largely a blend of all the variables versus the research that was concluded puts much more emphasis on customer collaboration. The researcher attributes this difference again to the diversity of the companies examined. When focusing on one sub-segment of the overall market, especially for a new company like a start-up, ensuring that the product is aligned to a customer is of utmost importance.

Lowry and Wilson (2016) found that while customer collaboration was generally good, there can be a saturation point to where single threaded collaboration negatively influences the outcome of the project. This can also be true for start-ups however the commentary from the participants in this study warned against focusing on one customer and instead to focus on common denominators across several customers to ensure the company does not end up with a product that is only suited for one customer.

Relating to the conceptual framework, Jones, Wicks, and Freeman (2017) found that firms should not only create value for shareholders but also stakeholders including communities (thus stakeholder theory), investors, employees, suppliers, and finally, customers. The research that was just completed does not align with this theory. Participants did not speak to communities, investors, or suppliers at all. Instead, participants focused on alignment to the customer in everything they are building to ensure that the end product would fit a specific market. It is the belief of the researcher that Jones, Wicks, and Freeman (2017) may have been generalizing to a broader subset of companies rather than simply start-ups. Start-ups are focused on the customer primarily within Agile product development versus generalizing to a broader group. Unless the start-up can become successful and build revenue, the other groups are less of a focus which may explain some of the lack of emphasis found in other research.

Overall, customer collaboration was the most important variable that impacted technology start-up success for Agile product development projects within the Pacific Northwest. Other literature and research do not have such a strong rating to customer collaboration however their scopes were not limited to start-ups only. This scope may explain the variance in this research versus other groups studied. Additionally, the Agile product development methodology by nature encourages a high amount of customer collaboration. The combination of these two facts may be skewing the importance of customer collaboration high but it does make sense for the market segment that is being evaluated in the research with the Agile product development methodology.

Research Question 1.

The last research question (RQ1) to be examined is how does the use of customer collaboration within the Agile software development process affect project success rates within

start-ups based in the Pacific Northwest? The researcher established a baseline of project success from the participant, mapped and weighted the importance of various variables to the success of the project, and now the researcher is attempting to understand how customer collaboration was used within the Agile software development process such that it affects project success rates within technology start-ups in the Pacific Northwest. *Figure 8. How Customer Collaboration Impacts Success Rates* below summarizes the findings from the research:

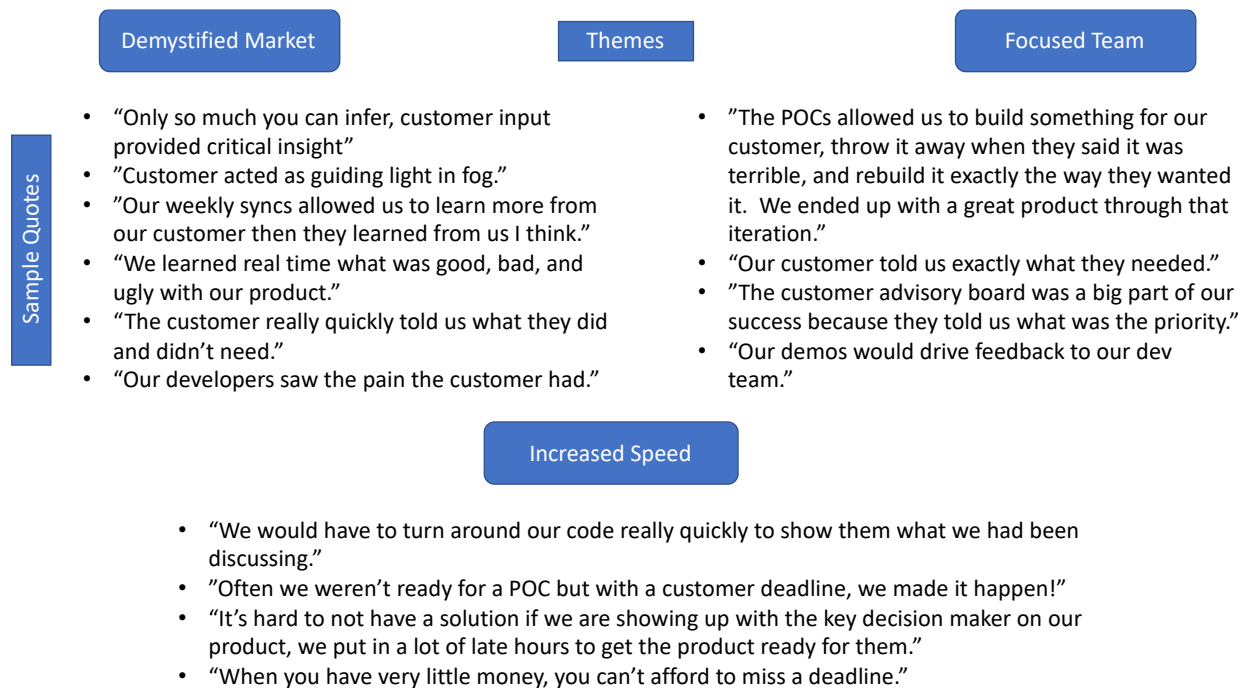


Figure 8. Quote themes on how customer collaboration impacts success rates.

Three main themes came out of the research. First, participants in different ways said that having that close collaboration with their customers demystified the market for them allowing them to have a higher chance of succeeding. The quotes found in Figure 8. How Customer Collaboration Impacts Success Rates outline examples of what participants said helped them succeed in the market. By working very closely with the customer, start-up companies were able to isolate use cases they could solve to ensure their products met the requirements they were hearing from the customer.

Hoda, Noble, and Marshall (2011) found that the lack of customer collaboration was one of the biggest challenges faced by agile product teams within 16 software development companies within New Zealand and India. This research confirms those findings. It indicates that the inclusion of customer collaboration was start-up companies' biggest strengths and allowed participants to better understand the market opportunity. By not having customer collaboration present in the Hoda, Noble, and Marshall (2011) companies researched, the agile product teams struggled to be successful. This is not a surprise as this research validates that the most important variable to a start-up success is customer collaboration.

Second, having more focus as a team increased their probability of success. Ridder (2017) found high failure rates for IT projects overall. While the research does not provide an exact percentage of success for IT projects, the data certainly suggests that using customer collaboration improves success rates from the industry norm. This literature indicates that across the industry the success of these IT projects is historically low (Sanchez, Terlizzi, & Moraes, 2017). Agile has an opportunity to increase the success of IT projects due to the research indicating that customer collaboration drives more focus of the team to solve the problems they unearthed during the discovery process with the customer. By clearly understanding the pain points and requirements, Agile teams demonstrated being able to address those needs in a focused way.

Finally, customer collaboration actually drove the teams to be faster which increased their probability for success within their projects. Start-ups did not have the luxury of time to get everything right the first time. The research indicated that start-ups often took a minimum viable product (MVP) approach to development where they would present something to the customer for feedback quickly in order to better refine it. Instead of doing months of research to present a

product to the customer, the participants indicated they would spend weeks if not days to put together something for the customer and then polish it from there. By iterating often and continuously, start-ups were able to not only move more quickly, but end with a better product than if they had not had that interaction with the customer.

This model is significantly different than that proposed by Stoica, Ghilic-Micu, Mircea, and Uscatu (2016) where the product went through multiple stage gates before it was shown to the customer. The process was leapfrogged for speed's sake to get the product to the customer for continuous feedback. By making continuous changes with the customer, the participants indicated they were also able to bypass the issues brought up by Baseer, Rama, and Shoban (2015) which was that every change created significant delays in getting the product out the door. The only feedback loop was between the developers and the customer instead of a bureaucratic process that increased the time it took to get the product out the door.

Overall, having closer customer collaboration allowed technology start-ups in the Pacific Northwest practicing Agile product development to demystify the market, focus the team, and move more quickly based on the research. This research helps validate Battistella, De Toni, and Pessot's (2017) theory that success rates do increase when agile product development is implemented. The data indicates that the rationale for this is the strong inclusion of customer collaboration throughout the entire product development process. The data also indicates that Williams, Ariyachandra, and Frolick (2017) was right in saying that Agile-development projects can improve project success. How much it improves success is still unknown as most of the participants are working on active projects where the success is still pending.

Summary of the findings.

To summarize the overall findings in the context of the research questions, RQ2 data suggests that the vast majority of participants did not use hard metrics to define success at all allow the start-up employees to take the time to truly understand the environment and then create a product that could best meet the identified use cases (Figure 3). While hard metrics like revenue or customer adoption are sometimes tracked by the minority of start-ups, the focus is on ensuring that solution that the start-up is providing is aligned to the need and that it is resonating well with the customer. The conclusion for RQ2 is that start-ups focus on soft indicators such as understanding their customer, isolating the problem, and using that data to get to a solution while getting customer validation along the way (Figure 3).

For RQ3 overall, customer collaboration was the most important and most frequent variable that impacted technology start-up success for Agile product development projects within the Pacific Northwest based on the research. Other literature and research do not have such a strong rating to customer collaboration however their scopes were not limited to start-ups only (Belderbos, Carree, Lokshin, & Sastre, 2015). This scope may explain the variance in this research versus other groups studied. Additionally, the Agile product development methodology by nature encourages a high amount of customer collaboration. The combination of these two facts may be skewing the importance of customer collaboration high but it does make sense for the market segment that is being evaluated in the research with the Agile product development methodology.

Finally, the research suggests that having closer customer collaboration allowed technology start-ups in the Pacific Northwest practicing Agile product development to demystify the market, focus the team, and move more quickly based on the research thus answering RQ1.

This research helps validate Battistella, De Toni, and Pessot's (2017) theory that success rates does increase when agile product development is implemented. The data indicates that the rationale for this is the strong inclusion of customer collaboration throughout the entire product development process. The data also indicates that Williams, Ariyachandra, and Frolick (2017) was right in saying that Agile-development projects can improve project success. How much it improves success is still unknown as most of the participants are working on active projects where the success is still pending.

Applications to Professional Practice

Aligned with the themes from the study's findings based on the research questions, this section will cover what companies (start-ups and more mature companies alike) can apply from this research. While this research is bounded by a particular geographic region (Pacific Northwest), company size (start-up), product development methodology (Agile), and industry (technology), the researcher will draw applications that could apply to any company, in any region, with any size, and doing product development with any type of methodology. It is not expected this research will be a perfect fit to apply to an organization, but the general guidelines could serve as a guide for what can potentially improve their business outcomes and ultimately revenue.

First, companies should measure project success largely by soft indicators such as customer interest, POC feedback, and alignment to solutions for critical customer problems (Figure 3). The research found that more than two-thirds of participants interviewed said their companies used soft indicators to decide if their project was successful. Large companies often will measure a new project by unachievable hard success metrics such as revenue numbers or customer orders (Albert, Balve, & Spang, 2017). If the company does not meet those objectives,

then no matter what the soft indicators suggest, leadership will kill the project and reassign the team. Finance organizations especially have no tools to measure the soft indicators when evaluating return-on-investment (ROI) and may unintentionally kill projects that could change the company's revenue trajectory for years to come. With more time to allow the team to iterate on the customer feedback, the team could produce a market changing, if not world changing, solutions. The research suggests that measuring a company explicitly on hard metrics is not representative of how start-ups make decisions and ultimately how major corporations are formed if an idea is successful (Figure 3; Chrisman, Chua, De Massis, Minola, & Vismara, 2016).

In relation to a Christian's biblical framework, God does not measure the spirituality of a person's life with hard metrics either. God is not counting the number of nice things a person does on a particular day, how many times a person speaks about Jesus, or how many prayers are said in a month to determine if someone goes to heaven. Christians need to live their life for Jesus to get to the Father, John 14:6 says "Jesus said to him, 'I am the way, and the truth, and the life; no one comes to the Father but through Me.'" Living for Jesus is not a set number of tasks but an ongoing love for Christ that guides everyday actions to feed the poor, tend to the sick, and serve as a light for the world. These are soft indicators that a person is living for Christ.

Just as research cannot measure if someone is a Christian, the research completed in this study suggests that most technology start-ups in the Pacific Northwest do not try to measure project success with hard metrics. Instead, they measure project success by a series of data points, indicators, feelings, and overall directional parity with their customers. They fundamentally believe that their team will be successful if they are aligned with their customer need and executing towards that direction. Just as these start-ups are constantly striving to be

closer to their customer for success, so should Christians strive to be closer to Jesus for the eternal reward.

The second major finding from the research that could be applied to professional practice is that customer collaboration and communication are the two most important behaviors that determine the success of a product development project (Figure 5). Customer collaboration could come in the form of a POC, customer advisory board, regular meetings with the customer for feedback, demos, or even constant conversation with the customer. The more customer collaboration and communication that happens, the smarter the team becomes on the pain points that the customer has and what their solution needs to contain to solve it (Figure 7; Chen, C. C. V., Chen, C. J., & Lin, 2015). If that problem that is isolated is something an entire market is struggling with, then a company has a real product/service that can be sold at scale.

Doing the research upfront with the customer and communicating that to the internal team to ensure all stakeholders are aligned on the solution is key to company's success based on the study findings (Figure 5). Instead of focusing on internal company stakeholder's opinions, Wall Street, or company leadership, companies should focus outwardly on their customer to form solutions and execute strategy. Other sources of input can be a distraction from the true customer and the team can be sidetracked chasing ideas that may not be aligned to the customer or produce meaningful revenue. Companies that are aligned to a customer need and communicating well internally have a higher chance of being successful based on the research (Figure 5; DeMers, 2018).

With regards to the biblical framework, there can be a similar comparison. People should be actively focused on understanding what God wants, not what man wants. The only way to truly understand what God wants, is by collaborating with Him through reading His word and

prayer. By doing detailed studies of the Bible, people can discern what action they need to take in their own lives to become closer to Him. Man can create many distractions that take them away from what should be the focus in life. Each of these paths lead to destruction according to Matthew 7:13-14 which reads:

Enter by the narrow gate; for wide is the gate and broad is the way that leads to destruction, and there are many who go in by it. Because narrow is the gate and difficult is the way which leads to life, and there are few who find it.

By focusing on the spiritual/eternal and ignoring the physical/temporal, people can have a better understanding of what God wants for His people on this earth. Just as start-ups are very focused on their customer for guidance, Christians should be laser focused on Christ and orient their life around what He wants.

Finally, the last finding from the research that can be applied to professional practice is that when customer collaboration is present, it demystifies the market, focuses the team, and increases the team's speed (Figure 8). The research indicates that teams that are iteratively working with the customer on a solution to their problem, have better clarity on the overall market they are pursuing (Dingsøyr & Moe, 2014). This clarity demystifies the market and allows the company to focus on solving a specific use case that the entire market may be struggling with.

Companies may not engage their customer as often as they should using iterative feedback along the way in product development. Some companies may only get feedback in the beginning and at the end of a project. The research suggests that companies should get feedback at every step along the product development process (Figure 5 & 6). That way, companies can

make any necessary adjustments along the way to ensure they end up with a product that is aligned to a customer/market need.

As a result of having isolated a problem the customer is dealing with, the team can focus on solving that problem. Larger companies may sometimes lose sight of the customer as they focus on ordering systems, executive direction, or any other non-customer variable that is thrown at the team (Elbanna & Sarker, 2016). A major application for any company is to not distract the product development teams with overhead that takes them away from a customer focus. Ensuring that the team remains focused is critical because if the team follows another target, then it is more likely they will produce a product that is not aligned with the customer/market problem (Figure 8).

Finally, an application from the research that any sort of company can apply is that with constant customer interaction, company leadership can expect an increase in their team's speed (Figure 8; Fitzgerald, Stol, O'Sullivan, & O'Brien, 2013). Iterative feedback seems to accelerate development by increasing motivation for the team based on the interviews with participants. A developer appears to be more motivated to complete quality work when they know that a specific customer will be evaluating a prototype. By interacting and collaboratively developing with their customer, the product development team demonstrates faster development speeds (Found & Harrison, 2012).

This can be useful for customers that want to increase velocity of their teams. Instead of using negative reinforcement like threatening jobs, creating artificial timelines, or requiring overtime, a company can have the team work with a customer more closely to increase speed. This is a useful tool that can be used as a carrot for teams rather than a stick. Companies

encouraging close customer development could increase the productivity of their teams, clarify the market, and focus the team based on the study findings (Figure 8).

From a biblical perspective, focusing on God not only can give people the clarity of what they should do with their lives, but it provides the spiritual focus that is required to please God. Hebrews 11:6 says “But without faith it is impossible to please Him, for he who comes to God must believe that He is, and that He is a rewarder of those who diligently seek Him.” Faith is rewarded by God for those that diligently seek Him. Just as start-ups are diligently seeking a customer’s problems/needs, so a Christian must seek God.

When love for God exists, people want to do what is right. While they are aware that hell is for those that do not follow Him, people that are diligently seeking God do not focus on the punishment. They are running towards the reward. 1 Corinthians 9:24-27 says that we are running towards an “imperishable crown” which is eternal heaven with the Father in heaven. When someone devotes their life to Christ, they want to do what God wants as quickly as possible because they love Him. Just as start-ups love to solve customers’ problems, when they understand their will, they also run towards a solution.

From the perspective of marketing as a field of study, these conclusions all align with the successful principles of marketing as well. No marketing campaign can be effective without first understanding and catering to the audience’s needs (Fidel, Schlesinger, & Cervera, 2015). This includes understanding at a deep level both their stated and unstated desires. The research completed in this study validate that conclusion as start-ups rely heavily on intimately knowing their customer before they try to sell anything. They are hyper focused on making sure they truly understand the problem that the customer has before trying to address it. Marketing similarly

must understand the problem their audience has and then create something that will catch their attention to educate them on how the product/services solves their problem.

Marketing is a field that is driven by metrics (Sridhar, Naik, & Kelkar, 2017). Whether it is clicks, sales, search traffic, or customer wins. Large companies can often be guilty of only evaluating marketing success based on these types of metrics. Based on the research, start-ups put more value on whether they are pleasing their customer versus how many times the customer watched the latest ad. A lesson that all marketing organizations should remember is that they should put more emphasis on solving customer problems and less importance to some of the material that surrounds it (Hamby, Pierce, & Brinberg, 2017). If there truly is a customer problem and it has been researched well, then marketing should be about educating the customer on how their solution solves the problem. Once that hurdle is over, companies can focus on crafting the best strategy to sell that product but there fundamentally needs to be a problem and there needs to be a solution (Cooper, 2018). The research indicates that start-ups are determined to get that portion right and assume the rest will work out (Figure 6). While this strategy may not work for more established markets (because the problem/solution is validated, now the company needs awareness), for start-ups it is essential to get the company off the ground.

Recommendations for Action

The first recommendation for action based on the research study conclusions is that Agile product development teams should ensure that they are solving for a problem the customer has by collaborating intimately (Figure 7). Agile teams may not provide regular demos to the customer, do POCs, or have regular communication. While it can be hard to be disciplined about coordinating with busy customers, product teams must find time to stay in sync to have a better chance of not only understanding their problem but creating a viable solution for it that they are

willing to pay for. The specific actions the team can take is to request that the product owner take the necessary steps to setup bi-weekly meetings at least with the customer to demo, discuss, and make adjustments to the overall product/service direction.

Once the feedback is received via the regular syncs with the customer, the researcher would recommend that product owners should provide transparent communication to the rest of the Agile team by allowing them to attend the sessions or at the very least providing very detailed notes (Figure 8). Allowing the team to ask questions directly to the customer is very beneficial as it helps them understand that what they are working on is real and it is for actual people. Developers can sometimes lose track that the work they are doing will be consumed by someone with a problem. Helping them connect the dots can increase focus, speed/motivation, and market understanding leading to a better solution at the outcome of the project based on the study findings.

Finally, the last recommendation is for start-up founders, Agile team leaders, and even large company executive management. The recommendation is that for new projects, do not judge the project's success entirely on hard metrics like revenue or customer adoption (Figure 4). Allow the team to learn from the customer, make mistakes, and course correct. As long as these leaders can continually help guide the team to solve the customer problem and apply it to the overall market more generically, then the team is much more likely to find success. Specifically, if the finance department recommends to kill a project because they have not made as much money as expected in a period of time, then leadership should step in to evaluate if the team is on the right track using soft indicators such as the amount of engagement the team has with their customers, if POCs are yielding positive results, if value is being delivered to the customer, and if the team is getting positive feedback for solving real problems the customer has. While there

is no standard measure the industry uses to assess whether or not the customer problem has been solved, the customer themselves can highlight a specific pain point that no longer exists (Cordeiro & Tewari, 2015). If these soft indicators are pointing to progress in solving a customer pain point, then allow the team more time to be successful rather than judging them solely on hard metrics like revenue. Follow-up with the customer and assess whether or not the team is on to a valuable solution or whether the solution produced will not produce the mass market results expected. While the team must make money at some point to be successful, constant evaluation of progress by leadership and more importantly the customer is a better sign of future project success than an arbitrary number at a specific point in time.

The results of this study can be disseminated to Agile project teams and company leadership at Agile related conferences, e-mail distribution to start-up companies, and targeted research summaries to large company leadership. Additionally, company leadership acting as a customer to another company should insist that their partner work iteratively with them in an Agile way with constant communication. The last thing company leadership would want is to expect a product delivered in a specific way and the solution not live up to expectations.

Recommendations for Further Study

One recommendation for further study is to do the exact same research study but for non-Agile product development projects. The author wonders if the same focus on customers would show up in IT projects that were not based on the Agile product development technique. It is the suspicion of the author that in non-Agile IT projects, there may be less focus on the customer and more focus on internal or other external stakeholders (such as investors). Agile product development is deliberately very focused on the customer which may not have the same focus on non-Agile related projects.

Another recommendation for further study is to change the perspective of this research. The focus of this research study has been on the Agile project teams however inversely, new research could be conducted from the customer perspective. How many customers are actively influencing their partners on product/service/solution direction? Are they clearly identifying their pain points and problems? Does the customer change their mind every month and churn the Agile project team so that they end up not being able to deliver an effective solution? There is a lot of training, certifications, and education on Agile product development practices but there is not a lot of research available pertaining to how a customer should behave in those teams. Customers have an extremely important role in being able to effectively guide their partner companies in the work they need done and why. Training could be developed to help educate the customer and allow them to be a more effective partner so that they end up with the solution they need.

There is little more frustrating than telling someone what is needed and after a period of time not getting what is expected. A breakdown in communication occurred and research could also be undertaken to understand why that occurred. Regardless, there is a lot of need to do research to more effectively understand the role of the customer in Agile teams and ways to prevent communication breakdown. With research, more training, and focus by partners/customers alike Agile product development teams can be more effective overall in delivering value jointly.

Reflections

The researcher found the research process frustrating but the findings exhilarating. Trying to schedule thirty interviews while working full time has been an extreme challenge however conducting the interviews has been very rewarding as the researcher has created a

fantastic network of now friends that have provided deep insights into their businesses. This type of insight has been invaluable to the researcher as was able to have uninterrupted time learning from the success and failures of others. In start-ups, there are many passionate people that vigorously believe in a specific product/solution/service and they are willing to do whatever it takes to make it successful because ultimately their families are depending on their success. This passion has been utterly inspiring to witness and has truly provided the researcher with an experience that will stick with him for the rest of his life.

That said, the researcher did have to hold himself in check to not interject personal beliefs, bias, or preconceived ideas into the research. While the researcher had beliefs before the study even begun, extreme care was made to not “pollute” the study with personal bias. The interview guide was strictly followed and the interviews with all participants was purely objective. Once the interview ended, the researcher would then talk more frankly about his own thoughts to the participants. That post-interview discussion became one of the highlights of the experience because the researcher was able to bond over the participant experience and share stories. That said, at no point was the researcher aware that any personal opinions entered the study.

The researcher’s opinions have shifted dramatically as a result of the study. While the researcher believed that customer collaboration was an important factor for start-up success before the study, the researcher certainly did not expect to see 97% of all participants say that it was the most important variable with regards to their project’s success. That is an overwhelmingly high number that caused the researcher to wonder if that number was so high because of some suggestion from the researcher during the study. Upon reflection, the researcher found no evidence of artificially creating that finding which suggests that customer

collaboration truly is life or death to start-ups. The ones that most effectively gather and harness customer collaboration had more success in their start-ups. That finding is still astounding to the researcher which cannot be underestimated by Agile project teams. Unfortunately, the researcher feels like many Agile teams do a poor or non-existent job of gathering customer collaboration in big companies as they are more removed from the customer. Ensuring that the customer remains the focus whether it is a big or small company will be something that the researcher never forgets.

Finally, throughout the study, the researcher reflected on two Bible verses that fit the themes found in the study. The first was James 4:14 which reads “whereas you do not know what will happen tomorrow. For what is your life? It is even a vapor that appears for a little time and then vanishes away.” Most start-up companies fail because they do a poor job on some variable or many variables in the market. No one person has a silver bullet for what will make a company effective, luck definitely comes to play in the decision as well but focusing on the customer seems to be a large success factor that cannot be ignored especially by a start-up. Trusting in God was a variable that did not come up in the interviews which was unfortunate. The participants were so involved in the world that the researcher suspects many did not have God in their life. Long after their start-up has succeeded or failed, everyone will come to know God at judgement day. Reflecting on James 4:14 helped ground the researcher along the way on what is truly important in life.

The second verse that kept coming to the researcher was Romans 12:2 which reads:
And do not be conformed to this world, but be transformed by the renewing of your mind, that you may prove what is that good and acceptable and perfect will of God.

Most start-ups interviewed kept that mindset in the forefront of their behavior. Instead of accepting the solutions around them and being conformed to the world, they decided to help transform the world in some significant way. The participants are innovators trying to make life better for someone in some way. This passion will also stick with the researcher for the rest of his life.

The second part of Romans 12:2 is important as well as companies will only succeed if it is the will of God. Trusting on God can get people through any trial. It does require people to let go of their own strength and lean on God which is counterintuitive to today's self-independent culture. The researcher suspects if more people would turn their problems over to God through prayer, there may be higher success rates demonstrated as well.

Summary and Study Conclusions

To recap, the purpose of this qualitative case study was to analyze the impact of customer collaboration on agile product development success within start-up technology companies within the Pacific Northwest. According to Hoda, Noble, and Marshall (2011) lack of customer collaboration was found to be one of the biggest challenges faced by agile product teams within 16 software development companies within New Zealand and India. The intent of the study was to evaluate whether customer collaboration is also a driving indicator of agile product development team success for start-up technology companies within the Pacific Northwest. Results from the case study interviews will be used to determine if customer collaboration does play a role in start-up technology company success within the Pacific Northwest.

After concluding this study, the researcher can state that the results of this study show that Hoda, Noble, and Marshall (2011) was partially right in that customer collaboration was found to be one of the most important factors for agile product teams. The difference in the

Hoda, Noble, and Marshall (2011) and the research concluded is that, at least for technology start-ups in the Pacific Northwest practicing Agile product development, customer collaboration was the most present and most important variable. There was no lack of customer collaboration as 97% of participants interviewed stated that customer collaboration was the most important success factor for their project.

The gap in the literature that has been closed is specifically what the impact of customer collaboration is on technology start-up companies in the Pacific Northwest. This gap was closed by the researcher conducting thirty interviews and recording the findings objectively, discovering themes, and summarizing the themes in the findings of this study. These findings have not been present in any other research and the insights from the research are not only customer collaboration focused, but how the start-up companies use this feedback or how they measure their own success. The below points are the key findings from this research study:

1. The vast majority of participants did not use hard metrics to define success at all which allows the start-up employees to take the time to truly understand the environment and then create a product that could best meet the identified use cases. While hard metrics like revenue or customer adoption are sometimes tracked by the minority of start-ups, the focus is on ensuring that solution that the start-up is providing is aligned to the need and that it is resonating well with the customer. The conclusion is that start-ups focus on soft indicators such as understanding their customer, isolating the problem, and using that data to get to a solution while getting customer validation along the way.
2. Customer collaboration was the most important and most frequent variable that impacted technology start-up success for Agile product development projects within the Pacific Northwest based on the research. Other literature and research do not have such a

strong rating to customer collaboration however their scopes were not limited to start-ups only. This scope may explain the variance in this research versus other groups studied. Additionally, the Agile product development methodology by nature encourages a high amount of customer collaboration. The combination of these two facts may be skewing the importance of customer collaboration high but it does make sense for the market segment that is being evaluated in the research with the Agile product development methodology.

3. Finally, the research suggests that having closer customer collaboration allowed technology start-ups in the Pacific Northwest practicing Agile product development to demystify the market, focus the team, and move more quickly. This research helps validate Battistella, De Toni, and Pessot's (2017) theory that success rates does increase when agile product development is implemented. The data indicates that the rationale for this is the strong inclusion of customer collaboration throughout the entire product development process. The data also indicates that Williams, Ariyachandra, and Frolick (2017) was right in saying that Agile-development projects can improve project success. How much it improves success is still unknown as most of the participants are working on active projects where the success is still pending.

These findings conclude the themes discovered in the interviews by the researcher.

Overall, start-ups are a market unto themselves and these companies very intentionally have to operate in specific ways in order to survive to the next day. These findings represent a very specific subset of the overall market, being technology start-ups in the Pacific Northwest, however the results can be generalized to both big and small companies in any industry and region. While the study findings parallel the literature (Hoda, Noble, & Marshall, 2011), there

are some distinct differences in the findings mainly centering around how critical customer collaboration is to project success. Agile teams and company leadership should pay close attention to the findings and take immediate action within their organizations to help improve success rates of projects.

In conclusion, Agile teams and company leadership should ensure that they are measuring teams/projects using the right combination of hard metrics and soft indicators (Figure 4), that they are integrating intensive customer collaboration and communication into their projects (Figure 5), and that they are using that feedback to shape and motivate their solution/teams to improve success rates of their projects (Figure 8). One recommendation for action by the researcher based on the findings is for leaders to provide an environment that allows the project team to iteratively collaborate with the customer, which will allow the teams to innovate on solutions that solve customer problems. Additionally, the team needs to make sure they are not solving one specific problem for just one customer, but they are solving for the common denominators in the select market they are focusing on. By closely collaborating with the customer, teams can demystify their market, increase focus, and speed based on the findings (Figure 8). This study highlights new findings from the literature specific to technology-based start-ups in the Pacific Northwest such as 97% of participants believing customer collaboration was the most important variable for their success and the benefits that customer collaboration can bring to the team. Agile as a product development method for IT based projects forces a close partnership with the team's customer as the philosophy emphasizes demos, brainstorming sessions, and frequent check-ins (Cooper & Sommer, 2018). Start-ups effectively using this philosophy can have several benefits as highlighted in the study. Overall, this research was

fascinating to conduct because it identified how critical customer collaboration was for start-ups and the power that the collaboration can have over the team's (and company's) overall success.

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Appendix A: Interview Guide

Welcome and thank you for your participation today. My name is Chad Thompson and I am a graduate student at Liberty University conducting a study in partial fulfillment of the requirements for the degree of Doctor of Business Administration. Thank you for responding to my request for to chat.

This interview will take about 60 minutes and will include a confirmation of the 4 pre-interview questions and then 8 questions regarding your agile product development experiences and what contributed to your project's success. I would like your permission to record this interview, so I may accurately document the information you convey. If at any time during the interview you wish to discontinue the use of the recorder or the interview itself, please feel free to let me know. All of your responses are confidential. Your responses will remain confidential and will be used to develop a better understanding what contributes to a successful agile product development project, if anything. The purpose of this case study is to analyze the impact of customer collaboration on agile product development success within start-up technology companies within the Pacific Northwest.

At this time, I would like to remind you of your written consent to participate in this study. Your participation in this interview is completely voluntary. If at any time you need to stop, take a break, or return to a previous question, please let me know. You may also withdraw your participation at any time without consequence. Do you have any questions or concerns before we begin? Then with your permission we will begin the interview.

The specific problem to be addressed is the failure rate of technology based product development projects using the Agile software development process, including customer collaboration, within start-ups in the Pacific Northwest. As per my previous note, to be eligible

to participate in this study, you needed to work for a company in the Pacific Northwest, work for a start-up, work for a technology company, and have first-hand knowledge of variables that impacted agile product development success of a project within your company? I will begin by reconfirming those questions and getting more context from you:

1. Can you confirm that you do work for a company founded in the Pacific Northwest which will be defined as Washington, Idaho, and Oregon?
2. Can you confirm you work for a start-up company which will be defined as start-up companies will be defined as companies that are less than three years old, generating revenues below \$20 million, have less than 80 employees, and remain in the control of the founder?
3. Can you confirm you work for a technology company which will be defined as companies that manufacture electronics, create software, computers or products and services relating to information technology?
4. Finally, can you confirm you have first-hand knowledge of variables that impacted agile product development success of a project within your company?

Thank you for that. The remaining part of the interview will focus on the variables that affected your project's success. The first question is:

5. How does your technology company define project success?
 - a. Probing question: What specific metrics were used to measure success?
6. What variables affected your agile product development project's success?
 - a. Probing question: Which variables were more important for the success of the project than others?

7. How does the use of customer collaboration within your agile product development project affect success?
 - a. Probing question: What did customer collaboration look like at your company?
 - b. Probing question: How did you take that feedback and use it?
8. Before we conclude this interview, is there anything else you would like to share about your experience with agile product development?

Thank you for your participation! I am happy to send you a copy of the completed dissertation when complete if you are interested. If you know of others that also qualify to participate in the study, then I would certainly welcome the help. Thank you again and I hope to stay in touch! Good luck!