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Embracing Live Stream Video: A Virtual Conundrum

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Requirements for the degree
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Philip A. van Haaster

Division of Online and Professional Studies

Department of Business Administration

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Embracing Live Stream Video: A Virtual Conundrum

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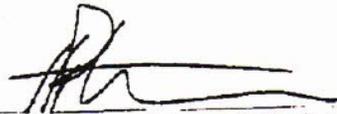
Philip A. van Haaster

has been approved by the

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in partial fulfillment of the requirements

for the degree Doctor of Public Administration



Henry L. Petersen, Ph.D., Committee Chair



A. Patalowski, Ph.D., Committee Member



James Yoo, Ph.D., Committee Member



Drs. Davis, Ph.D., Associate Vice President of Academics

ABSTRACT

Relationships develop between people. In their infancy they are cautious and experimental, but upon maturation they become trusting and reliable. Businesses are interested in hastening this process, as commerce is also an event occurring between people, and 2 parties that trust the goods or services of each other welcome a free exchange agreement. This transfer is not limited to the tangible but also encompasses idea- and knowledge-sharing within an organization, the ability to make quality decisions, and action-oriented collaboration. With the global expansion of organizations, the reality of remote teams, and an increasing desire among talent to operate on a flexible schedule, establishing functioning teams that flourish has become ever more challenging. Reframing the issue into a relationship and trust development challenge allows organizations to introduce live-streaming during remote video conferencing as a solution to maintaining a meeting community. Testing surveys from remote-meeting participants in a global organization collected streaming habits during meetings and their opinions surrounding the effect live-streaming can have on building trust, establishing engagement, deploying a high-performance team, technical challenges, and privacy considerations. The data were analyzed with a binomial logistic regression to establish predictive behavior and employee markers that can be used by industry to create training and education. The Likert 5-point scale results were also contrasted between the streaming usage and no streaming usage groups with an independent samples *t* test, with significant differences found between the 2 user groups when considering effectiveness on building trust, engaging team members, and ultimate team performance.

Keywords: live-feed, streaming, video conference, facial cues, nonverbal communication, remote teams, global, trust, relationship, productivity, decision quality, team performance, collaboration.

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My wife Tina is an unbelievable gift from God. She has shown me where I can succeed and supported me in all things. Without her I would not have heard the gospel, would not have achieved industrial success, and would not have pursued academic excellence.

My children are the inconceivable manifestations of God's love for me. They show me how to live better and how to forgive freely. Many times during years of study they willingly gave of their time to help me complete this academic objective.

And finally, I'd like to thank my cohort partners, Doug and Joyce. Their shared knowledge, experience, and prayers guided me through the times of rejection and made it possible for me to realize that setbacks are no reason to quit.

DEDICATION

To my wife Tina, who understands me more than I understand myself. She is the closest thing to heaven that I have on earth.

TABLE OF CONTENTS

ABSTRACT	iv
ACKNOWLEDGEMENTS	vi
DEDICATION	vii
LIST OF TABLES	XI
LIST OF FIGURES	xii
CHAPTER 1: INTRODUCTION	1
Background	2
Statement of the Research Problem	9
Purpose Statement	13
Research Questions	13
Significance of the Problem	15
Theoretical Framework	17
Live-Stream Video and Knowledge Spillover	18
Trust	18
Employee engagement	21
Virtual proximity	22
Rejection Regardless of Promised Benefits	24
Conclusion	26
Definitions	27
Organization of the Study	27
CHAPTER 2: REVIEW OF THE LITERATURE	29
History of the Subject Being Studied	29
Knowledge Spillover Theory of Entrepreneurship	30
Knowledge Proximity	33
Team Dynamics	33
Social Capital Theory	35
Media Rich Theory	37
Risk and Uncertainty	38
Trust and Uncertainty	38
Social presence	39
Information acquisition	42
It better work	42
Information gathering	43
Action From Attitude	45
Trust	47
Technology	49
Intention	50
Motivation	50

Planning.....	53
Attitude.....	55
Social norms.....	57
Action reaction.....	58
Complexity.....	59
Decision-Making Quality.....	60
Culture.....	61
Collaboration.....	62
Hard to Make a Habit.....	63
Diffusion.....	64
Cultural Alignment.....	64
Demographics.....	67
Interpersonal.....	69
Agency Is Active and Powerful.....	71
Self-Efficacy and Mistrust.....	71
Social Orientation.....	74
Employee Engagement.....	75
Involvement.....	75
Commitment.....	76
Meaningfulness.....	77
Empowerment.....	77
Manager Support.....	78
Loyalty.....	79
Intent for Use.....	80
Behavioral Intention.....	82
Behavioral Expectation.....	82
Inclusion.....	83
Information transmission and interpretation.....	84
Facilitating conditions.....	85
Cognitive Processing.....	85
Imitating Behavior.....	86
Summary.....	87
CHAPTER 3: METHODOLOGY.....	88
Purpose Statement.....	88
Research Questions.....	88
Research Design.....	90
Population.....	91
Sample.....	94
Instrumentation.....	94
Data Collection.....	95
Data Analysis.....	95
Limitations.....	96
Summary.....	97
CHAPTER 4: RESEARCH, DATA COLLECTION, AND FINDINGS.....	99
Overview.....	99

Purpose Statement.....	100
Research Questions.....	100
Research Methods and Data Collection Procedures.....	102
Coding of Data.....	103
Condense Usage Category.....	103
Transform the Likert Scale.....	104
Internal Consistency Reliability.....	105
Trust building from streaming video.....	105
Team engagement from streaming video.....	106
Team performance from streaming video.....	106
Technical challenges from streaming video.....	106
Privacy expectations from streaming video.....	107
Reduce Category Grouping.....	107
Summation of Variables.....	108
Presentation and Analysis of Data.....	108
Testing for Probability of Influence.....	108
Binomial logistic regression setup.....	108
Binomial regression results.....	111
Independent samples <i>t</i> testing.....	112
Review of Survey Responses.....	116
Meeting volume, streaming usage, and group socialization.....	116
Motives, intent, and focus.....	119
Knowledge sharing and decision-making.....	121
Technology challenges and privacy considerations.....	123
Summary.....	124
CHAPTER 5: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS.....	126
Major Findings.....	128
Binomial Logistic Regression.....	130
Trust, Engagement, and Performance.....	130
Independent samples <i>t</i> testing.....	132
Unexpected Findings.....	136
Other Findings.....	138
Conclusions.....	139
Implications for Action.....	141
Recommendations for Further Research.....	142
Concluding Remarks and Reflections.....	144
APPENDICES.....	181
A. Survey Questions.....	182
B. McAllister’s Survey Questions to Assess Trust in an Organization.....	193

LIST OF TABLES

Table 1. Summary of UTAUT Attributes	81
Table 2. Sample Quantity, Mean, and Standard Deviation.....	109
Table 3. Dependent Variable Frequency for Each Group.....	109
Table 4. Casewise List of Outliers	110
Table 5. First Binomial Logistic Analysis With All Potential IVs.....	112
Table 6. Frequency Table on Gender.....	112
Table 7. Frequency Table of Generation	113
Table 8. Frequency Table of Education.....	113
Table 10. Descriptive Statistics for IVs in the Independent Samples t Test.....	115
Table 11. Results of Independent-Samples <i>t</i> -Testing: Mean of Opinion Variables	117
Table 12. Results of Independent-Samples <i>t</i> -Testing: Mean of Demographic Variables	118
Table 13. Descriptive Values for Independent Opinion Variables	129
Table 14. Binomial Logistic Regression Analysis: Five Independent Variables	131
Table 15. Descriptive Data for Independent Variables by Dependent Variable Group	135

LIST OF FIGURES

Figure 1. Percentage of people using computers from home for work.....	6
Figure 2. Telecommuting within or outside regular business hours.....	6
Figure 3. Growth trend of employers offering telecommuting option.....	7
Figure 4. Employers allowing working options.....	7
Figure 5. Worker survey of ideal working conditions	12
Figure 6. Worker attention during meetings	12
Figure 7. Graphical representation of the conceptual framework for research design.	14
Figure 8. Flow chart for relationships leading to profitable growth	18
Figure 9. URT and institutional-based trust association.	43
Figure 10. Progression to trusting behaviors	46
Figure 11. Motivation model—summary of self-determination styles.....	52
Figure 12. Personal computing—toward a conceptual model of utilization	56
Figure 13. Penetration of early technologies	65
Figure 14. Modern consumer product diffusion	66
Figure 15. Internet adoption across the globe	67
Figure 16. Product diffusion from introduction.....	70
Figure 17. Basic concept underlying user acceptance models.....	80
Figure 18. Conceptual framework with survey question connections to hypotheses.	91
Figure 19. Graphical representation of conceptual framework for research design.	101
Figure 20. Remote meeting frequency.....	104
Figure 21. Live-stream utilization.....	104
Figure 22. Gender distribution of survey participants	114
Figure 23. Remote meeting frequency.....	119
Figure 24. Live-stream utilization.....	119

Figure 25. Constructive response to challenges.....	120
Figure 26. Comfortable sharing problems	120
Figure 27. Live-stream helps determine motives.....	120
Figure 28. Live-stream helps determines intent.....	120
Figure 29. Live-streaming improves focus	121
Figure 30. Live-streaming improves collaboration.....	121
Figure 31. Live-stream helps transfer knowledge.....	122
Figure 32. Live-stream improves understanding	122
Figure 33. Live-streaming improves recollection of the contributor	122
Figure 34. Meeting with live-stream are difficult to start, bandwidth issues	123
Figure 35. Remote meetings with streaming work better in the office.....	123
Figure 36. Concerned with appearance during live-streaming	124
Figure 37. Distracted by image during live-streaming	124

CHAPTER 1: INTRODUCTION

Effective collaboration is a hallmark characteristic of high-performance teams. When groups of employees are engaged, knowledge spills over from one person to another, substantially increasing the innovative output of an organization (Inoue, Nakajima, & Saito, 2019). Modern-day corporations seek tools enabling their organization to capitalize on a global talent pool without diluting the inventive cooperation of their employees. Research such as that completed by Hoekman, Frenken, and Tijssen (2010) concluded that physical distance impedes trust building and collaboration, making the need for an effective virtual cooperation tool all the more necessary.

When considering video conferencing as the tool, it is important to recognize which part of the video conferencing capabilities are critical to determining utilization and verify whether these aspects are being embraced by the users. Although there is significant research promoting the use of video conferencing to replace face-to-face interactions, the controlled environment evaluation results could be enhanced by examining whether remote meeting attendees on virtual teams recognize this alternative to building trust (Edinger, 2018; Karis, Wildman, & Mané, 2016; Lee et al., 2016). The purpose of this study was to explore whether positive, negative, or indifferent beliefs toward live-stream video as a tool for developing trusting relationships, enhancing team engagement, and improving team performance are a suitable predictor for actual usage during remote team meetings. The ability to predict acceptance and utilization of streaming during remote meetings resides in the discovery of trigger beliefs, opinions, or

demographics that will contribute to organizational adoption of the streaming engagement tool and what training or cultural shift may be needed to improve adoption.

Background

Organizations are the mechanism to accomplish the impossible, the brains to create the unimaginable, the culture to resolve the unreasonable, and the instrument to transform the unfeasible (Morgan, 2006). Crafting an organization into a force that embraces success as the assumed outcome is the objective of entrepreneurs and CEOs alike. One organizational facet that has dramatically changed in this century is the way talent collaborates (Meier, Smith, & Porter, 2016; Rhoads, 2010; Zhang, Chen, Ordóñez de Pablos, Lytras, & Sun, 2016). Modern companies vie for high-quality people, especially when these companies are all located in a region or cluster of innovation (Hervas-Oliver, Lleo, & Cervello, 2017; Inoue et al., 2019; Ozer & Zhang, 2015). Zoltan, David, and Erik (2013) completed research demonstrating that knowledge spillover drives innovation and that high-impact entrepreneurs are the vehicle fueling new progress and economic growth. As people work together and resolve challenges, there exists a knowledge collective that develops into an individual expertise. This can then be exploited by their current employer or harnessed into an innovation for personal gain. Either way, knowledge sharing has historically been governed by proximity, with only the creep of societies spreading this knowledge collective, or spillover, beyond a localized area (Inoue et al., 2019; Wu, Wang, & Li, 2015).

When corporations were introduced to telepresence video conferencing, a face-to-face (F2F) alternative emerged as a possible engagement mechanism. Leaders quickly believed that long distance collaboration could become a reality, with siloed expertise

being shared outside of their personal boundaries (Anton, Kurillo, & Bajcsy, 2018; Karis et al., 2016; Panteli & Dawson, 2001). A review of the literature from the relevant period (i.e., the telepresence-introduction period) showed that expectations were high as research in the 1990s professed the interpersonal, relational, collaborative, and cost-saving benefits of direct and synchronous interactions between remote talent (Agius & Angelides, 1997; Masoodian, Apperley, & Frederickson, 1995; Whittaker, 1995). However, additional research published during the infancy of the deployment revealed that actual utilization of the communication medium lagged expectations (Panteli & Dawson, 2001).

While accepting that the media richness theory (Daft & Lengel, 1986) postulates that a user will select a medium appropriate to the importance of the information being shared, Panteli and Dawson (2001) also examined the social and contextual factors that could influence usage. The researchers concluded that video conferencing was not a rich communication tool and fell far short of performance and utilization expectations. Five years later, Bekkering and Shim (2006) re-enforced these findings, establishing that users were not thrilled with the technology, negatively influencing adoption. Choppy images, connection challenges, and delayed audio created a combined burden that outweighed any perceived benefit of seeing all parties in the remote meeting.

Fast forward another half dozen years and questions of utilization appeared to persist. Julsrud, Hjorthol, and Denstadli (2012) published a study evaluating which type of media was preferred by business travelers. The authors confirmed that business travelers preferred a video conferencing media that most closely simulated F2F, electing to forego personal, internet-based systems, while mildly accepting telepresence

conference room systems. Similarly, Denstadli, Gripsrud, Hjorthol, and Julsrud (2013) published research where business travelers were asked if they believed video conferencing could substitute for F2F meetings. A regression analysis of the results showed that respondents were more likely to accept video conference as a substitute for F2F interactions when they have access to video conferencing rooms than those using personal devices (i.e., internet-based software on a laptop or PC). However, as the technology continued to mature, full acceptance of video conferencing as a substitute across all available platforms remained unresolved.

With trust being a basic element of cooperation and knowledge sharing, the lack of a virtual presence among team members continued to be a barrier to effective employee engagement (Piricz & Mandjak, 2016). Physical accessibility was preferred, and regional expertise and geographic centers of excellence (e.g., Silicon Valley, Hollywood) maintained their dominance as the backbone for collaboration and innovation (Asheim & Gertler, 2005). But proximity restrictions continued to limit the talent pool, and organizations with similar skill requirements recruited and hoarded their assets aggressively. This competition splashed onto the nightly news in 2015 when Silicon Valley engineers achieved a \$415,000,000 class action settlement against the likes of Apple, Intel, Google, and Adobe, companies that exchanged an agreement to avoid recruitment from an untouchable list of valued employees (Whitney, 2015). The apparent practice illustrates further the value attributed to a strong workforce and a need to incorporate people from outside a local area. Accessing a broader and more diverse reservoir of talent was not the only challenge; converting remote employees into contributing members of highly functional teams remained a familiar complication.

Knowledge sharing, active decision-making, and intergroup learning are all desirable aspects of team productivity (Baltagi, Egger, & Kesina, 2015; Edinger, 2018; Taylor, Levitt, & Villarroel, 2009; Xiaoning Long, Hale, & Miura, 2014). Limiting ambiguity or mixed interpretation among members can positively influence decision-making (Eriksson, Patel, Sjödin, Frishammar, & Parida, 2016), while too much precision will negatively affect creativity (Audretsch & Belitski, 2013). Establishing the delicate balance within a team occurs when there is high-quality communication and trusting relationships.

In addition, the demand for an alternate to F2F communication, the most effective method for communicating and building relationships, appeared on the rise as employee flex-hours became a larger portion of the work week. In 2015, Gallup conducted its annual work and education poll where it asked about telecommuting prevalence. The telephone interview results of 1,011 adults aged 18 or older are shown in Figure 1, which graphically plots an affirmative response to the question of whether survey respondents have worked from home using a computer as their communication device (Jones, 2015). Despite the 2-year reduction from 2006 to 2008, understandable when considering the Great Recession of 2008 (Rich, 2013), telecommuting had grown annually over the 20-year period by slightly over 7%. In addition, Figure 2 from the same poll shows that the timeframe for telecommuting during normal business hours was increasing (Jones, 2015).

It is no surprise that employer data correspond with this growing attitude among the workforce. In Figure 3, the share of employers offering telecommuting to their employees continued to rise over the 4 years ending in 2013. The data were collected via an annual e-mail survey of members of the Society of Human Resources Management

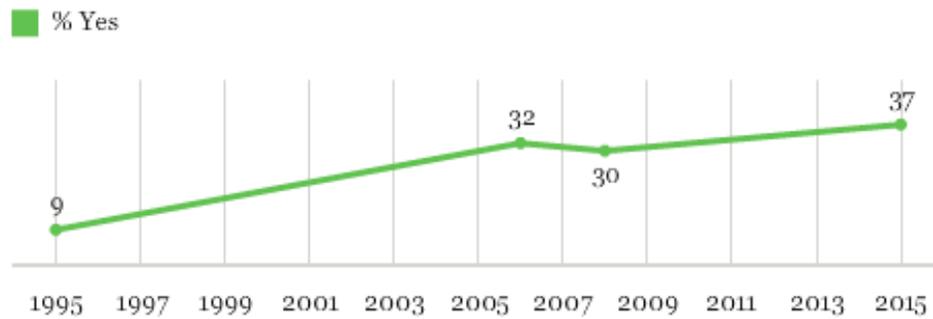


Figure 1. Percentage of people using computers from home for work. From *In U.S., telecommuting for work climbs to 37%*, by J. M. Jones, 2015, para. 1 (<https://news.gallup.com/poll/184649/telecommuting-work-climbs.aspx>).

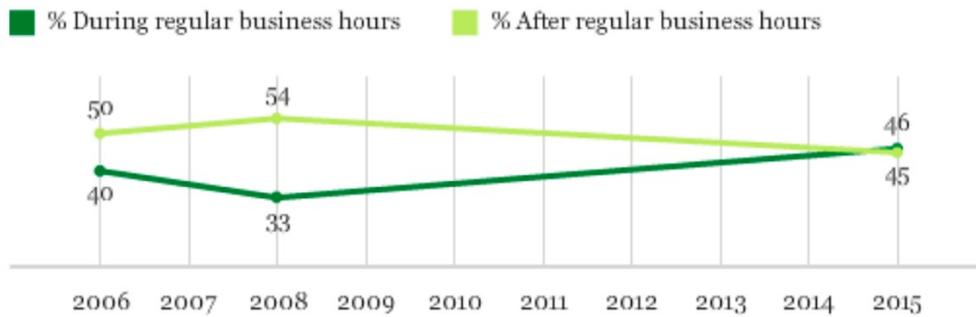


Figure 2. Telecommuting within or outside regular business hours. From *In U.S., telecommuting for work climbs to 37%*, by J. M. Jones, 2015, para. 8 (<https://news.gallup.com/poll/184649/telecommuting-work-climbs.aspx>).

(SHRM). Further historical research shows that this historical trend extended beyond 2013. The results from a survey of 3,227 respondents, completed in 2017, are shown in Figure 4. With 62% of employers allowing for some telecommuting and 57% allowing employees to operate under some type of flexible work schedule (Mulvey, 2017), the trend beginning in 2009 continues.

Furthermore, the U.S. Census Bureau's America Community Survey (ACS) questions 3,500,000 households about where they work. ACS collects responses from the question: What was your primary means of transportation to work during the survey

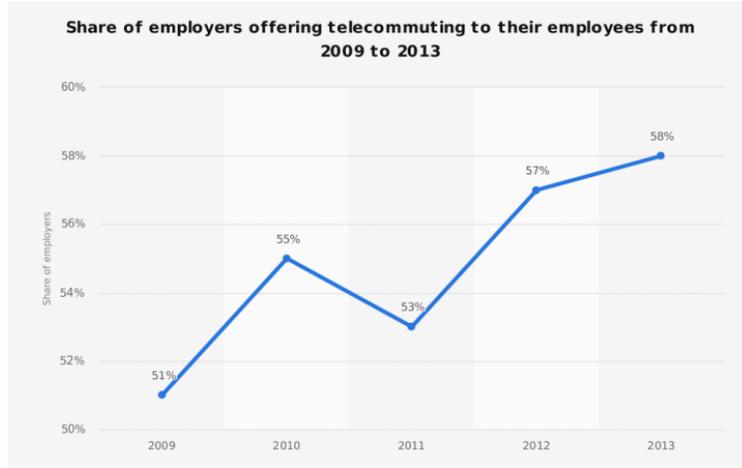


Figure 2. Growth trend of employers offering telecommuting option. “Share of Employers Offering Telecommuting to Their Employees From 2009 to 2013,” by SHRM, 2013. *Statista* (<https://www.statista.com/statistics/256028/share-of-employers-offering-telecommuting-to-their-employees/>).

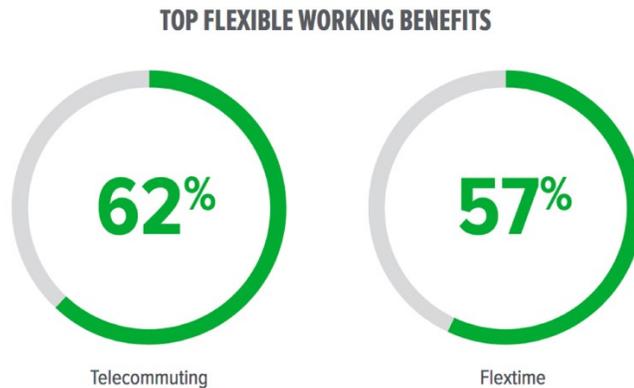


Figure 3. Employers allowing working options. “Share of Employers Offering Telecommuting to Their Employees From 2009 to 2013,” by SHRM, 2013, *Statista* (<https://www.statista.com/statistics/256028/share-of-employers-offering-telecommuting-to-their-employees/>).

week? One of the choices is “worked at home,” which then categorizes the respondents as working primarily from home at least half the time. When comparing alongside the Bureau of Labor Statistics, telecommuting trend data in 2017 demonstrate that over the previous decade, remote work attendance of full-time employees grew by 115%, a rate of

increase that was nearly 10 times greater than the rest of the workforce (Telecommuting Trend Data, 2018). This continued trend represents a 40% growth in the United States from 2010. Additionally, the barriers to implementation continue to fall, as exemplified by the Congressional Budget Office's estimate showing that the cost of a full telework rollout of U.S. government offices, \$30,000,000, would be less than one day of lost productivity due to a government shutdown of Washington DC offices from snow storms, \$100,000,000 (Telecommuting Trend Data, 2018).

With a workforce desiring flexible workspace and organizations facing a reduced cost associated with execution, companies in the last decade again looked to video conferencing as a collaborative tool, allowing recruitment of remote talent and permitting a flexible workforce that could realistically be part of a company culture. Hardware suppliers were quick to claim that the original hiccups of the first 10 years of this century (e.g., choppy video, difficult scheduling, delayed audio) had been addressed (Cisco, 2020; Mao, Netravali, & Alizadeh, 2017; Mert, Kalali, & Hamzaoglu, 2017), and video-conferencing capabilities became standard equipment on laptops and handheld devices. Possibly as a result of this optimism, research into video conferencing appears to assume that the technological corrections have resolved the negative experiences of the past, focusing instead on the capacity for building trust, team effectiveness, and knowledge spillover when using this communication medium rather than employee adoption and utilization (Hassell & Cotton, 2017; Jimenez, Boehe, Taras, & Caprar, 2017; Schaubroeck & Yu, 2017; Serrat, 2017).

This study contributes by evaluating whether positive, negative, or indifferent beliefs toward live-stream video as a tool for developing trusting relationships, enhancing

team engagement, and improving team performance motivate usage in technical industries, and if previously cited assertions (e.g., nonverbal cues contribute to developing trust and decision-making quality) can be harnessed to educate employees and improve live-stream usage. The sample participants selected came from companies where information sharing was of high importance, technical in nature, and extremely market fluid; as such, the ideal communication mode for decisive transfer was F2F.

Employees in this industry are sensitive to the flow of knowledge and apprehensive toward leakage outside of their collective circles, slow to collaborate with unknown meeting attendees. Survey questions address this hesitation by asking team members if they agree with positive statements toward streaming during remote meetings when considering building trust, improving employee engagement, information transfer, and decision-making quality. Respondents were also asked if a positive association of live-streaming and improved relationships can overcome personal reluctance, if any, to using the tool. Demographics were collected and compared to establish any role they may have in the adoption of video conferencing, allowing future researchers and industry to consider appropriate training methods according to the makeup of their workforce and criticality of team performance.

Statement of the Research Problem

There is an industry need for a tool or procedure that simulates F2F interactions without relying on proximity. Social interactions develop relationships, building a foundation of trust that sparks employee engagement, enhances decision-making quality, and validates knowledge transfer (Braunerhjelm, Ding, & Thulin, 2018; Fung & Xu, 2019). Researchers have applied the study of physical interactions to video conferencing,

inferring that some advantages of F2F communication can be achieved with the use of virtual technology. For example, Sears, Zhang, Wiesner, Hackett, and Yuan (2013) evaluated whether live-stream video conferencing could be used to interview remote candidates for employment, an interaction that requires quick character assessments and evaluating the integrity of candidate responses. Additionally, Wilson, Straus, and McEvily (2006) conducted a 3-week study with 156 undergraduate students comparing the length of time required to build trust when using F2F interactions versus live stream video conferencing collaboration. They found that F2F began with a higher level of trust than computer-mediated interactions, but the latter eventually intersected after only three collaborative sessions. Further research continued to look for opportunities, methods, or procedures that would improve the overall video conferencing experience and more closely align with F2F meetings (Bellmar, 2015; Denstadli et al., 2013; Edinger, 2018; Karis et al., 2016). However, the historical research lacked one basic element when evaluating its collective data: whether active and regular remote team members typify the research by utilizing live-feed video technology during remote team meetings, expanding and sharing knowledge with outcomes similar to F2F interactions. Specifically, by turning on their cameras and joining a video conference meeting with live-streaming video, not simply audio, users recognize that trusting relationships, team engagement, and team performance are enhanced with computer-mediated video.

Reframing the challenge into a search for trigger opinions allows the collection of data that can be analyzed with quantitative tools. There is a lack of quantitative research investigating which positive opinions toward live-stream video will impact the streaming usage in industry. Without statistical support, conclusive solutions founded on anecdotal

interviews are poorly structured (Ogee & Ellis, 2012). As such, clarifying data points regarding virtual interactions replacing business travel, substituting for physical interactions that require a high quality of information transfer, or the establishment of trust between two remote parties, are incomplete (Karis et al., 2016; Nilsson & Mattes, 2015; Serrat, 2017).

Additional research is lacking on the effect of demographics in the workplace and how they may affect early adoption or even create an environment that could influence utilization. Surveys for ideal working conditions have been routinely distributed by temporary employee fulfillment company Kelly Services asking employees to rate preferred working conditions. Figure 5 includes statistics confirming that workers want a collaborative environment and flexible work options. Given the overwhelming desire for versatility, researchers accept the positive worker responses as a universal reality and assume that when provided with a technology allowing employees to achieve what has been published as their most desirable working condition, a technology advancing that said outcome would be embraced by all involved (Ferrazzi, 2014; Jimenez et al., 2017). However, according to a survey of 530 workers worldwide by InterCall, Figure 6 plots conflicting feedback showing that employees actually disengage during purely audio conference calls, choosing to multitask rather than fully participate (Gavett, 2014). These data suggest the need to disseminate between conference meetings where participants are not live-streaming video with meetings where the device camera of participants is activated and streaming. Employers and software suppliers promoting the positive contributions associated with trust and decision-making when using video streaming of participants during virtual meetings may not be enough motivation for usage; until now,

collected data addressing what might truly determine whether meeting attendees activate their streaming devices during remote meeting participation is limited.

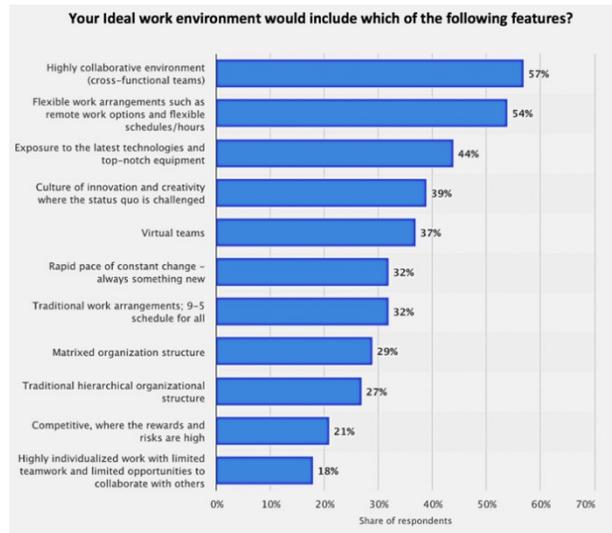


Figure 4. Worker survey of ideal working conditions. “Your Ideal Work Environment Would Include Which of the Following Features?” by Kelly Services, 2014, *Statista* (<https://www.statista.com/statistics/379218/ideal-work-environment-according-to-workers-worldwide>).

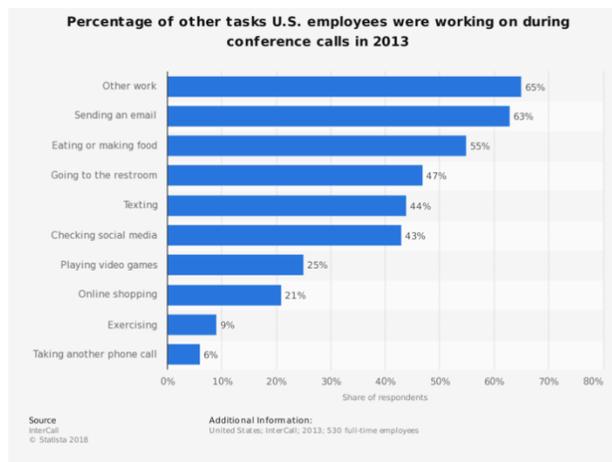


Figure 5. Worker attention during meetings. “Percentage of Other Tasks U.S. Employees Were Working on During Conference Calls in 2013,” by InterCall, 2014, *Statista* (<https://www.statista.com/statistics/323678/what-us-employees-are-doing-in-a-conference-call/>).

Purpose Statement

The purpose of this study was to explore whether positive, negative, or indifferent beliefs toward live-stream video as a tool for developing trusting relationships, enhancing team engagement and team performance, were a suitable predictor for actual usage during remote team meetings. In addition, this study considered whether employee opinions regarding privacy expectations or technical challenges would alter usage regardless of attitude toward benefits while using live-streaming.

The demographic information from the participants was also analyzed for potential correlation to video usage among meeting attendees. A binomial logistic regression study was utilized for this research as it allowed the collection and analysis of numerical data on an individual's utilization of the live-stream video mechanism, comparing usage with Likert 5-point scores on user opinions related to trust, engagement, and performance (Bennett, Briggs, & Triola, 2018; Carr, 1994; Mayoux, 2006). A predictive model associating opinions and attributes that influence usage, will allow industry and academia to establish training protocols and desirable attitudes of the virtual team member.

Research Questions

This study aimed to associate positive opinions toward live-streaming as a tool for trust- and relationship-building activities with actual streaming usage in a virtual meeting environment. Substantiating the value of a live-streaming environment is needed if researchers are to correlate other studies on personal interaction (e.g., knowledge spillover, collaboration, etc.) with procedural requirements, allowing organizations to fully enjoy the benefits associated with research findings. In this way, organizations can

examine research relevant to their needs and implement a customized setup to duplicate the research findings in their workspace. Figure 7 graphically represents the conceptual framework that directs the research and the research problem:

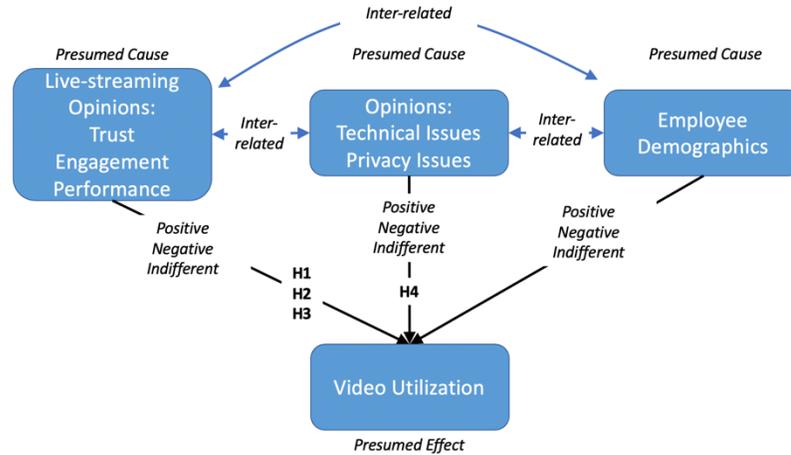


Figure 6. Graphical representation of the conceptual framework for research design.

In this model, one presumed cause for utilization would be opinions on trust, engagement, and performance. It is not required that the opinion be definitive, as an indifferent attitude may indicate the presence of fertile ground, allowing the organization or other influencers to affect whether streaming is activated during a meeting. A further understanding of this causality is explored with the following research questions:

- RQ1. What attitudes toward live-stream video as an effective tool for building trusting relationships predict streaming usage among virtual team members?
- RQ2. What attitudes toward live-stream video as an effective tool for enhanced team engagement predict streaming usage among virtual team members?
- RQ3. What attitudes toward live-stream video as an effective tool for improving decision-making quality predict streaming usage among virtual team members?

Interrelated with people's beliefs on meeting outcomes are barriers to meeting participation, including demographics and opinions on technical challenges and/or privacy expectations. Virtual team members may fully acknowledge benefits to streaming, but utilization changes depending on personal feelings regarding technical headaches or privacy expectations. The following research question explored this connection further:

RQ4. How are opinions about live-streaming in relation to technical challenges and privacy preferences determining whether virtual team members activate their video during remote team meetings?

Significance of the Problem

The expansion to a global workforce to maintain a competitive talent resource requires an alternative to traditional office meeting environment. Remotely located employees have grown substantially, with 54% of the global workforce functioning from off-site locations 2.5 days or more per week (Statista, 2018). Additional research conducted by Regus (2017) found that half of the companies surveyed reported employees who demanded flexible workspace opportunities, driving a need for virtual teams and remote collaboration. Researchers responded by evaluating solutions that will maintain a collective culture and community, allowing innovation and creativity that duplicates the effect of employee proximity (Karis et al., 2016).

Several studies addressed the need for alternative communication that will mimic F2F interactions. Media-rich theory proposed that as the importance of the information increased, so too did the need for effective communication methods (Dennis & Kinney, 1998). From this basis, research began comparing the quality of information exchange

when F2F with similar interactions was conducted via video. Interviewing candidates for future employment is one such area that was evaluated for information exchange. Toldi (2011) assessed applicant reaction when using video for the interview process while Bartram (2000) studied the security implications of personal question and answers during a video chat that could be hacked.

Corporate budgeting demanded evidence of video conferencing as a substitute for business travel and again, the research community responded with controlled environment evaluations. Previous studies found that while frequent business travelers seemed to accept video conferencing as a substitute, many survey respondents associated their acceptance with the availability of video conference rooms at an office rather than on personal devices (Denstadli et al., 2013; Julsrud et al., 2012; Karis et al., 2016). Additional research was completed by Guerin (2017), who looked at the potential savings if business travel was reduced and substituted with video conferencing. After a 3-month trial at a participating global organization, Guerin concluded that the company would save 40% of the travel budget versus the normal operating procedures.

Business magazines such as *Forbes* and *Harvard Business Review* also published articles related to virtual collaboration with a video conferencing portal, asserting the superiority of this advanced communication tool over traditional audio conferences (Bellmar, 2015; Ferrazzi, 2014, 2015; B. Rogers, 2017). Researchers conducted case study analyses of organizations that applied the accepted virtual team principles with video conference solutions (Collins, 2018; LaFollette, 2018). However, neither research nor investigative reporting validated that live-stream video was actually being exercised during the video meetings or whether the users in an office or corporate environment

considered this feature beneficial to the team dynamics. Compound this with other research about people's reluctance to view themselves during a conference call (Hassell & Cotton, 2017) and actual utilization of the streaming option cannot be assumed.

Theoretical Framework

Relevant theory related to the core problem was needed to establish a framework from the most applicable principles. The core problem underlying this research was identifying what methods or training could be deployed to encourage adoption of streaming during virtual team meetings. The premise driving this problem was that businesses succeed when employees build trusting relationships with their colleagues in the workplace. This increases collaboration, innovation, efficiencies, and strategic decision-making. According to Greenwood and Van Buren (2008), team dynamics and institutional memory are present when profitable growth occurs. This is a result of leadership developing relationships within the organization. Muethel, Siebdrat, and Hoegl (2012) were supported by Nilsson and Mattes (2015) when taking this concept of relationships to show that remote teams need to build trust more than ever if innovation and collaboration are to flourish. The flow from profitable growth to live-feed streaming when remote teams are the reality can be seen in Figure 8 and a theoretical framework can be established from this diagram. On one track, physical interaction would require global travel in order to facilitate building relationships. As relationships solidified, trust between parties strengthened and knowledge transfer and team collaboration excelled. This satisfying dynamic encouraged retention, resulting in institutional memory, exploitation of innovative talent, and eventually profitable growth. If the initial interaction can be replaced by live-feed video communications, the subsequent action

will still converge on the foundational building block, relationship building, and continue the trajectory toward profitable growth.

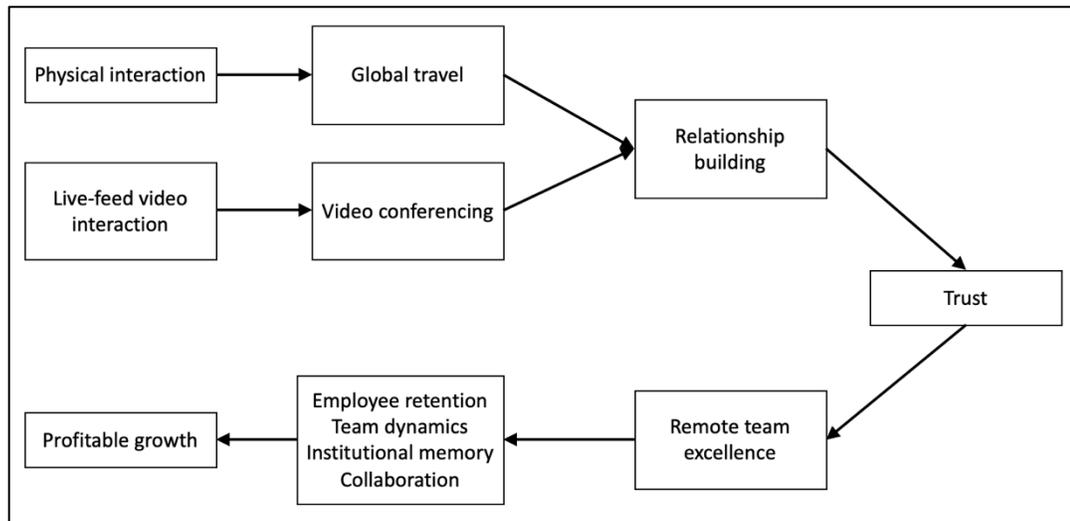


Figure 7. Flow chart for relationships leading to profitable growth.

Live-Stream Video and Knowledge Spillover

Trust. There are several theories that can guide the research into the discovery of user adoption and motivation. The first is the knowledge spillover theory of entrepreneurship (KSTE). This framework combines theories on economics with theories on growth, recognizing that there is a context within which entrepreneurial activity can flourish (Zoltan et al., 2013). When knowledge-rich employees either work in a knowledge-rich group or create their own knowledge-rich environment, innovation and new thinking abound. This spillover from one person to another, or one organization to another, eventually materializes into something of value. Whether this is a disruptive technology, a bolt-on innovative device, or a completely novel way of delivering a service, the new grouping of knowledge that occurs when talent reorganizes will increase the entrepreneurial activity of a society.

KSTE applies to this topic when considering the mechanism companies can deploy to establish this new grouping of knowledge (Braunerhjelm et al., 2018; Ghio, Rossi-Lamastra, Guerini, & Lehmann, 2015). Historical methods allowed organizations to assemble in a brick-and-mortar office, facilitating collaboration of talent and daily operations. However, the global nature of top firms along with the need for virtual team activities have changed this model, forcing companies to refine a new method of grouping talent and extracting the knowledge spillover that leads to success. Video conferencing with live-feed could be the answer.

KSTE has been used in research to explain a process for knowledge spillover and why this spillover results in a real increase in development activity. Studying the economic contributions from technology-heavy industries with a KSTE framework shows that the shift from one scientific platform to another is grounded in the environmental situation or clustering of talent rather than the talent itself. Researchers Ghio, Rossi-Lamastra, et al. (2015) conducted a meta-analysis of published peer-reviewed studies using a KSTE framework and found that 52 separate studies contributed to the development and expansion of this theory between 1999 and 2013. Articles ranged in topics from small business economics to research policies, and established KSTE as a powerful model in the field of social and economic studies. Using KSTE as a framework, survey questions would be similar to those of Audretsch and Belitski (2013), where researchers focused on creativity as a commodity rather than human capital. Live-feed video streaming would be the collaborative tool that develops and expands on a company's processes such that endogenous growth is achieved when internal creativity is exploited via video conferencing.

When considering KSTE along with social capital theory, the trustworthiness of a group encourages knowledge transfer within the group and establishes the capacity of the group to consume the knowledge (Andrews, 2017; Wen, Qiang, & Gloor, 2018). By identifying contributions from personal connections and goodwill to trust, reciprocity, and information transfer, SCT provides a framework for exploring a connection to trust and collaboration. Engbers, Rubin, and Aubuchon (2017) used this theory to quantify the value of social structures in organizations on the economic well-being and urban job creation. Deep connections are not necessarily required as a wide net of connections can contribute a broader net of information (Kim & Aldrich, 2005).

Several researchers have published different theories for measuring trust. Dietz and Den Hartog (2006) compiled several publications and categorized them by their applicable stakeholders within an organization, finding that McAllister (1995) established a set of 11 questions measuring peer-to-peer trustworthiness based on their qualities and performance. These questions were grouped to address two types of trust generators: cognitive-based trust, grounded on the perception of peer reliability and dependability; affect-based trust, which focuses on reciprocated interpersonal care and concern toward colleagues or other team members. Drawing on these theoretical frameworks and associating trust with knowledge sharing, following are the null and alternate hypotheses:

Ho₁. Positive opinions from team members toward using live-streaming to build trust within the virtual team will not result in participants engaging their streaming devices during remote team meetings.

Ha₁. Positive opinions from team members toward using live-streaming to build trust within the virtual team will result in participants engaging their streaming devices during remote team meetings.

Employee engagement. In addition to trust, engagement is another indicator of a positive team dynamic. Creating a network where one trustworthy member can vouch for the character of another unknown member will rapidly increase the engagement of all members and deliver on the team's objectives (Nepal, Bista, & Paris, 2015). Employee engagement occurs when there is fulfillment from contributing to the goal, fairness in recognition, and concern for an employee's well-being (Shahid & Azhar, 2013). When an organization delivers on these items, research has shown that employee engagement follows.

Each of these three items is influenced by trust within the group. The ability to demonstrate care and concern with transparency is especially important to the millennial cohort (Barbutto & Gottfredson, 2016). Research into global virtual teams has confirmed that trust, even in a virtual environment, is a key element to engaging employees (Shaik & Makhecha, 2019). Both supervisors and subordinates confirmed that as the level of trust increases, their ability to set achievable objectives and their engagement within the team improves. Supporting research from Holland, Cooper, and Sheehan (2017) examined responses from 1,039 nurses, confirming that trust will impact engagement within the healthcare organization. Supervisor support that is considered valuable and constructive, along with a direct communication path to organizational leadership, is accomplished when trust exists within the team. Another factor that Holland et al. (2017) identified is that there are two key social relationships for an employee: a proximal

relationship with the supervisor and a distal relationship with the organizational leadership. When positive relationships are established as a prerequisite for these social interactions, the employee engagement increases measurably. Whether or not live-stream video during meetings influences engagement was tested across groups of attendees by the following null and alternate hypotheses:

Ho₂. Positive opinions from team members toward using live-streaming as a tool for fostering active engagement within the virtual team will not result in participants engaging their streaming devices during remote team meetings.

Ha₂. Positive opinions from team members toward using live-streaming as a tool for fostering active engagement within the virtual team will result in participants engaging their streaming devices during remote team meetings.

Virtual proximity. When considering the substantial influence that physical presence has on building trust and employee engagement, it is necessary to consider a theory that explains when proximity might be required. Media rich theory (MRT) is one proposal that provides a framework. MRT considers the method for human interaction and assigns that method to a spectrum. For example, F2F interactions would be at one end of the interaction spectrum while e-mails or written memos would be located on the other end of the spectrum (Lengel & Daft, 1988). The theory was first developed in the mid-1980s and was used to help leaders determine the appropriate medium to use depending on the importance of the message. Lengel and Daft (1988) showed that certain human interactions have a larger impact and can better control the message. When leadership needs to convey a message that is vitally important to the organization, it is best shared with F2F and/or one-on-one meetings.

MRT provides a method for assigning different communication modes to a scale, where one end of the scale represents low personal interaction and the other represents high personal interaction. Although, MRT falls short of explaining why F2F meetings are on one extreme of the spectrum (Van der Kleij, Lijkwan, Rasker, & De Dreu, 2009), the theory is actively used when analyzing consumer responses to various levels of media exposure (Maity, Dass, & Kumar, 2018), the value being that researchers can compare the richness of the media on the spectrum with the actual reaction of the observer and establish a correlation. When considering how employee engagement within a community will share knowledge that is on the information-rich end of the spectrum, a high-performance outcome from this team requires the method of transfer to also be on the same side of the spectrum.

However, the literature on proximity is not unanimous, with several studies still contending that location is a decisive factor to a successfully engaged team (Antonelli & Colombelli, 2015; Audretsch & Feldman, 1996; Inoue et al., 2019; Nilsson & Mattes, 2015). A study by Inoue et al. (2019) of R&D activities across Japan based on patent applications from 1986-2005 found that localization boundaries still applied to organizational innovation, despite advancements in information and communication technologies (ICT) during this period. The contradictions within the research community require an explanation, and further study on whether proximity is a barrier to employee engagement is needed. Therefore, the following third null and alternate hypotheses were proposed:

Ho₃. Positive opinions from team members toward using live-streaming during meetings to improve decision quality within virtual team meetings will not result in participants engaging their streaming devices during remote team meetings.

Ha₃. Positive opinions from team members toward using live-streaming during meetings to improve decision quality within virtual team meetings will result in participants engaging their streaming devices during remote team meetings.

Rejection Regardless of Promised Benefits

Although previously cited research supports live-stream video as a mechanism for building trust, implementing a new technology into the workstream and gaining broad acceptance is not a foregone conclusion. Social dynamic media theory (SDMT) examines how businesses implement and effectively use ICT at their disposal (Montoya, Massey, Hung, & Crisp, 2009; Rhoads, 2010). SDMT exposes the barriers to embracing a technology and considers whether proper training and an organizational culture shift can break down those barriers. This may also include a review of the leadership styles (e.g., traditional supervision, servant leadership, etc.), and investigating which best promote acceptance and which may inherently prevent adoption.

SDMT has been used to research how global teams collaborate on new product development (Montoya et al., 2009) as well as investigating group identity in a remote learning environment (Ho & Lin, 2016). In both instances, SDMT helps research frame the role of technology acceptance, utilization, and effectiveness. Evaluating employee motivations and organizational culture by identifying what information is actually being processed could affect the user's decision to adopt or ignore the new technology.

Implementing a communication technology is not the only challenge. Adaptive structuration theory (AST) suggests the idea that group perceptions will influence the adoption of a new technology (Rhoads, 2010). When a community considers a technology simple to use, the new product or process will be recognized as beneficial. From this, a well-designed training and orientation program could transform a group into true believers, not only excited to use the technology in their immediate environment but also passionate for organization acceptance.

When originally proposed, AST was used as the framework for examining how ICT managers could improve support services to their users (Gopal, Bostrom, & Chin, 1992). However, it was recently applied to e-learning efforts, where barriers to the approach are identified and a process to overcome those barriers crafted (Stoffregen & Pawlowski, 2018). In addition, the theory is included when researching individual performance and technology acceptance (Schmitz, Teng, & Webb, 2016). In this way, AST confirms an association between an organization's cultural attitude toward new ICT products and the overall performance.

Both theories may be trumped by employees' expectations on privacy. Privacy is a personal attribute that may not extend to group dynamics (Shirish, Boughzala, & Srivastava, 2016; Yadin, 2012). Even legal circles have been challenged to properly define privacy using structural terms, instead allowing for a fluid definition dependent on reasonable expectations in a given circumstance (Bentzen, 2012; Sprague, 2008). Since employee privacy is generally at the discretion of the employer, employee engagement that requires attendees to reveal personal space may be neglected (Karlen, 2014). Applying SDMT and AST to the study of user acceptance can lead to an understanding of

why employees will embrace or reject live-stream video as a tool for establishing trust within a group. Using these theories as a basis and taking into consideration anticipated privacy and technology expectations, the following are the final null and alternate hypotheses:

- Ho₄. Negative opinions from team members toward technical challenges and privacy expectations while using live-streaming will not prevent virtual meeting participants from engaging their streaming devices during remote team meetings.
- Ha₄. Negative opinions from team members toward technical challenges and privacy expectations while using live-streaming will prevent virtual meeting participants from engaging their streaming devices during remote team meetings.

Conclusion

Nonverbal cues have been proposed as a catalyst for establishing relationships and building trust (J. Davis et al., 2017; Lyyra, Wirth, & Hietanen, 2017; Phutela, 2015; Tognetti, Yamagata-Nakashima, Faurie, & Oda, 2018). The economic value of these relationships, and how relationships strengthen with more nonverbal interaction, is of continued interest to academia and industry alike. This research is about investigating whether employees involved in collaborative efforts with remote colleagues profess a positive opinion when considering live-streaming for developing trust, enhancing team engagement, and improving team performance. The aforementioned publications maintain that once social connections are in place, group dynamics improve and people engage in a more productive output, sharing concerns, educating teammates, and creating innovative solutions to difficult problems. Establishing a relationship begins by interacting with a mode of communication that furthers the social connection; utilizing

live-stream video as a substitute for F2F interactions can be the tool needed for remote connection, and a positive opinion toward streaming may translate into actual usage. The study ends by evaluating whether informed users of remote meeting tools are impacted by opinions on technical challenges and privacy when deciding whether to engage other virtual participants with their streaming device.

Definitions

Live-feed video. For the purpose of this study, live-feed video is the act of participating in a video conference meeting with a camera on and capturing one's real time actions for all participants to see (Croes, Antheunis, Schouten, & Krahmer, 2019).

Flexible schedule. Employee work hours are flexible (i.e., they are free to work nontraditional hours) and can be at flexible locations (e.g., coffee shop, home office) (Regus, 2017; Tysiac, 2017).

Nonverbal communication. The transfer of information without audio cues (Graham, Unruh, & Jennings, 1991; Noll, 1976; Phutela, 2015).

Remote teams. Colleagues within an organization that have a similar objective but are not within physical proximity of each other (B. Rogers, 2017; Serrat, 2017).

Virtual teams. Remote teams utilizing video conferencing to collaborate (Ferrazzi, 2014; B. Rogers, 2017).

Organization of the Study

This quantitative study used cross-sectional surveys to collect data on the opinions related to trust and live-streaming, engagement and live-streaming, team performance and live-streaming, technical challenges and live-streaming, and personal concerns and live-streaming, thereby creating a predictive model for live-stream usage

during remote team meetings. Study participants included sales people and program managers for a global technology company and its North American partners. This sampling represents remote employees who need to collaborate with colleagues for product development, customer requirements, or strategic initiatives. Research infers that virtual interactions approach F2F quality when considering relationship building, information transfer, and product development (Bekkering & Shim, 2006; Chyng-Yang, 2013; Karis et al., 2016; Muethel et al., 2012; Sears et al., 2013). This study does not seek to validate these findings but to establish whether positive opinions toward live-streaming as a conduit for developing trust, engagement, and improved team performance result in usage of streaming during virtual meetings in a real-world global business environment.

CHAPTER 2: REVIEW OF THE LITERATURE

History of the Subject Being Studied

Improving decision-making quality within a team leads to improved economic output (Jaber, Marle, & Jankovic, 2015; Wen et al., 2018). Organizations contain knowledge of information needed for quality decisions but do not always recognize the existence or value of this knowledge due to restraints within their communication channel. This may result in knowledge leakage that is unproductive (e.g., knowledge leaving the organization or spilling over outside the organization) and a loss of economic value for the firm. Computer-mediated employee interactions, especially with the rise of remote workers, could be the solution to knowledge sharing that prevents unproductive leakage. Virtual meetings are one solution to uniting long-distance teams and building a high-functioning culture regardless of location.

Containing trade secrets and information within the four walls of an organization has historically been in the best interest of a company (Richmond, Morrison, & Covarrubias, 2017) and has been influential on the profitable aspirations of the organization. However, as corporations and academic ventures expand beyond a single location, sharing knowledge with colleagues outside of the immediate vicinity becomes essential to survival (Acs, Braunerhjelm, Audretsch, & Carlsson, 2009; Audretsch & Belitski, 2013). The value impetus from knowledge can be understood when considering how ingenuity is introduced to the market through entrepreneurial activities.

Entrepreneurship is the innovation engine that disrupts and transforms industries. Products are launched for broad distribution either by corporate R&D departments or new start-ups, allowing existing knowledge to address a market-driven requirement. Whether

the former or the latter, the fixed cost associated with this innovation presents a barrier to actual product release (Banerjee & Poddar, 2019; Sinha, 2016). The ultimate driver of entrepreneurship has been debated; until recently, research has promoted the idea that this phenomenon is exogenous, a constant sea of ideas lapping at the shore waiting to be noticed by someone possessing specific personality traits or skillsets (Lazear, 2005). However, the last 25 years has produced abundant research surrounding a new understanding of entrepreneurship and the knowledge sharing that leads to this exploratory activity endogenously: knowledge spillover theory of entrepreneurship (Ghio, Guerini, Lehmann, & Rossi-Lamastra, 2015). Before discussing the importance of relationships for containing or sharing information, it is necessary to first review the framework of KSTE.

Knowledge Spillover Theory of Entrepreneurship

KSTE was introduced when Audretsch (1995) published *Innovation and Industry Evolution*, a new theory about what drives entrepreneurial activity. Audretsch proposed that knowledge spillover was the impetus behind entrepreneurial events, an endogenous force that could be mapped and predicted. Large organizations contain information that may or may not be exploited. When a firm or academic institution chooses not to commercialize an idea stemming from its internal knowledge base, this knowledge will spill over to outside startups that then exploit the knowledge. Firms may have multiple, and very justifiable, reasons for shelving the information: Concepts are not relevant to their core competencies, their commercial offerings or sales infrastructure cannot market the new idea, and capital investment is prohibitive (Ross, Fisch, & Varga, 2018). Regardless, the results are the same and lead to a spillover, where entrepreneurs take the

knowledge and leverage it into a commercial product or service (Ghio, Guerini, et al., 2015). It is important to recognize that the spillover occurs when there is company inaction, intentional or otherwise, and represents unrealized potential for organic economic growth.

For commercial organizations, the relevance of building trust in business situations is ultimately governed by the economic benefits that can be associated with expertise in this area. For knowledge to be transferred, trust must be established among a group's members (Fung & Xu, 2019). High-performance teams have a high degree of trust and responsibility (Liff & Gustavson, 2016; Wicks & Berman, 2004). When considering this essential element, developing methods to hasten and establish these ties will ultimately improve the economics of the organization. Whether sharing existing knowledge or creating new knowledge, a high-performance team is able to quickly percolate a shared vision that each member can defend. All of this represents a cost, and knowledge transfer has a distinct cost function.

New knowledge still exacts a price from the institution as organizations invest to develop the knowledge base within their teams. This development, or seed financing, is a sunk cost if the knowledge cannot then be exploited. Therefore, knowledge that spills over outside the original firm is not only a lost opportunity but also a lost investment. The entrepreneur who commercializes this knowledge does so at a lower overall cost since he or she was not required to develop the knowledge from the lowest level (Antonelli & Colombelli, 2015, 2017; Audretsch, 1995; Audretsch & Keilbach, 2007; Beneito, Rochina-Barrachina, & Sanchis, 2014).

However, the spillover method for entrepreneurial activity is not universal across global economies and more accurately depicts a mechanism for growth activity in advanced economies with high-technology industries. González-Pernía, Jung, and Pena (2015) applied spillover to developing countries and found limited connection for knowledge spillover and increased entrepreneurial activities or innovative advancements. The comprehensive study collected data across 45 developing countries and from nearly 250,000 individuals. This is not surprising as modern advancements are technical in nature. When considering MIT's annual list of breakthrough advancements, all are related to technology or overcoming historical technical challenges ("10 Breakthrough Technologies," 2018, 2019). From artificial intelligence to cancer vaccines, disruptive knowledge has a technical nature that emanates from developed economies. It behooves organizations to establish a culture of knowledge sharing and knowledge analysis such that ideas can be exploited within their intellectual boundaries rather than overflowing uncontained into another organization.

Nevertheless, companies with well-established R&D programs output more innovations (Beneito et al., 2014), suggesting that internal process and collaboration are important elements when exploiting new knowledge productivity. This knowledge productivity function (KPF) was studied by Criscuolo, Haskel, and Slaughter (2010) to confirm that companies with a large knowledge base (e.g., global enterprises) are more likely to innovate than firms with less knowledge activity. By pulling responses from two sets of European innovation surveys over a 12-year period, the researchers established that a larger information bank contained within an organization will lead to greater innovations based on the number of product or process innovations, quantity of

employed researchers, and greater exposure to supplier-based knowledge spillover.

While there is nothing in the research verifying whether the knowledge was fully exploited and innovation converted to revenue, the evidence of increased inventiveness is indisputable.

Knowledge Proximity

One ingredient that research shows will maximize innovation and knowledge spillover is the proximity of knowledge (Audretsch & Keilbach, 2007; Hervas-Oliver et al., 2017). Spatial concentration breeds entrepreneurship, a measure of exploited and/or commercialized new knowledge. This may manifest as company spin-offs or start-ups, but these new ventures occur in the same vicinity as the incubators that spawned the knowledge. One explanation is that social ties are strengthened by regular interactions, reducing transaction costs and facilitating a shared network of resources. Research completed by Inoue, Nakajima, and Saito (2019) focused on this correlation of innovation and proximity. The authors examined patent applications in Japan from 1986 through 2005, considering the location of the inventors and their proximity to one another. Localization of collaboration is observed in most technologies, reflecting a consistent connection throughout this period even though significant communication advancements occurred.

Team Dynamics

With the potential for knowledge spilling over outside the organization, effective collaboration that leads to strong decision-making among colleagues encapsulates ever-increasing value. Decision-making is a process where information and knowledge are transferred with intensity and purpose. This activity is not performed in a vacuum, it

involves multiple people, and hinges on several variables depending on the meeting context: importance, uncertainty, motive, trust, and team diversity (Dayan, Elbannia, & Di Benedetto, 2012). In addition, competition among members becomes a factor that must be removed. Effective decision-making output is generated by collaborative networks, members interested in contributing rather than individuals interested in pursuing discreet objectives (Jaber et al., 2015; Stingl & Geraldi, 2017).

The study of how team dynamics affect the timeliness of decision-making was explored by Wen, Qiang, and Gloor (2018). By executing a Cox regression to investigate the effect of dynamics on the time needed to decide, the researchers established that relationships, especially those strengthened by previous collaboration and established social capital, contribute to timely decision-making (Wen et al., 2018). The suggestion is that not only are the individual qualities important to the timeliness of the decision, but the network dynamics between collaborators are a decisive factor. This need for social capital introduces a parameter that is easily overlooked when establishing teams.

KSTE signals that information has value within and without an organization. When shared within, it improves economic value and team performance; when shared without, it represents a loss of equity value as well as advancing a competitive challenger. In addition, KSTE suggests that proximity and spatial concentration can be a factor when sharing knowledge or compounding spillover. A common measure for proliferation within or prevention without is the development of a trusting relationship among team members. The next theory, social capital theory, investigates this facet.

Social Capital Theory

Social capital theory parallels financial capital theory, physical theory, and human capital theory but is founded on relationships. First introduced by Coleman (1988), social capital theory delves into the effect an individual's network can have on human capital formation and decision-making. Coleman evaluated the impact by studying the dropout rate of high school sophomores and how their personal relationships played a part in their highly social environment. A primary concept within the theory is trustworthiness of the social environment and information-flow capacity in the network. When these areas are well grounded, social capital is high, trust is bestowed upon colleagues, and decision-making quality excels.

In addition, the presence of social capital in project teams affects knowledge sharing. Learning is a social process that facilitates the transfer of knowledge among individuals or multiple participants (Bartsch, Ebers, & Maurer, 2013; Batallas & Yassine, 2006). When a team is assembled with people containing high levels of social capital among each other, information flows more easily between participants, and knowledge-sharing networks are tested and strengthened. Some studies show that a high level of social capital among a small minority (i.e., two or three) of team members may negatively influence the process, as these members will dominate any discussions with bilateral information flow and neglect the knowledge transfer from other parties (Hällgren, 2010; Riccobono, Bruccoleri, & Größler, 2016). This promotion of groupthink by dominant members stifles creativity among the team members and essentially reduces the membership to only those who have the relationships. However, this concern was tested and the results maintain that a diverse set of members with

interrelational experience will commonly overcome the groupthink and promote higher quality decision-making more quickly than otherwise (Wen et al., 2018).

While team dynamics and social capital are proven elements for knowledge sharing and decision-making, no group is born with these linkages, and developing a collaboration rhythm is a process (Savelsbergh, Poell, & van der Heijden, 2015). Reaching agreement on objectives must first be accomplished, and this apparently small endeavor requires levels of trust that are not quickly established (Buvik & Rolfsen, 2015). Trust is a well-known factor contributing to team effectiveness when considering decision-making quality and collaboration (Dayan et al., 2012). In fact, Madhavan and Grover (1998) established that a lack of trust will reduce team performance as members withhold knowledge sharing among the group. Koskinen, Pihlanto, and Vanharanta (2003) approached the value of trust from the opposite direction, showing that when trust is high within a group, knowledge flow exceeds levels where there is little established trust within the group.

When considering the creation of trust, spatiality of interactions is relevant. Individuals who have contact while in the proximity of one another capitalize on relational tools that are otherwise not available (Nilsson & Mattes, 2015). Eye contact, nonverbal cues, and facial animation all influence the perceived sincerity of each party, driving trust creation to levels needed for effective knowledge sharing. While KSTE sets the framework for knowledge sharing, translating into economic benefits, social capital theory confirms the inherent need for personal interactions if that knowledge is to be exploited. The next consideration is how social interactions can be activated and accelerated. Media rich theory (MRT) considers the most valuable trust-building

methods of interaction and suggests an appropriate methodology for sharing depending on the importance of the information being transferred.

Media Rich Theory

Originated by authors Daft and Lengel (1986), MRT concludes that the major problem with information transfer is the lack of clarity, not the lack of data. For this reason, a different mode of communication should be employed depending on the uncertainty of knowledge or outcome. MRT considers the method for human interaction and assigns that method to a spectrum. For example, F2F interactions would be at one end while e-mails or written memos reside at the other end of the spectrum (Lengel & Daft, 1988). F2F is considered the richest form of communication due to the simultaneous transfer of multiple pieces of information. The theory was first developed in the mid-1980s and was used to help leaders determine the appropriate medium to use, depending on the importance of the message. It shows that certain human interactions have a larger impact or can better control the message. When leadership needs to convey a message that is vitally important to the organization, it is best shared with F2F and/or in one-on-one meetings.

The theory has modern applications as well. With the advancement of various forms of media, the richness of the exchange has adapted to the various tools available. Consumers will use several pieces of media (e.g., social media, product reviews, posted videos) to evaluate a purchase (Maity et al., 2018). Lines have become blurred when considering the availability of information on the Internet and how that information is presented to a reader. However, MRT is still a viable theory when considering all of the available means of information transfer (Ishii, Lyons, & Carr, 2019).

Risk and Uncertainty

Resistance to acting on knowledge with unpredictable results emanates from risk and uncertainty (Alvarez, 2003). The difference between these barriers (i.e., risk and uncertainty) is that risk can be quantified. Finance leadership works with operations to determine the cost of building infrastructure, deploying a commercial and marketing team, and projecting the rate of return from the release of an adjacent or completely new product or service. Uncertainty cannot be evaluated, predicted, or similarly measured. Decision-making under this challenging scenario is nearly impossible to overcome, resulting in intractable problems that resist valuation attempts (Alvarez & Barney, 2005). The unfortunate reality is that firms entrenched in uncertainty will maintain the status quo, relying on current inertia to grow their business rather than products generated by disruptive advancements. This inherent uncertainty is embedded in the DNA of new knowledge and cannot be overcome by analysis or research available outside the new knowledge.

Trust and Uncertainty

The challenge to building trust associated with uncertainty led to the founding of the uncertainty reduction theory (URT), where eliminating uncertainties in an unfamiliar situation is key to advancing trust (Berger, 1979; Berger & Calabrese, 1975). Newly acquainted people in a social or work setting will use their information-gathering skills to understand the motives, intentions, and contributions of the other people in the same setting, thus reducing anxiety and uncertainty. URT offers context to the problem of uncertainty and the impact of improving this metric. The theory has been used as a foundation for determining the social dynamics of a wide range of interpersonal

activities, from improving intimacy in romantic relationships (Soyoung, Soojin, Hyun, & Biocca, 2017; Theiss & Solomon, 2008) to building an effective team via computer-mediated communication (Ramirez, Walther, Burgoon, & Sunnafrank, 2002).

Social presence. The physical separation of the decision makers increases the challenges when building trust and improving decision-making quality. When considering a trust transitivity that progresses across the functions of trust, distrust, inconsistency, and hesitancy, distance has been shown to influence the trust score associated with the function (Fung & Xu, 2019). However, distance only impacts the trust function when the trust score is equal, such that the distance-based knowledge as a function of the trust function will increase or decrease depending on the distance. When in a virtual group setting, physical distance blurs and group-member experts must rely on what they know about the other experts. Group decision-making requires these experts to converge on an execution path. Depending on what they know about each member, or the influence of someone they trust regarding the expertise of an unknown member, is the norm for all groups, and remote teams only elevate the need to develop trust and certainty. Social presence theory (SPT) governs this proximity aspect of trust, but first uncertainty in decision-making is addressed.

Berger (1987) noted that people's ability to capture all information needed to reduce uncertainty from verbal or even F2F interactions would be naïve, and he advocated for multiple inputs to augment communication. Deep dives into social media transactions, historical publications, e-mails, and even public advocacy will further an understanding of each other and reveal behavioral motives. URT prescribes that when one party knows enough about the other to predict his or her behavior, uncertainty is

reduced and trust can blossom, allowing for the knowledge sharing required to exploit new ideas within the organization and prevent lost value from spillover.

The ability of a communication medium to convey social cues can be guided by SPT. Initially proposed by Short, Williams, and Christie (1976), the theory came together as physical proximity in communication changed, with long distance interactions becoming technologically possible. F2F presents one extreme, where people are collaborating in the presence of each other and thereby capturing multiple nonverbal cues; written communication may be on the other end of the spectrum where concepts are shared with nothing more than words to reveal an author's intent. SPT frames the psychological methods for measuring social orientation, team collaboration, personal motivations, and a feeling of being in the presence of another. This does not require being in the same room or having the ability to make physical contact but conveying a closeness by transmitting enough social cues to share feelings, attitudes, and motivation.

Several researchers considered SPT when evaluating the perceived presence through various communication methods (Ji Hee & Hollenbeck, 2015; Kandaurova & Lee, 2019; Shin, Song, Kim, & Biocca, 2019). Shin, Song, Kim, and Biocca (2019) used SPT as the basis for determining whether 3d audio would cause someone listening to the recording of a performer to feel more connected with the concert. In their study, participants listened to 3d sound from a prerecorded live concert while watching on a television or virtual reality headset. The researchers found that the inclusion of 3d audio enhanced the social presence and rendered a feeling of being in close proximity to the performer. This then resulted in participants having a greater sense of joy from the

interaction, being more willing to trust the performer, and even having a greater tendency to make financial commitments to the performer.

SPT combined with MRT has been used to further the psychology of connections and physical presence. One such study used virtual reality marketing methods to evaluate whether feelings of empathy, guilt, and responsibility could be conveyed with human contact. In their contemporary research publication, Kandaurova and Lee (2019) compared the donations committed when viewing a visual media presentation to a virtual reality presentation. Using ANOVA with empathy, responsibility, guilt, and money and time donations as the dependent variables, and social belonging and media type as the independent variables, the authors discovered that feelings of empathy and responsibility were more significant when users participated in a virtual reality demonstration, resulting in an increase in both monetary donations and volunteered time (Kandaurova & Lee, 2019). Social presence increased when study participants viewed the presentation on a medium that brought the presenters closer to the subjects, allowing for a feeling of participation and connection.

The technological advancements in virtual reality are not the only way to impart social presence. Even something as simple as texting can be altered to improve social presence between two people by adding cues and emojis, conveying intent and attitude (Croes et al., 2019). Texting across mobile devices from service providers to customers has improved the customer experience by quickly connecting customer-service responses remotely while still making a social connection (Ji Hee & Hollenbeck, 2015). The inclusion of emojis or other cues to transmit intent results in perceived control, positive responsiveness, and feelings of concern about the situation.

Information acquisition. Acquiring information can also be governed by URT, with strategies including active, passive, and interactive (Berger & Calabrese, 1975). The additional information allows group participants to quickly assess each member by eliminating uncertainty and advancing the productivity of the team. Active strategies include observations of the surroundings and behavioral patterns of the participants. This method is a primary source of information and can quickly promote trust. In contrast, passive strategies rely on third-party information and can be used to augment primary source observations, validating notions of trust or understanding. Finally, interactive strategies transcend simple observations and include actual collaboration among team members, simulating a cause-and-effect actuality that demonstrates direct results from participant stimuli. Each of these URT strategies coincides with dimensions of institutional-based trust: active strategies to situational normality, passive strategies to structural assurance, and interactive strategies to social presence. Situational normality occurs when the participant views the environment to be setup for success (Baier, 1986). For example, participants in a virtual meeting will perceive situational normality when the communication devices function properly, the meeting times are conducive to all parties, and each party has an equal opportunity to contribute.

It better work. Structural assurance parallels passive strategies in that the structure of the event will promote a successful outcome of the meeting (Harter, 2018; Srivastava & Chandra, 2018). Similar to live events, attendees of a virtual meeting recognize and expect that certain rules will be included (Bellmar, 2015; B. Rogers, 2017; Shaik & Makhecha, 2019). Prompt arrival, honest preparation, and action item follow-up is the expected structure of the discussion. In addition, workplace regulations that

include controls on harassment or preventing preferential treatment provide the confidence each individual needs to enter into a fruitful and productive discussion. The association between URT and institutional-based trust is summarized in Figure 9, where pillars define the foundation, body, and result of each institution.

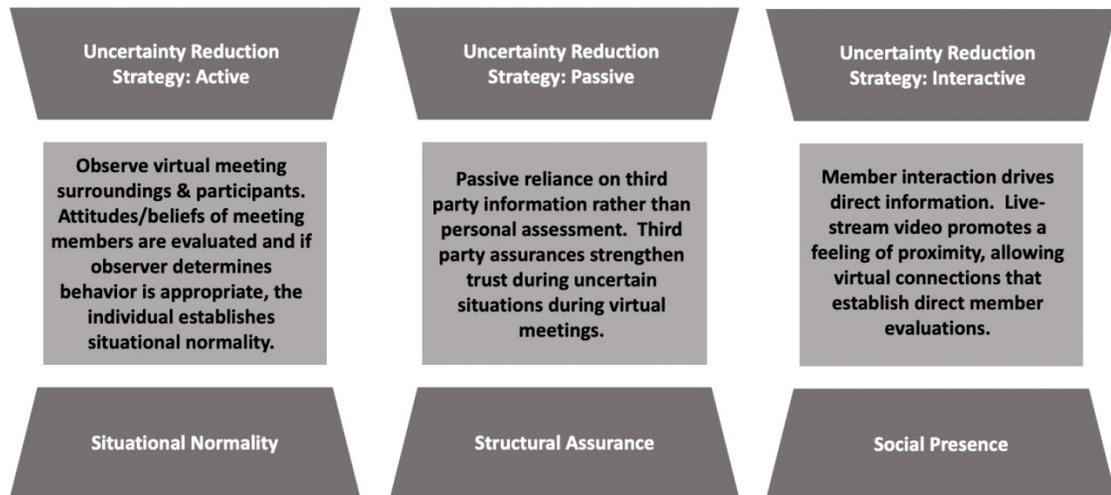


Figure 8. URT and institutional-based trust association. “Social Presence in Virtual World Collaboration: An Uncertainty Reduction Perspective Using a Mixed Methods Approach, by S. C. Srivastava & S. Chandra, 2018, *MIS Quarterly*, 42(3), p. 784 (<https://doi.org/10.25300/MISQ/2018/11914>).

Information gathering. While drilling into multiple aspects of a person’s character may be revealing and establish a full profile-dossier (Ramirez et al., 2002), any process that encourages an abundance of inputs and information gathering (i.e., nonverbal cues) would be beneficial. A foundational aspect of URT is having an established pathway to building trust among members. Trust is a firm belief in the validity of the information flowing from another person. Most researchers define the parameters needed for trust by their areas of study. Psychologists bracket trust as a person’s ability to grant this attribute to another person (Kret & De Dreu, 2019; Rotter, 1971). Meanwhile, social psychologists prescribe trust as something that occurs when one party has a discernment

or understanding of another (Feeney & Collins, 2015; Mayer, Davis, & Schoorman, 1995; Rempel, Holmes, & Zanna, 1985). Sociologists further analyze trust as an institutional environment, or atmosphere that enables certain behaviors commonly attributed to trustworthiness (Wicks & Berman, 2004). While URT provides a process, institutional environments (e.g., video conferencing) give context to what occurs subconsciously when building trust and how these environments act as an enabler for the subconscious transactions.

Institutional-based trust relies on factors outside of interpersonal attributes, and yet can have a magnifying effect by creating a conduit through which trust-building actions prosper. It is the parameter that allows the social presence, or interactive aspect of URT, to develop and become the social capital needed for trusting relationships and knowledge transfer. Research has shown that when institutional trust is well established, people associate the situation to a low-risk environment and are therefore more likely to impart trust to all participants or the organization (Lu, Zeng, & Fan, 2016; Poortvliet & Lokhorst, 2016). Live-streaming during a video conference creates a virtual meeting place that simulates a familiar routine: face-to-face (F2F) discussions enabling each party to interpret visual cues and understand motives, thereby establishing behavioral understanding and predictability. Thus, the institutional-based trust is rooted in how a person perceives the activity, rather than the consequences of the action. This is the foundational approach of reasoned action.

Institutional-based trust or social presence advances during meetings with live-streaming on account of four components of the virtual meeting portal. *Nonverbal cues* activate a cognitive reasoning in uncertain situations that is based on previous

experiences (Biocca, Harms, & Burgoon, 2003; Soyoung et al., 2017). The greater the capacity for information gathering, the higher the social presence, improving a participant's willingness to impart trust. The live images projected by each meeting attendee allow for all parties to build a portfolio of data, triggering a *heuristic response* that allows each person to evaluate the intentions of another. Social presence also develops an environment of *intimacy* and *immediacy*, two cognitive behaviors that reduce perceived risk and facilitate trusting relationships (Biocca et al., 2003). This aspect is revealed through the commitment to live-streaming during video conferencing, demonstrating the user's vulnerability by projecting him or herself from a personal space or simply by being interested in seeing the person to whom he or she is speaking. Once again, *perceived intent* becomes a factor in establishing trust and is a framework established by reasoned action.

Action From Attitude

The theory of reasoned action (Fishbein & Ajzen, 1977) outlines how a belief generates an attitude, which then leads to intentions, and finally, action. The theory of reasoned action (TRA) was instrumental in how research predicted behavior by changing the focus from an attitude toward an object to an attitude toward a behavior or belief in relation to the object (Montano & Kasprzyk, 2015). The new basis for evaluating behavior proved pivotal. Prior to this breakthrough, most researchers attempted to predict behavior by measuring a person's attitude toward an object. Essentially, this attitude represents the degree to which a person will trust the information known about an object. For example, in order to determine whether a person would vaccinate him or herself against measles, the theorist would attempt to conclude that a person's attitude or

level of trust was associated with known information toward measles. However, Fishbein and Ajzen (1977) determined that a more accurate model for predicting behavior would be to determine a person’s attitude toward the action (e.g., getting vaccinated) that relates to the object. Thus, it is the belief (in an action) that leads to trusting the results of that action to resolve the object being considered. As illustrated in Figure 10, this progression governs behavior as a foregone conclusion.

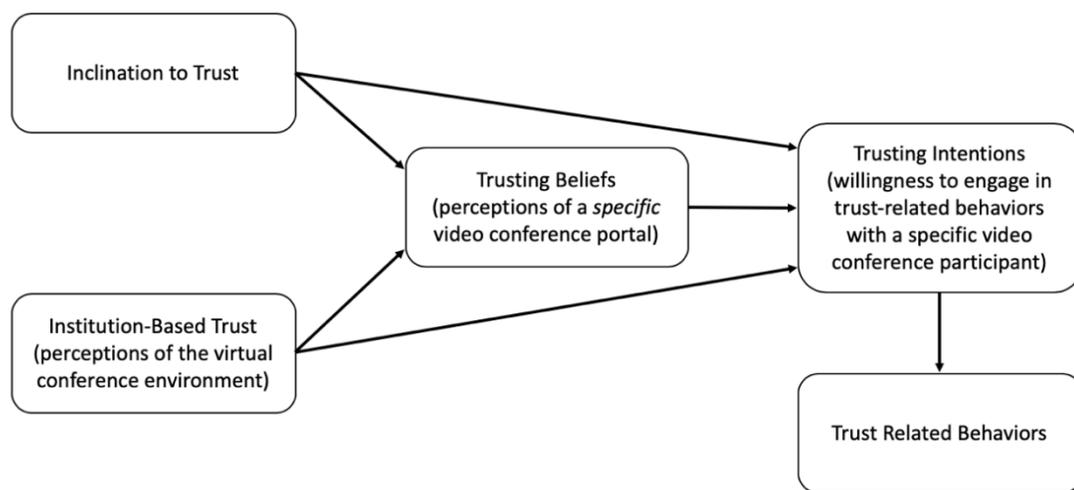


Figure 9. Progression to trusting behaviors. “Developing and Validating Trust Measures for E-commerce: An Integrative Typology,” by D. H. McKnight, V. Choudhury, & C. Kacmar, 2002, *Information Systems Research*, 13(3), 337.

As noted previously, institution-based trust builds as participants accept one environment (e.g., virtual conference meetings) by associating it with a known environment for building trust (e.g., F2F meetings). Trusting beliefs is another block on the diagram for building trusting behavior. This aspect may or may not be required when attempting to reduce perceived risk, but it can be a positive contributor. To illustrate, consider how members of a F2F meeting would react if they knew that there was an observation deck behind a window, and inside that room was a global gathering of

unknown people. Contributions would be cautious, dialogue guarded, and knowledge sharing dramatically controlled or limited (Festré & Garrouste, 2014; Nepal et al., 2015). Now project this same attitude onto a virtual platform with no data integrity or implied confidentiality. Users of this platform would suspect outside intrusion, observation, or even identity or information theft. For this reason, trusting beliefs in the portal being used for virtual meetings can benefit or harm the utilization of a virtual meeting tool, even if the tool was shown to benefit the meeting outcome.

Trust

Next consider the trusting intentions component of TRA. This represents the understanding that each person in the exchange is willing to depend on the other. The concept goes beyond the stated intent and instead includes unstated assumptions. A meeting with strong trusting intentions bypasses concerns for interpersonal errors because there is a fundamental acceptance of dependence, allowing one's vulnerability to be at the mercy of another and relying on the positive intentions of each participant (McKnight, Choudhury, & Kacmar, 2002; Srivastava & Chandra, 2018). This is a challenging proposition in any meeting environment, and participants will be anxious to collect as much data as possible before accepting this dependence on one another. Remote meetings need additional inputs if they are to provide an environment where intentions can be assessed and behaviors interpreted properly.

However, current research into the motivation for sharing online content shows that the public may be changing its intentions from the historic TRA protocol, with social conversation being the most powerful stimulant for knowledge sharing. Ham, Lee, Hayes, and Bae (2019) studied why people share information across multiple social

media platforms. When looking at the four motivational dimensions (i.e., social presence, social conversation, easy connection, and self-management), social conversation influenced actions more than any other. Respondents were most positive about sharing information when considering the value this action would have on their relationship building. This process created a shared experience that could be discussed at length and, in some sense, contribute to social presence by allowing a person to establish an identity based on shared information. While this still involves an element of trusting intentions, the motivator shifts from dependence to exploitation.

TRA frames the process leading to trusting behavior and the resulting action. Each of these operators can be influenced by physical presence. When considering virtual meetings with video, having a tool that simulates physical attendance will check the boxes associated with the TRA model and allow previous research to apply in the same context. One such research included evaluating the propensity to trust based on pupil size of the participant (Kret & De Dreu, 2019). During the study, researchers evaluated whether those with dilated eye pupils were perceived as more trusting and thereby contributed to whether participants were willing to make a financial investment (i.e., reciprocity). The results concluded that eye pupil size will affect a person's attitude toward the other, moving relationships forward or preventing deeper acceptance of information. Conclusive research demonstrates that the ability to see another enables the subject to evaluate and make social decisions that could have serious personal consequences. Traditional remote meetings have sacrificed this capability, reducing the richness of the communication medium and limiting the intercourse to written or audio interaction (Maity et al., 2018). Video during conferencing reintroduces the physical

nature into remote meetings, re-enabling this discernment tool to the participants and possibly reducing the time required to evaluate colleagues and improve decision-making. As such, historical research that included nonverbal cues now available in today's virtual environment can be used to model proposed team collaboration methods and probable outcomes.

Technology

While TRA provides the process for reasoned action, it broadly addresses all situations. However, F. D. Davis (1985) introduced a narrowed theory built from TRA, the technology acceptance model (TAM), to specifically address user acceptance of technology. TAM would both improve an understanding of reasoned acceptance of technology while also allowing for practical modeling to evaluate whether new technology systems would be utilized prior to investing in the development. F. D. Davis completed research by evaluating whether potential users were motivated to use an alternative system. Research quickly followed using TAM to further evaluate user intentions and explain these intentions based on attitude and perceived usefulness (F. D. Davis, Bagozzi, & Warshaw, 1989).

More recently, TAM has been the foundation for evaluating the acceptance of virtual reality. Wearable technology hit the market with exciting potential, allowing a simple integration of information sharing and wearable devices (e.g., smart watches, connected running shoes, Google glass). Virtual reality goggles are more limiting, requiring emersion into the virtual world and restricting exposure to the local environment. This limiting physical effect may be a cause for rejection by some users; applying TAM into this advanced technology that introduces significant changes of user

adaptability allows research to devise a usage-evaluation model (Manis & Choi, 2019). Not surprising, TAM is also at the forefront of determining whether driverless vehicle technology is ready to be adopted by the average consumer (Koul & Eydgahi, 2018). TAM could be applied to live-stream adoption into the workforce as well, providing a framework to measure what drives acceptance or prevents utilization.

Intention

The refinement of TRA by TAM still did not include the effect of social influence and facilitating conditions. Brown, Dennis, and Venkatesh (2010) corrected this absence with the unified theory of acceptance and use of technology (UTAUT). UTAUT is an integrated model formulated to include moderators for intentions and relationships. By including these factors as key dependent variables, UTAUT allows for social and psychological components to improve utilization predictors. The models analyzed and collected into UTAUT include TRA, TAM, motivational model (MM), theory of planned behavior (TPB), model of PC utilization (MPCU), innovation diffusion theory (IDT), and social cognitive theory (SCT). Each of these brings a core construct that improves the eventual predictor of behavior and use of new technology.

Motivation. TRA and TAM have previously been introduced. MM is a general motivational theory that addresses behavior. Vallerand (1997) combined intrinsic and extrinsic motivation into a hierarchy that then identifies the mechanisms of motivational changes. Since intrinsic and extrinsic factors cover all human interactions, this broadly addresses motivation for behavior across all experiences. Researchers have used portions of this model to evaluate the lasting effect of motivation, categorizing the intrinsic and extrinsic operators into self-determination styles. Intrinsic motivators occur when a

person participates for the pleasure of the experience itself, such as hang gliding, a birthday party, or online gaming. When considering computer platform utilization, F. D. Davis et al. (1992) completed two studies showing that intrinsic motivation (e.g., pleasure of use) combined with usefulness when accomplishing the task accounted for 62% and 75% of the usage intentions.

Intrinsic motivation is the most personally controlling style of motivation. The study by F. D. Davis et al. (1992) combined an intrinsic motivator with an extrinsic motivator when determining the overall intentions of using a computer program. Extrinsic motivators have been proposed with varying degrees of self-determination (Deci & Ryan, 1985): identified regulation, introjected regulation, external regulation, and amotivation.

Identified regulation has the greatest impact of extrinsic motivators and relates to the internalized importance a person affords completing or neglecting a particular activity. This would occur when there is a specific objective related to the activity, such as studying to achieve a higher performance grade in a class.

Introjected regulation is a lesser internalization and is perceived as a shared motivation. For example, a child may feel guilt for not obeying his or her parent and making his or her bed. To correct this, the child wakes in the morning and makes the bed first thing, resulting in pleasing another while also eliminating feelings of guilt.

External regulation is motivators that ensue from an external reward or consequence, the classic reward or punishment parable. Finally, *amotivation* is characterized by a lack of motivation or ability to discern any personal benefit. Extrinsic motivators combine with intrinsic motivators to cover behavior that is the result of

external influences and behavior resulting from positive internal desires or feelings. Among other things, the use of a computer portal’s video feature during virtual meetings may elicit feelings of pleasure as well as avoidance, accomplishment and failure, simplicity and frustration; intrinsic and extrinsic behavior motivators cover a significant portion when determining what influences utilization of video during a remote meeting.

Figure 11 illustrates the building blocks of self-determination styles, where intrinsic and extrinsic styles are the basis for motivations. A test of this motivational model in the academic environment was completed by Lavigne, Vallerand, and Miquelon (2007) when they studied whether intrinsic or extrinsic motivators were influential on 10th-grade high school students attending science class and pursuing a career in science.

The structural equation modeling results showed connections between a student’s perceived competence and self-governing attitude and his or her motivation to continue in the science field. Also, students with motivation based on higher levels of intrinsic influencers were more inclined to continue interest and should consider a long-term career in science.

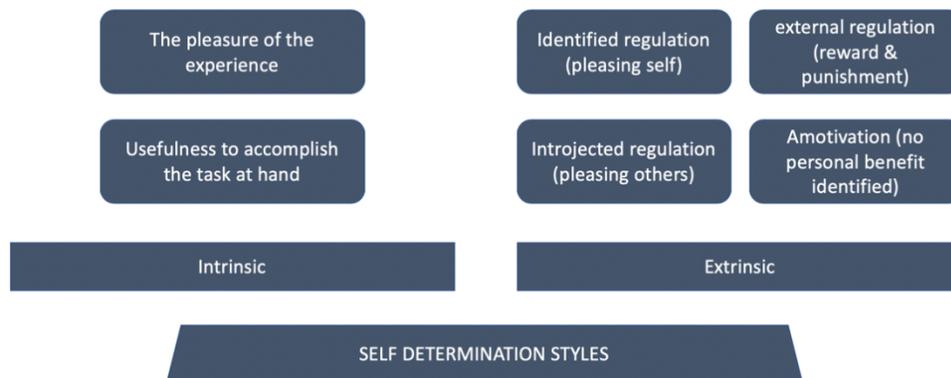


Figure 10. Motivation model—summary of self-determination styles.

Planning. The theory of planned behavior (TPB) constructs a framework for predicting actions based on a subject's beliefs. By evaluating a person's beliefs about the consequence of an action, TPB associates the belief with a behavior (Ajzen, 1991). There are three beliefs that combine to predict behavior. The attitude toward a behavior is rooted in a belief in the behavior's likely outcome, or the *behavioral beliefs*. Subjective norms are determined by taking into consideration the expected behavior of others, providing a contribution from *normative beliefs* to influence the action. Finally, *control beliefs*, such as factors that promote or hinder the outcome, introduce a perceived behavioral control into the theory. TPB incorporates these three elements into a predictive equation that determines a person's attitude toward a suggestion, and thereby the responding behavior (Yuha, Jin Nam, & Kyungmook, 2018).

The theory has been used to predict behaviors across common activities. Piazza et al. (2019) used the framework to evaluate whether people will cross the street while using a mobile phone device. The research results indicate that a person's perspective on behavioral beliefs, normative beliefs, and control beliefs can correctly predict his or her use of a mobile device while crossing a street. Behavior and subjective norms were the strongest indicators of attitude toward the activity, and the researchers suggested that conduct modification could be designed based on the TPB model. In the same way, the theory of planned behavior can be a framework for determining the adoption of video during virtual meetings and team collaboration. By determining what perspectives a person holds toward streaming and the establishment of trust, engagement, and performance, behavior can be determined or affected.

Since its introduction, TPB has been used to evaluate a range of responses, from the likelihood of career selection (Moore & Burrus, 2019), to the entrepreneurial intentions toward waste management in agriculture (Sukhmani & Gupta, 2017). However, TPB has also been criticized for not considering anticipated affect and how this influences intentions. Sandberg and Conner (2008) completed a meta-analysis of 24 research projects across a wide variety of behavioral studies that applied TPB and found that the inclusion of anticipated affect improved the prediction of intentions by a statistically substantial margin of 7%. While this has been cited as an enhancement of TPB, further review of the studies used in the meta-analysis reveals that the anticipated effect was presented as a contrary action rather than a complimentary action. In other words, research participants were asked their attitude toward a behavior using the three behavior controls (i.e., behavioral beliefs, normative beliefs, control beliefs), but then asked their response when anticipating the effect of *not* performing the action. This critical distinction removes the contradiction to TPB. Further research shows that when the anticipated effect of performing the action is considered (positive statement), the results of the TPB model are strengthened (Ajzen & Sheikh, 2013). In parallel, when TPB is used to evaluate inaction and anticipated effect of inaction, the results are again validated. Thus, when considering the anticipated effect of action or inaction along with behaviors associated with action or inaction, TPB modeling provides strong predictive indicators.

The model of PC utilization (MPCU) is another method of study that narrows the focus of behavior to the adoption of personal computers (PC) in the daily activities of users. As described in TPB, there are three behavioral controls: behavioral beliefs,

normative beliefs, and control beliefs. Later research added in an expected outcome or anticipated affect. Attitudes toward a particular tool or process are developed from these behavioral controls. Thompson and Higgins (1991) adapted a behavioral model proposed by Triandis (1971, 1979) and applied to PC usage to create a model of PC utilization. Triandis (1971) asserted that behavior is determined by four factors: what a person would like to do (i.e., attitude), what a person thought he or she should do (i.e., social norm), what a person would usually do (i.e., habit), and the expected outcome of the behavior.

Attitude. When considering what shapes a person's attitude, Triandis (1971) suggested that the building blocks consist of cognitive, affective, and behavioral elements. The cognitive contribution involves a belief. For example, a person believes operating a PC will make his or her activity more productive. The affective contribution is related to likes and dislikes, or how a person feels about a tool (e.g., PCs). The statement "I love computers,," while an obvious exaggeration, represents the affective contribution toward intentions and is influenced by habits. The behavioral element is how a person would like to act, or the intentional aspect of attitude, represented by what a person would like to do in relation to a product, process, or activity. A person's intention to learn a new language or make a new purchase is the behavioral intention that contributes to the developing attitude toward a device or tool. These building blocks of behavior are similar to the behavioral beliefs defined by TPB.

Triandis (1979) furthered his work nearly a decade later with a more comprehensive model on interpersonal behavior. Intentions, established by social factors, affect, and perceived consequences, along with habit and facilitating conditions

are the primary factors determining behavior. Figure 12 shows the connections between these ingredients and which may influence another.

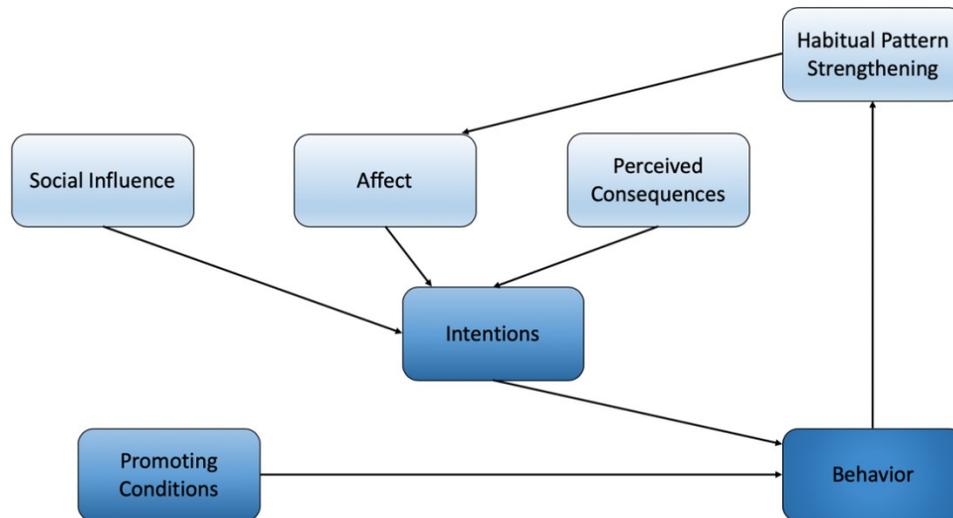


Figure 11. Personal computing—toward a conceptual model of utilization. From “Personal Computing: Toward a Conceptual Model of Utilization,” by R. L. Thompson & C. A. Higgins, 1991, *MIS Quarterly*, 15(1), 127 (<https://doi.org/10.2307/249443>).

Social factors are an expansion of social norms. Triandis (1971) looked at social factors as a construct of social norms created by a person’s subjective internalization of his or her social situation. This would include specific social engagement agreements that two or more individuals have accepted for a particular social activity. The agreements are not freely and openly exchanged but are understood as an underlying cultural truism, something subjective and yet accepted by all in the group. This culture determines the instructions by which an individual may act or behave in a manner perceived to be correct. The culture also establishes the role of an individual by defining what types of actions or behaviors are appropriate for the station or title of a person in a group or society. Finally, the group culture creates and confirms significance with frameworks that have powerful definitions relating to moods, feelings, and attitudes.

Social norms. Before continuing further, it is important to acknowledge the value of a culture's social norms when predicting the adoption of innovation. Consider the possibility of implementing a disruptive technology into a society where that technology was contrary to the social norms. Regardless of the advertised benefits and positive societal impact, actual utilization by those who would most benefit seems unlikely. This supposition is supported by the contrary when Tornatsky and Klein (1982) completed a meta-analysis of 75 studies regarding the relationship between innovation and user adoptions. The authors concluded that alignment of the innovation with the social norms greatly increased the likelihood that the innovation would be adopted. This correlates to one component of TRA, where social norms influence a person's attitude toward an action. Evaluating the adoption of new technology such as live-stream video during remote meetings cannot be complete unless there is an aspect of social norms in the modeling. The social norms of one culture may not align with those of another culture, creating a challenging implementation procedure for global organizations that could be more successful when targeting the culture rather than the technology.

While applying social norms to the adoption of a technology models the prevalent response, there still exists the mavericks who defy their culture and stray outside of the common behavior. Commonly referred to as thinking outside the box, creativity is an important indicator of group members' attitude toward novel action (Smith & Smith, 2017). This does not mean the action is new to the world, it is simply new to the person and/or group. When framing a new action as a representation of creativity, it is important to understand what is novel or creative and what is not. Simonton (2018) proposed that creative thinking results in ideas that have probability, functionality, and the originator's

prior understanding of the functionality. This approach to identifying novel thinking aligns with TRA in that the initiator of the creative thought has some insight into the results of the thought and the probability of making it a reality. Where it diverges is in the area of social norms. Novelty is by definition outside of the norm and has been proposed as the sine qua non of creativity (Smith & Smith, 2017). Creativity joins the concepts of surprise and originality such that an outcome not previously tested occurs.

Interestingly, thinking inside and outside of social norms can equally address the affect component of TRA (Ham et al., 2019; Montano & Kasprzyk, 2015). How an activity impacts a person's area of influence contributes to intentions for action. Furthermore, as these intentions become stronger, the likelihood of action increases, promoting a better cognitive understanding of the impact and thereby further influencing intentions. If this seems like a circular argument, it is. Understanding the influence of the outcome is better addressed with the theory of decision making.

Action reaction. Perceived consequences are bound in the theory of decision making (TDM). Foundational research on TDM was published by Edwards (1954), where multiple economic and psychological theories are combined to model decision-making and the expected outcomes. TDM has been cited thousands of times as a basis for future theories previously stated, including TPB and TAM, and is foundational when considering the influence of perceived consequences on shaping intentions. One study that used TDM when considering how decision-making is influenced by perceived consequences focused on evaluating decisions revolving around what was generally considered risky behavior (Beyth-Marom, Austin, Fischhoff, Palmgren, & Jacobs-Quadrel, 1993). In this study, the researchers compared consequential effects of risky

behaviors between adult and adolescent respondents. An understanding of the consequences was then compared with the decision for action or inaction across the generation for correlations.

Triandis (1979) proposed that each act can be connected to a perceived consequence with a probability factor. If a consequence is certain to result from an act, then the probability that the consequence occurs when the person engages in the act is 1.0. In the same sense, if an individual is certain that a particular consequence will not occur after the act, then the probability of the consequence is zero. If there is uncertainty, the probability of the consequence as a result of the act is 0.50. Perceived consequences play a role in MPCU as the usage of the tool (e.g., PCs) will be influenced by the probability of a positively or negatively perceived consequence. There are several possible results of PC utilization, including improved efficiency, job satisfaction, and job flexibility. This potential for multidimensional outcomes is consistent with TRA and TPB. As it relates to live-stream video adoption during remote conference meetings, complexity, decision-making quality, and building team collaboration are three foundations of perceived consequences.

Complexity

Complexity typifies a situation where a collection of parts assemble, resulting in a system or device with a functionality not achievable outside the sum of the parts. While this may appear to be an all-inclusive definition, social norms interpret varying degrees of complexity such that one culture may accept as simple what another views as complex. One suggested categorization method defining complexity was proposed by Saurin and Gonzalez (2013). In their research, the authors identified two characteristics, which

follow. The first would consider complexity in sociotechnical systems, allowing for a questioning of current practices or established methodologies. When considering the assumption that F2F interactions are less complex than virtual meetings, stepping outside the assumed complexity of virtual meetings could be an important first step to alleviating social bias. The second characteristic views complexity from an epistemological perspective, enabling an analysis of complexity on the basis of belief and opinion. When viewing complexity from this perspective, research can clearly separate opinion from reality, thereby using complexity as a universal term across a cultural sample.

Decision-Making Quality

Evaluating decision-making quality starts with defining a good decision, then determining a group's ability to make accurate and productive decisions (Ghasemaghaei, 2019; Visinescu, Jones, & Sidorova, 2017). Since decisions require information, the more business intelligence available, the greater the decision quality (Visinescu et al., 2017). Knowledge or intellectual resources are a fundamental requirement to decision-making quality and speed of decision-making (Alavi, Kayworth, & Leidner, 2005). Some studies address these knowledge resources by applying data analytics to the intellectual base, using analytical tools to transfer knowledge within the organization (Alavi et al., 2005; Ghasemaghaei, 2019). However, an organization's depending on data relies on its ability to digest the data and properly understand the content, requiring a high degree of analytic competency (Ghasemaghaei, 2019). While knowledge sharing via data can influence decision-making quality, analytics were not considered in this dissertation. Instead, the focus was on how colleagues can verbally and nonverbally transfer information remotely by using a virtual meeting portal.

Culture. When considering knowledge as an asset, knowledge management is guided by an organization's culture and promotes decision-making quality (Alavi et al., 2005). An organization's culture embodies expectations, philosophies, values, and experiences that establish the measure for member significance, interactions, outside influence, and internal impact collaboration. Culture captures a system of knowledge, ideology, and day-to-day activities and is essentially a catch-all for a way of life (Morgan, 2006). When distilled to this basic principle, the process of transferring knowledge within a company, or "way" of transferring knowledge, needs to be unified across the entire organization if it is to be considered company culture. As noted previously, the transfer of knowledge is the transfer of an organization's resource, thereby allowing for the resource to propel the decision-making process. In the same way that a nation's natural resources can be harnessed to increase the social wealth and well-being of its citizens by spreading those resources across a wide body of inventive exploits, a group can capitalize on a body of knowledge more effectively when that body of knowledge becomes collective rather than exclusive. It stands to reason that making knowledge collective in a global community will result in improved decision quality and expediency.

This assumption was tested by Antonelli and Columbelli (2015) when they studied United Kingdom and European continent firms from 1995-2006, applying a knowledge cost function according to the size of the company and the new technological knowledge generated by the organization. According to the Schumpeterian hypothesis, only large organizations can fund and generate the knowledge base needed to output innovation that provides sustained market position (Schumpeter, 1934). In contrast, the

Marshallian hypothesis credits externalities for large-scale innovation; whether supply and demand, local talent, or geographic conditions, disruptive changes are a result of external contributors (Marshall, 1920). Antonelli and Columbelli (2015) developed a knowledge cost function to evaluate these two approaches and predict the cost of knowledge. Their modeling of a knowledge cost function showed that the size of the firm (Schumpeterian hypothesis) does not reduce the cost of knowledge. On the other hand, the role and size of external knowledge available (Marshallian hypothesis) significantly reduced the knowledge cost function, emphasizing the value of local talent pools.

The data used by Antonelli and Columbelli (2015) occurred prior to large-scale video usage during interorganizational meetings. As such, the data on the value of local knowledge pools speak to the need for the proximity of knowledge more than the availability of knowledge. Video during virtual meetings introduces a virtual proximity and allows the principles of the knowledge cost factor to be applied to global organizations of today. By bringing talent closer and creating a “local” talent pool, Marshallian principles can apply as external contributors become integrated into the culture of the organization. When the culture embraces video conferencing, the localization of the knowledge results in a lower overall cost of knowledge, and organizations are able to convert their access to knowledge into innovative and disruptive technologies.

Collaboration. Building team collaboration is the third support for perceived expectations. When considering how self-efficacy impacts knowledge sharing, team collaboration is governed by more than simple interactions. Modern teams must develop

relationships quickly in order to take advantage of the combined knowledge within the group. A collaborative team is more productive, resolving difficult problems more quickly and with high levels of success (Li, Zhou, & Zajac, 2009). Much of this comes from a willingness to share potentially sensitive or valuable information. Consider again the use of virtual worlds to establish a safe environment. Research in this area consistently supports expanded collaboration and quick decision-making (Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012; Venkatesh & Windeler, 2012).

Team collaboration also promotes the innovation diffusion (de Freitas, Mayer, Arnab, & Marshall, 2014; Halbinger, 2018; Miguélez & Moreno, 2013). A revealing example is the area of makerspaces or communities that gather to tinker and share ideas. The high volume of collaboration has been shown to produce not only innovation but also a quick circulation of the new technology and a rapid incorporation of that technology into additional inventions (Halbinger, 2018). While the sharing of ideas is effective, the acceptance of the new idea generates additional thought currency that increases in value as it spreads across the collaborative network.

Hard to Make a Habit

Recalling that intentions established by social factors, affect, and perceived consequences, along with habit and facilitating conditions, are the primary factors determining behavior, a deeper understanding of habitual pattern formation is required. A common myth is that it takes 21 days to form a habit. This originated from the publications of Maxwell Maltz's book *Psycho-Cybernetics*, where he stated that it takes at least 21 days for an old mental image to be replaced by a new mental image (Maltz,

2002). This was then promoted by self-help books and professionals to encourage readers and clients to work at something for a specific period of time and they would create the mental synapsis needed to establish automaticity. Unfortunately for most, later research showed that the time required varied greatly depending on the person and the action.

Performing actions for the first time requires intentionality, planning, momentum, and desire. When the action is less than desirable but required, transforming the initial energy into a habitual momentum that requires little input to sustain is an attractive proposition. However, research has shown that forming habits can take anywhere from 18 to 254 days, hardly the short guarantee promised in the self-help aisle of the book store (Lally, van Jaarsveld, Potts, & Wardle, 2010). Establishing the collaborative environment where group members habitually activate their video during virtual meetings will take time and leadership. Organizations should not expect employees to immediately embrace a new meeting policy or collaboration process but should understand and accept the need for consistent behavioral reinforcement. As this habit is formed, group members' intentions can be predicted and the use of live-stream video modeled and predicted. Additional procedures would then be implemented to affect the utilization in meetings.

Diffusion

Cultural Alignment

Adopting new technologies is not a foregone conclusion. Case studies focus on innovation mavericks but neglect to address the reasons behind failures that fade into oblivion. Microsoft Zune, Amazon Fire Phone, and Google Glass all hit the market with

hype only to be discontinued in 1 to 5 years. There are clear indicators that the public hungers for technology, perceiving invention as a fast track to productivity and economic prosperity. As global communication abounds, the idea that societies can achieve science inspired by fictional theater amplifies (Perkowitz, 2016). What is unique today is the speed with which technology is now absorbed into everyday life.

Consider basic amenities that many households today believe essential to survival. Running water, electricity, refrigeration, flushing toilets, all of which took over 30 years to achieve 80% adoption in the United States. Figure 13 plots the penetration of these technologies and their progression into American households. The fact that it took 20 years for 80% of households to have a refrigerator seems unreal, but considering the fact that running water was not available to more than 80% of households until 1950 seems a flashback to the Middle Ages. Global awareness efforts play a part in

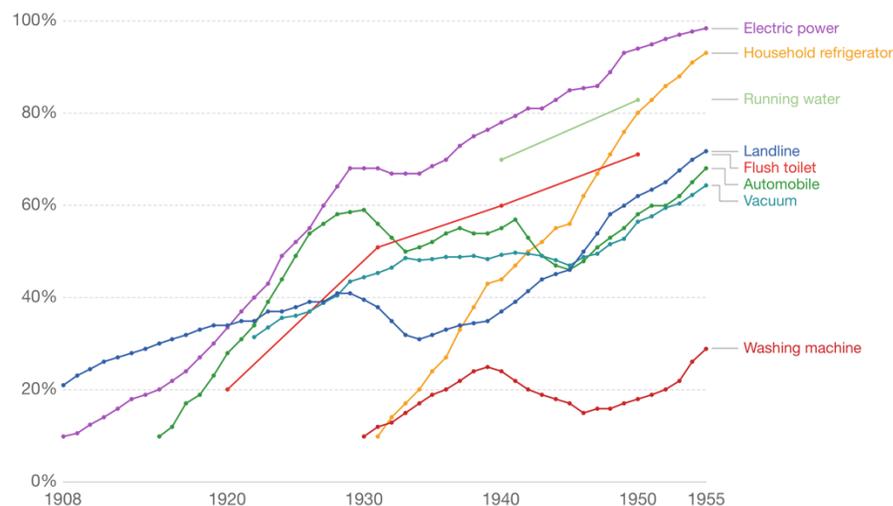


Figure 12. Penetration of early technologies. From “Technology Adoption in US households,” by H. Ritchie & M. Roser, 2019, *Technology Adoption* (<https://ourworldindata.org/technology-adoption>).

propagating technology (United Nations, 1977) and research continues to define what is deemed essential to prevent suffering and large-scale societal decay (Gleick, 1996), but relying on significant human misery to promote what is considered a luxury would be an act of industrial hubris. Instead, technical organizations can exploit the advances of their predecessors and access a global network previously unavailable.

For example, when considering luxuries such as the computer, smartphone, Amazon Prime, and tablets, these technologies were quickly absorbed into common societal usage within 10 years in the United States. Smartphone usage reached enviable penetration in 5 years and e-book readers captured 25% of the household market in a mere 4 years. Figure 14 plots the progression of typical consumer products and services in the United States for quick reference. The change in adoption velocity is obvious. \

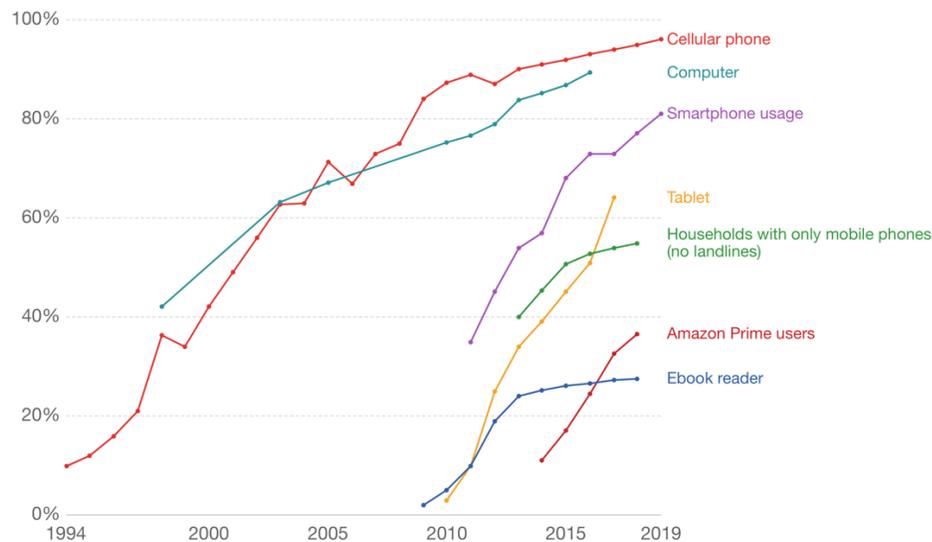


Figure 13. Modern consumer product diffusion. From “Technology Adoption in US households,” by H. Ritchie & M. Rose, 2019, *Technology Adoption* (<https://ourworldindata.org/technology-adoption>).

Researchers' continued study of attitude toward technology validates this cultural indicator as a major driver toward adoption (Rojas-Méndez, Parasuraman, & Papadopoulos, 2017; Roser, Ortiz-Ospina, & Hasell, 2019). Nevertheless, a positive inclination toward technology can still be overcome by economics, with lower income nations lagging full household acceptance regardless of their affinity toward an innovation.

Demographics

Research has shown that demographics play a significant role in adoption, and data from global organizations appear to support this hypothesis. A summary of internet adoption on a global scale in 2017 is shown in Figure 15. Countries with a more educated populace have a broader adoption of this technology, seemingly in support of research modeling a technology readiness index (Meng, Elliott, & Hall, 2010; Rojas-Méndez et al., 2017). The study of technology readiness is not limited to heavily

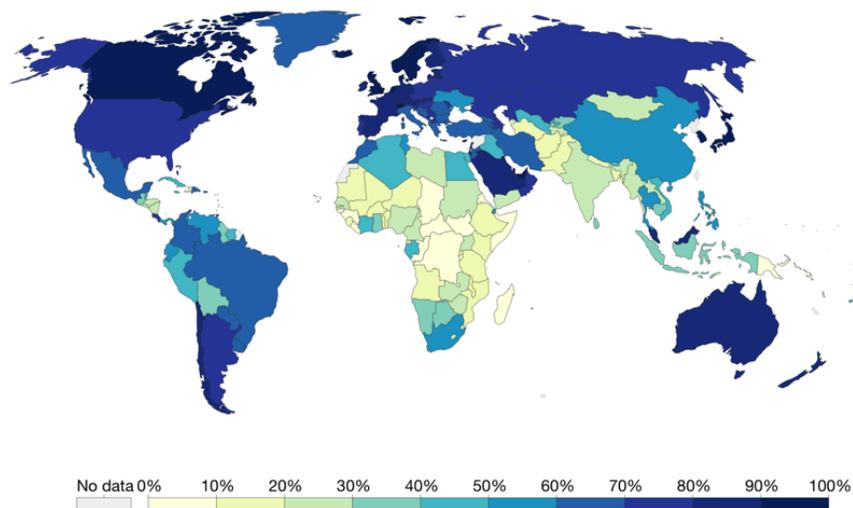


Figure 14. Internet adoption across the globe. From “Technology Adoption in US households,” by H. Ritchie & M. Roser, 2019, *Technology Adoption* (<https://ourworldindata.org/technology-adoption>).

educated societies; Rojas-Mendez et al. (2017) completed research analyzing the readiness of the United States and Chile, two dissimilar cultures, with actual adoption, and validated the predictive nature of the technological readiness index. What is most interesting is the fact that U.S. demographics still play a role in adoption that they did in the early era of consumer electronics. Just as males, the more educated, and the young embraced technology 50 years ago more than females, older generations, and less educated, today's culture seems to follow that of the previous generations.

The spread of a new idea or innovation in a market is referred to as diffusion. Modeling that captures this penetration has been researched, developed, and refined to predict public responses to a product introduction. A foundational theory that defines the terms and focus for future models was first published in 1962 as an expansion of the doctoral thesis by Everett Rogers. In his ground-breaking proposals, E. M. Rogers (2010) pointed out that all innovations, regardless of whether they are impacting agriculture, education, medicine, or market, follow a similar diffusion pattern of adoption. Furthermore, these similarities extend despite varying social constructs, cultures, or environmental conditions. Innovation diffusion theory (IDT) provides a framework for understanding the social acceptance of every disruptive or changing product introduced to social groups; at the time of this writing, E. M. Rogers book, *Diffusion of Innovations*, had been cited 104,997 times by journal articles and textbooks.

Research stemming from IDT goes beyond awareness and knowledge as it incorporates attitude, implementation, and decision-making. Time is a foundational function and affects several variables in the theory, including the time required to go from awareness to adoption, the function that establishes a distinction between members

within the group to adopt the innovation, and the overall rate of adoption within a group. The incongruity of the innovation with respect to the existing product will also impact adoption since the targeted market does not have a frame of reference with which to evaluate the performance of the introduced item (Jhang, Grant, & Campbell, 2012; E. M. Rogers, 2010). As the incongruity decreases, the rate of adoption increases. Researchers have interjected that this has little to do with what is being introduced to the group; rather, it is dependent on the information sharing or social norms within a society. Ease of understanding and demonstration of use have been shown as instrumental in overcoming incongruity (Al-Rahmi et al., 2019; Heiman & Muller, 1996).

Interpersonal

Diffusion of innovation is an interpersonal communication process. When innovators embrace a new technology, they share this finding with the early adopters. As the early adopters verify the value of the innovation, they spread the discovery among their peers or social network, establishing an early majority of people in the group who apply the new product or process. The late majority follows, but by now some from the previous users have moved on to new technology or innovations, reducing the overall number of those within the group who are actively utilizing the innovation. Finally, the laggards join the list of users and the social penetration is complete (E. M. Rogers, 2010). Figure 16 lists the adoption stages for a new product, plotted according to the time since introduction.

With several research indicators demonstrating that innovation diffusion is guided by social norms, globalization introduces a challenging variable not considered in previous decades (Hu, 2013; Islam & Meade, 2015; Papaioannou, 2011). The connection

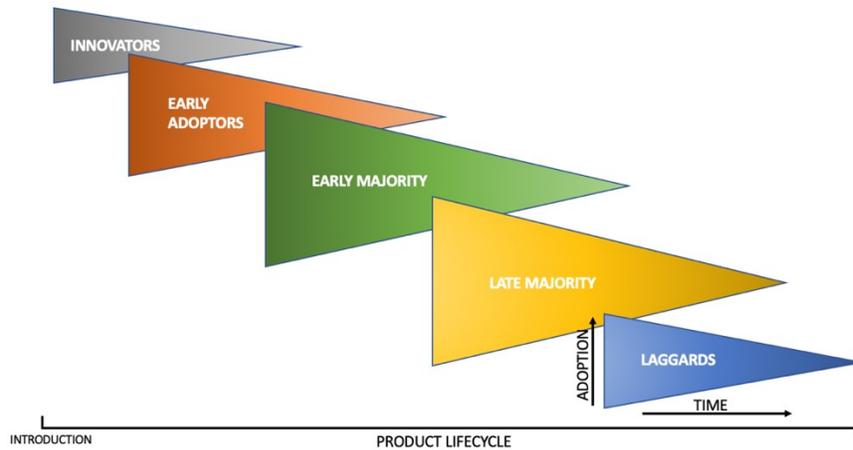


Figure 15. Product diffusion from introduction.

between group members is a defining characteristic that influences diffusion. Being part of a group does not require a social connection (e.g., women are part of the female gender group) but the type of connection will determine the depth of influence among the group (e.g., a mother-daughter relationship is a powerful connection within the female gender group). Some connections are long distance and only virtual. However, Hu (2013) demonstrated that remotely connected group members are still able to influence that rate and size of diffusion depending on the usage of their connected mode. The implication is that connections across the group do not need to be physical, and virtual interaction will have a significant impact on innovation diffusion. Modern-day members can identify with a group because of an internet blog connection, philanthropic attitudes, conservation beliefs, or other demographic association. With the advent of international communication, diffusion through social connections other than physical interactions has become a significant influencer (Hu, 2013; Islam & Meade, 2015; Mahajan & Muller, 1979).

Agency Is Active and Powerful

The final theory incorporated into the UTAUT is social cognitive theory (SCT). SCT is bounded by an understanding that people take an active role in developing their opinions, likes and dislikes, character, and intentions. A person is not molded by the externalities of his or her environment, an unwilling participant unable to change the essence of who he or she is. Rather, SCT stresses that people are self-regulating, self-organizing, and motivated to adapt according to their environment rather than by their environment (Bandura, 2001, 2002; Ng & Lucianetti, 2016). Essentially, individuals make conscientious decisions to influence their surroundings for personal benefit or for the benefit of something they value (Bandura, 2001).

To be an agent of one's destiny is a definitive property of humanity. SCT differentiates three ways in which a person acts on his or her own agency: direct personal agency, proxy agency where another is designated to ensure desired results, and collective agency with social coordination and interactive activities. This last is becoming more important as global interdependencies play a greater role in a person's area of influence.

Self-Efficacy and Mistrust

Direct personal agency occurs when someone acts with intentionality in an effort to accomplish his or her purpose. A strong sense of personal agency is required if members of a group (e.g., employees) are to advance innovation within the organization. If new ideas are to be shared and positive group collaboration and decision-making to progress, a person must believe his or her ideas have merit and can change the situation. Self-efficacy, perceptions, expectations, and past experiences influence the decision-

making process. As self-efficacy increases, a person's confidence in his or her creative ability increases, resulting in a higher output of creative ideas. Research has shown that when a person is confident in his or her creativity, new and innovative ideas flow freely (Gong, Huang, & Farh, 2009; Tierney & Farmer, 2011).

Furthermore, higher self-efficacy increases a person's ability to persuade others or disseminate that idea, a necessary trait that allows for further development, knowledge sharing, and rapid adoption (Ng & Lucianetti, 2016). When considering the value of knowledge and the need for organizations to capitalize on this value, the ability of a resource to express that value to others becomes increasingly important. Ng and Lucianetti's (2016) research noted that self-efficacy is a driving force behind knowledge sharing and effective decision-making, pushing for change and acceptance of creative thinking.

SCT continues to emphasize the need for building trust and negating fear in order to build self-efficacy among individuals on the team. With the value of self-efficacy already established, the impact of negatively influencing this trait becomes more concerning. When considering virtual meetings with streaming video, the video quality and/or setup can have unintended consequences that negatively affect self-efficacy. When evaluating the cone of gaze, Lyyra et al. (2017) investigated what angle outside of direct eye contact would still be perceived as direct eye contact. Their research found that this "cone" of gaze was important to establishing trust and if ignored, could result in an unintended reinforcement of untrustworthiness. When considering the location of the camera with respect to the display, hardware designers could inadvertently transmit eye direction outside of the cone of gaze, harming self-efficacy and reducing collaboration.

Creating an environment where team dynamics and interrelations can overcome anxiety, trepidation, and apprehension increases self-efficacy among the individuals within a group and thereby improves the free flow of information across the team. Bandura (2002) investigated these dynamics in the context of cross-cultural identities, values, and experiences, postulating that the complexities of efficacy increase as different organization cultures are combined into one team. This is made evident when considering the cross-cultural research by Earley (1994) on organizational productivity and efficacy across three distinctive cultures.

Earley (1994) investigated how manufacturers of similar telecommunications equipment in the United States, Hong Kong, and China evaluate individual efficacy and group efficacy. In each location, half of the managers were trained on individual-oriented management systems and the other half trained on group collective management systems. When asked to self-evaluate, those from collectivistic cultures such as Hong Kong and China judged their productivity to be the highest in a group-oriented management practice. Participants from the United States, a society that values individualism, rated performance under an individualistic management system to be higher and more productive. Self-rating of efficacy paralleled the findings on productivity. The implications to global teams are obvious, but the risk of stereotyping based on geography may not be so apparent.

Consider the danger when assuming that a member of the virtual team has a preferred collaboration style that is contrary to his or her origin or current region status. Earley (1994) drilled further into the research results and found that, regardless of the member's cultural social system, the member performed better based on his or her

personal efficacy beliefs. A U.S. collectivist performed better in a group-oriented organization while a Chinese individualist flourished under an individualistic management style. Analysis of individual preferences has greater functional value than cultural assumptions about self-efficacy. This is an important awareness and a necessary element when constructing remote teams using a virtual collaborative communication tool. Whether in a social individualistic environment or a collective group culture, the interactive method according to self-efficacy preferences impacts the performance of the individual and the contribution to the team.

Social Orientation

This dynamic relationship between self-efficacy and innovation could be tempered by social orientation (Ng & Lucianetti, 2016). The need to capture knowledge within the organization and avoid the economic loss associated with knowledge bleed requires that teams be assembled where innovation flows freely and consideration is given to circumstances that can negatively affect the objectives. When members have a strong desire toward social collectivism, managers should consider placing them on teams with the same objective. In this way, a person's high rating of self-efficacy under this context will align with group goals and improve decision-making quality, reduce anxiety and fear, and foster quick allocation of trust. Ng and Lucianetti (2016) argued that when team participants have a high trust within the organization, they are confident enough to promote innovative ideas rather than quell their creativity because they believe their team will value this information. Assembling virtual teams is no less affected by team dynamics than traditional teams, and careful consideration should be given when joining different cultures.

Employee Engagement

Jack Welch, chairman and CEO of General Electric from 1981–2001, orchestrated a 4,000% increase of corporate value during his tenure; one tenet he advocated was employee engagement. He said, “It goes without saying that no company, small or large, can win over the long run without energized employees who believe in the mission and understand how to achieve it” (Welch, 2015, para. 4). The research appears to support this assertion (Byrne, Hayes, & Holcombe, 2017; Harter, 2018; Holland et al., 2017). When considering growth performance, organizations reporting a higher level of employee engagement outpace their competitor’s earnings per share by more than four times (Harter, 2018).

Early investigators into this performance indicator defined engagement as the level of commitment an employee dedicates to his or her organization (i.e., intellectually committed), resulting in an increased effort and longevity (Corporate Leadership Council, 2004). Contemporary researchers maintained the definition but added an element of passion, feelings of involvement, and perception of empowerment (i.e., emotionally committed), furthering employee willingness to actively participate in organizational objectives (Mohammed, 2016; Mone & London, 2018). This adaptation added a level of complexity and personality to the measure of engagement. Mone and London (2018) summarized engagement into six facets for evaluating employees’ attitude: involvement, commitment, meaningfulness, empowerment, manager support, loyalty.

Involvement

Involvement is being energized to perform at one’s best and feeling good about the future. When employees are involved, an organization’s ability to outperform

previous expectations can reach surprising levels. One industry where the effect of involvement can substantially impact organization performance is manufacturing. Liff and Gustavson (2016) conducted a study of a manufacturer of consumer products in the midwestern United States. Many readers who follow the aggressive pricing demands of a successful consumer product may consider manufacturing in the United States, with its high employee costs, a failure in the making. However, the leadership's willingness to completely redesign the approach to training and engagement resulted in a collaborative environment where employee involvement was instilled in the onboarding process. The outcome was unprecedented. After 4 years, the revenue doubled, yields averaged 91.9% , cost per pound decreased 20% , and volume output increased 62% (Liff & Gustavson, 2016). Each of these performance indicators exceeded expectations.

Commitment

Consistently working with a high level of focus and energy requires an effort that employees are not willing to invest without some motivation. One explanation of this conduct is referred to as organizational citizenship behavior (OCB). OCB is defined as any constructive behavior that an employee does voluntarily to benefit the company (Chib, 2016). These employees are committed to going above and beyond the standard expectations for the job function. Early architects of commitment research, Porter, Steers, Mowday, and Boulian (1974), concluded that commitment is a driving acceptance of the organization's goals and a willingness to invest unreasonable effort to achieve these goals. They further suggested that committed employees want to maintain organizational membership, not wanting to leave or be replaced. Commitment is a strong

component of engagement, enabling a proficiency to perform despite working with less than perfect processes or systems (Shahid & Azhar, 2013).

Meaningfulness

Contributing to something bigger than oneself fulfills a worker in ways not otherwise possible. Christians have long been motivated by a higher purpose. In the *Bible*, 2 Corinthians 5:20 (New International Version) described follower of Jesus as “ambassadors, as though God were making His appeal through us.” Millennials are known to demand a similar sense of purpose from their employers, and are quick to discard one career choice for another if this conviction is lacking (Buckley, Viechnicki, & Barua, 2015; Deloitte, 2016; DeVaney, 2015). However, purpose-oriented workers are not restricted to a particular generation. Research codeveloped by New York University and industrial leaders reviewed responses from a national survey across the United States. The results confirmed that workers are seeking meaningfulness, regardless of vocation, and there is no measurable difference across generations (Hurst, 2016). Whether a new recruit or a longtime employee, meaningfulness is a component of employee engagement that never grows stale. In addition, meaningfulness is the only component that can determine whether the engagement is ethically acceptable to the employee or if the objectives are contrary to their moral worldview. When using meaningfulness as the guiding principle, measuring the benefits or the suffering becomes a part of the engagement decision process (Cejudo, 2014).

Empowerment

When employees have the equipment needed to be effective and the organizational structure to apply their skills, they feel empowered to make decisions that

impact their personal objectives. Referring back to the aforementioned manufacturing project in the midwestern United States, Liff and Gustavson (2016) noted that employee involvement requires employee empowerment. When the leadership established a team to design and implement the new factory ecosystem, they committed to accept the outcome of the team's decision-making process. But the employees did not start with nothing, they were given a set of guiding principles, or structure, that enabled the team members to put their technical and social skills to work in an environment that fostered results. This "power" becomes evident with each solution to a problem, improving team self-confidence and preventing individuals from becoming overwhelmed by the extent of the project (Chib, 2016). When present, employee empowerment is both a motive for engagement and a strong incubator for some of the other aspects of employee engagement.

Manager Support

Talent development and succession planning are activities that managers recognize as important for long-term health; however, these sustaining efforts often take a back seat to financial results (Cohn, Khurana, & Reeves, 2005). This reduced attention seems to be instilled by business schools that identify profitable performance as the supreme indicator of success rather than the preservation of the organization for the benefit of society as the esteemed outcome (Baden & Higgs, 2015). As a result, managerial support can be one of the most difficult components to encourage employee engagement. One type of leadership that consistently stimulates employees to excel is servant leadership (Barbuto & Gottfredson, 2016; Grisaffe, VanMeter, & Chonko, 2016; Teoh Kae & Rashad, 2015). This leadership style puts the employee's need to develop,

professionally and personally, ahead of the leader's self-ambitions. Manager support is evident to employees, and the knowledge that their engagement at the organization has been orchestrated by the manager to help the employees attain their aspirations improves the outlook and naturally drives the employees to invest in the success of the company. Research into the force that motivates millennials regularly points to a need for leaders who are supportive and continually advocate for employees' well-being (Barbuto & Gottfredson, 2016; Williams, 2014). Managerial support, regardless of generation, is an important component to motivating employee engagement.

Loyalty

A simple way to recognize the value of employee loyalty and how this element factors into engagement is to consider the opposite: disloyalty. If an employee is disloyal, organizations risk the theft of intellectual property, ineffective man hours, or reduced customer service levels that poorly represent the company (Kumar & Pansari, 2015). Each of these is the opposite of what would be expected from an employee who is proud to be associated with the organization and would recommend his or her place of employment to a friend or family member. Loyal employees tend to stay with the company and not jump from place to place (Chib, 2016). When considering longevity, loyal employees are more likely to engage in strategic planning and the tactical actions needed to achieve these goals. This aspiration, bred from a desire to see the company succeed, flows naturally when loyalty is present (Singh, Burgess, Heap, & Al Mehrzi, 2016). When loyalty is present, employees seek ways to engage with the organization.

Intent for Use

The underlying theme of these models is that each employs intentions and/or usage as a driving variable, requiring the predictive model to discover the intention-factor when determining the adoption of the innovation or device. The intention-factor can be determined by considering a person's reaction to the technology, his or her consideration toward using the technology, and then the actual use of the technology. Reaction to using the technology could leap to actual use, and actual use can influence future consideration to use the technology. Figure 17 shows a basic concept of the thought process related to user acceptance.

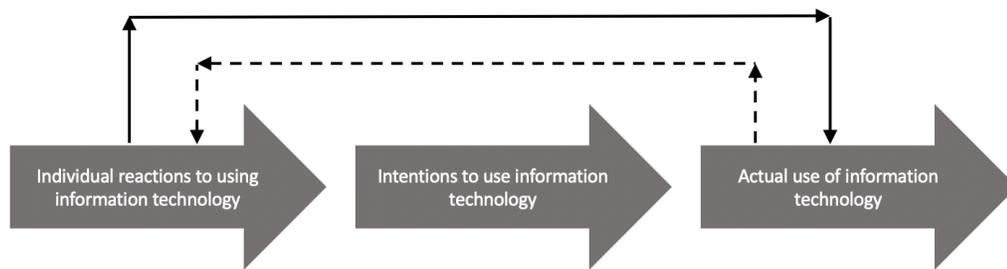


Figure 16. Basic concept underlying user acceptance models.

UTAUT joins several theories that involve intentions to predict behavior. As summarized in Table 1, there are several with social norm attributes, acceptance and attitude elements, and outcome and affect characteristics.

Table 1

Summary of UTAUT Attributes

Model	Attributes
Theory of reasoned action (TRA)	Attitude leads to action Belief generates attitude Trust fosters belief Dependence builds trust
Technology acceptance model (TAM)	User acceptance and adoption Attitude and perceived usefulness Usage-evaluation model Perceived ease of use
Motivational model (MM)	Intrinsic and extrinsic motivation Mechanisms of change Assigned value Perform or neglect importance
Theory of Planned Behavior (TPB)	actions based on beliefs subjective norm perceived control perceived usefulness suggestive response
Model of PC utilization (MPCU)	Attitude Social norm Habit Anticipated effect Expected outcome Behavioral intention
Theory of decision making (TDM)	Perceived consequences Foundation for other models
Innovation diffusion theory	Foundation Pattern of adoption Social acceptance Attitude Decision making Time dependent Social norms
Social cognitive theory (SCT)	Self-regulating Self-organizing Self adapt rather than mold by environment Influence surroundings Personal benefit Agent Self-efficacy Anxiety

Behavioral Intention

Behavioral intention is still a strong motivator and as predictive models expanded, the overlapping function of behavioral intention became dominant (Ajzen & Sheikh, 2013; Al-Rahmi et al., 2019; Brown et al., 2010; Koul & Eydgahi, 2018; Lavigne et al., 2007; Moore & Burrus, 2019; Venkatesh et al., 2012; Xie, Madrigal, & Boush, 2015). Research used behavioral intention or another similar motivator to predict technology usage or duration of use. UTAUT joins each model, using behavioral intention to link and evaluate the probability of expected actions. However, intentionality lacks the ability to determine intensity or frequency of use, thus limiting an organization's ability to fully adopt the technology according to expectations used to justify the technology rollout (Venkatesh, Brown, Maruping, & Bala, 2008; Venkatesh, Maruping, & Brown, 2006). Research that incorporated an *expectation* was needed to include a measure of usage intensity.

Behavioral Expectation

UTAUT and the dynamic variables regarding intention of use have been employed to focus on two core determinants of behavioral expectations: social influence and facilitating conditions. As opposed to behavioral intentions, behavioral expectation considers the expected outcome of the action and how this understanding of the expected outcome influences a user to engage in the practice to begin with (Maruping, Bala, Venkatesh, & Brown, 2017). The value of this alternate influencer is that expectations are an external influencer while intentions are an internal influencer. Leadership can guide a user's expectations with training, education, and information sharing. In other words, the social influence and facilitating conditions can be manipulated and

strengthened according to a desired end state when deploying a new technology within an organization. This is an important consideration when developing training protocols that positively influence live-stream usage during remote meetings. When behavioral expectations are perceived to be fulfilled, the participant is more likely to engage that behavior.

Maruping et al. (2017) completed a study based on UTAUT incorporating behavioral expectation. Behavioral expectation is a self-evaluation measurement that considers a person's likelihood of utilization based on the subject's cognitive assessment of how he or she would behave toward the information technology being proposed. When included in an evaluation of information technology adoption, the behavioral expectation component explained 65% of the variance; previous studies without behavioral expectation could only explain 52% of the variance (Venkatesh et al., 2003). With behavioral expectations being such a strong indicator of user adoption for information technologies, the need for empirical and theoretical understanding of what determines behavioral expectation is obvious. Maruping et al.'s (2017) integration of behavioral expectations into the UTAUT model attempted to fill this void by establishing two determinants: social influence and facilitating conditions.

Inclusion. Inclusion into a group can be heavily affected by social influence that much of the trust-building mechanisms and technological advancements can be undercut (Boekhorst, 2015). The diverse culture within organizations is further exacerbated by the new global footprint of many corporations and even academic institutions. Implementing solutions without considering factors needed for group inclusion may negate the capital invested into advancing the team communication. Some research has studied advancing

inclusion mechanisms such as virtual worlds to overcome inherent cultural bias (Chandra, Srivastava, & Yin-Leng, 2012). When members enter into a world that has universal cultural expectations, users leave behind their own partiality and accept the relationship conditions that go along with the virtual world construct. By adapting the original intent of the virtual world (i.e., gaming or social entertainment) to developing high-performance teams, participants in a virtual world environment have quickly advanced their interactions to a level of trust where risk and perceived intent are identifiable. While this research does not attempt to use the same virtual activity for advancing remote team performance, research in the virtual world dynamics clearly shows the advantage of establishing social norms and an all-inclusive work space (Boekhorst, 2015).

Information transmission and interpretation. When considering social norms and how information conveyed electronically is interpreted and influenced by one's social expectation, social information processing theory (SIP) proposes that users of computer-mediated communication will adapt to the tools at their disposal (Walther, 1992). Whether immersing oneself into a virtual world or utilizing emoticons while texting, the person transferring information will tap into these electronic media tools in an attempt to fulfill this objective. The social norm of each person plays a role into both transmission and interpretation. SIP asserts that people motivated to establish a relationship or present an impression will utilize whatever social cues they have at their disposal to complete this task. When nonverbal actions are not available, language is adapted. Walther, Loh, and Granka (2005) applied the SIP principles and confirmed that nonverbal cues via computer-mediated communication can effectively advance relationships and transfer information. However, their same study could not conclude the

degree and immediacy of relationship growth when comparing nonverbal computer-mediated cues with F2F interactions. This important distinction indicates the need to pursue studies of computer-mediated communication that include a virtual F2F mode of information exchange.

Facilitating conditions. Facilitating conditions have also been shown to impact user acceptance of new technology (Brown et al., 2010; Maruping et al., 2017; Venkatesh et al., 2008). Facilitating conditions are the conditions that lead a user to believe that the institution, equipment, and procedures all promote the use of the technology. When organizational infrastructure is absent, users will turn to another, more fully embraced mode of collaboration within the company or team. As such, facilitating conditions can be internal or external. For example, a user's internal perception of the effort required to utilize the technology will impact his or her expected outcome once tested, and thereby his or her intention to apply this behavior. In addition, external facilitating conditions (e.g., infrastructure, equipment, training) impact the expected outcome when using the resource, thereby influencing the behavioral expectation motivator (Maruping et al., 2017).

Cognitive Processing

The ability to connect the behavioral expectation with the technology being considered resides in group members' cognitive absorption abilities. Early adopters, depending on their perceived leadership position, will influence other members' cognitive analysis of the technology (Boekhorst, 2015). Following SCT (Bandura, 1977), people learn from one another by observing their behavior, imitating preferred behavior, and modeling for others these actions they admire. Leaders hold an exceptional position

as they are commonly held in admiration by colleagues or subordinates. When actions demonstrate leadership traits, group members witness and cognitively record those actions, learning by direct observation a skill or process that they will later take and apply.

Imitating Behavior

Next consider the impact of imitating behavior that is deemed valuable by group members. Recognizing the value of a behavior to the extent that the actions are imitated demonstrates a cognitive reaction akin to knowledge spillover. As explained earlier, KSTE proposes that knowledge will not be contained and either the original owner will capitalize on the information or another owner will take the knowledge at a lower net cost and develop innovation by exploiting the information. The cognitive activity associated with imitation is no different; recognizing the advantages of observed behavior and then putting that information into action is a cognitive activity (Audretsch & Keilbach, 2007).

Once group members determine that the leader's behavior is admirable and are convinced that they would like to duplicate that behavior, they begin to model similar behavior; the spillover is complete. But the social learning has just begun, as the new convert now models the behavior for those within his or her area of influence. This is an important operational advancement as it combines the principles of SLT with those of NSTE and IDT. While some members will directly imitate the behaviors of the leader, others will innovate the same behaviors and become inventors. Utilizing technology such as live-stream video in a virtual group by the leadership begins a process of adoption. The culture of the organization discerns the positives of a new technology, innovates and

adjusts that technology to better serve its team, and improves the overall knowledge sharing such that any value is extracted organically.

Summary

There are several areas of study that examine how people interact, whether socially, professionally, or virtually. The literature review drills into proposed theories and how they may interact with each other. What is abundantly clear is that people are social beings using multiple senses when engaging with each other, drawing on available verbal and nonverbal cues to evaluate the encounter and determine the depth of information appropriate for the situation. If their senses dictate that the engagement is trustworthy and significant, the parties develop a relationship that can be vulnerable, transparent, and productive. Based on the literature review, live-feed video conferencing can provide sensory data needed to advance the relationship to a level that promotes the positive attributes needed for knowledge sharing and innovation. By furthering a trusting relationship, live-stream video enhances employee engagement and high-performance team output. However, it is unknown whether research participants in an uncontrolled environment (i.e., global virtual teams that are highly reliant on remote meetings) recognize the value of live-feed video that research promotes or what opinions will influence their willingness to utilize the technology accordingly. This research aims to fill this void and conclusively reveal what additional training or awareness may be required to ensure effective collaboration at organizations relying on remote talent.

CHAPTER 3: METHODOLOGY

Purpose Statement

The purpose of this study was to explore whether positive, negative, or indifferent beliefs toward live-stream video as a tool for developing trusting relationships, enhancing team engagement, and improving team performance, are a suitable predictor for actual usage during remote team meetings. In addition, this study considered whether employee opinions regarding privacy expectations or technical challenges would alter usage regardless of attitude toward benefits while using live-streaming.

The demographic information from participants was also reviewed for potential triggers promoting or detracting from video usage by meeting attendees. While a qualitative study may explore further into individual motives and underlying reasoning for live-stream video usage, this study targeted the collection of categorical data according to previously identified markers for building relationships. The collection of categorical data of an ordinal and nominal nature can be effectively analyzed with quantitative methods (Bennett et al., 2018; Carr, 1994; Mayoux, 2006), addressing the research questions with a statistically sound analysis.

Research Questions

This study aimed to associate positive opinions toward live-streaming as a tool for trust- and relationship-building activities with actual streaming usage in a virtual meeting environment. Establishing the connection was needed if researchers were to correlate other studies on personal interaction (e.g., knowledge spillover, collaboration, etc.) with procedural requirements within an organization, allowing teams to fully enjoy the benefits associated with research findings. With this approach, organizations can

examine research relevant to their needs and implement a customized setup to duplicate the research findings in their workspace. The following questions directed the research, addressing the problem of this study:

- RQ1. What attitudes toward live-stream video as an effective tool for building trusting relationships predict streaming usage among virtual team members?
- RQ2. What attitudes toward live-stream video as an effective tool for enhanced team engagement predict streaming usage among virtual team members?
- RQ3. What attitudes toward live-stream video as an effective tool for improving decision-making quality predict streaming usage among virtual team members?
- RQ4. How are opinions about live-streaming in relation to technical challenges and privacy preferences determining whether virtual team members activate their video during remote team meetings?

A binomial logistic regression evaluated the dichotomous dependent variable of live-streaming usage attendance and the categorical independent variables resulting from the Likert score of several questions related to trust, engagement, performance, privacy, and technical challenges. A binomial regression analysis was required as the independent variables include categorical measurements rather than continuous or discrete units of measure. Subsequent independent-samples *t* testing was also performed on the data comparing the mean Likert score of each independent variable (IV) category (i.e., opinions on trust, engagement, performance, technical challenges, privacy expectations) to the two groups within the dependent variable (DV; streaming usage and no streaming usage). In this way, the independent-samples *t* testing will provide additional understanding of any significance found from the binomial logistic regression.

Research Design

This research used an exploratory survey and a scaling study design, where participants responded to questions regarding the value of live-streaming for establishing trust, employee engagement, and team performance. At the same time, data were collected on the streaming use of each participant during remote team meetings and a statistical quantitative tool used to analyze for significance. The survey questions were designed to address specific areas of theory and were associated with particular hypotheses. Figure 18 illustrates how each IV acts as a presumed cause for the DV, or presumed effect. For example, participant opinion regarding how positively live-streaming affects the development of a trusting relationship will predict whether live-streaming is used during a remote team meeting by the participant. However, this opinion is interrelated to demographic standing and/or opinions related to technical challenges or privacy expectations. Each of these three overarching categories can influence one another as well as live-stream usage. The survey questions were based on a Likert 5-point scale and were presented to respondents as 1 (*strongly agree*), 2 (*agree*); 3 (*neither agree nor disagree*), 4 (*disagree*) and 5 (*strongly disagree*). Questions addressing attitudes toward live-streaming and the development of trust, engagement activities, and team performance were derived from McAllister (1995) and results were used to evaluate null hypotheses H_{01} , H_{02} , and H_{03} . The instructions asked participants to relate their opinion on trust, engagement, team performance, privacy, and technical issues to their remote meeting experience while using live-stream video. Appendix A lists each question.

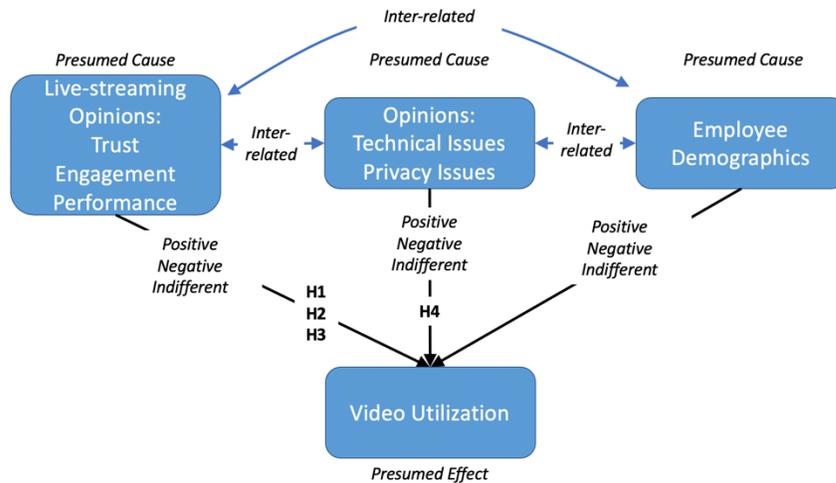


Figure 17. Conceptual framework with survey question connections to hypotheses.

Data were collected across various demographics including gender, age, job position, and years with the organization. Ultimately, the research aims to contribute by answering whether opinions toward live-stream video’s effect on developing trust, enhancing engagement, and improving team decision-making quality are a suitable predictor of actual streaming usage during remote team meetings.

Population

The target population were U.S.-based corporate users of a video conference portal employed by global organizations. The portal could be Microsoft Teams, Microsoft Skype, WebEx, Zoom, or some similar and commonly used video conference software that could be engaged with a personal computing device. These users participated regularly in regional and global meetings, either face-to-face (F2F) or via a call-in bridge. The size of this population (i.e., the workforce population that use video conferencing regularly) was not independently quantified, but it was some fraction of the 60,000,000 people employed by large businesses in the United States (Caruso, 2015). Global Workplace Analytics (Telecommuting Trend Data, 2018) research discovered that

50% of the workforce has a job that is compatible with remote work conditions and 25% telework with some consistency.

The population associated with this research were professionals involved in the electronics manufacturing industry segment in the United States. In 2018, the U.S. Bureau of Labor Statistics stated that a total of 1,096,000 people were employed by this industry in the United States (Bureau of Labor Statistics, 2018). Applying the same overall ratio that 25% telework with some regularity, the target population was 274,000 people.

The sample size was selected such that the assumptions related to binomial logistic regression and independent-samples *t* testing could be fulfilled. These assumptions included the following:

- There exists one dichotomous dependent variable;
- one or more independent variables that are measured on either a continuous or nominal scale; ordinal (continuous or categorical) variables are acceptable but must be treated as either continuous or nominal measurements;
- independence of observation and the categories of the dichotomous and all nominal independent variables are mutually exclusive;
- there should be at least 15 cases per category within the independent variable;
- there is no multicollinearity of the variables;
- linear relationship between any continuous independent variable and the logit transformation of the dependent variable;
- no outliers, high leverage values or highly influential points.

The distribution of the sample means and a normal distribution with a 95% confidence interval was necessary. A confidence interval is the range of means from the sample set that is are likely to include the true value of the population mean. A 95% confidence interval indicates that the actual population mean will fall within the sample mean plus or minus two standard deviations. Two standard deviations can also be considered as the margin of error. The margin of error for a 95% confidence interval is computed as follows:

$$\text{margin of error} = E = \frac{1.96s}{\sqrt{n}}$$

where s is the standard deviation of the sample and n is the sample size. The mean range will then be the mean of the sample plus and minus the margin of error. While it is impossible to determine the population mean, it is safe to say that the actual population mean will fall within this aforementioned range 95% of the time (Bennett et al., 2018).

G*Power version 3.1.9.4 was used to suggest that the sample size needed to properly simulate the population with a 95% confidence level. The program works backward from a required margin of error and the equation for a 95% confidence level, running a series of possible solutions until the optimum sample size is determined. Using an alpha of .05 and a power of .80, along with a medium effect size $R^2 = .09$, five predictor variables will require a sample size of 136.

Another valuable software used with statistical research is SPSS (Version 26). SPSS can take the responses from the sample and process the multinomial logistic regression analysis according to the required confidence level. The data outputted include a descriptive of participants for each question as well as the multinomial logistic

regression model for the selected questions. In addition, SPSS outputs the significance from each question included in the predictive equation.

Sample

The sample chosen to represent this population were 174 people fulfilling roles as sales executives, managers, and individual contributors. Most participants were associated with an engineering and manufacturing firm employing over 5,000 people, based in the United States and operating globally. Additional participants were companies associated with and working alongside this firm.

A list of remote meeting attendees was compiled from North American employees at a primary global organization. In addition, five ancillary companies conducting business within the electronics component industry, including but not limited to the primary organization, were solicited for volunteer survey respondents. The survey was distributed to 174 individuals and 145 responded before closing the request.

Instrumentation

The data were collected using SurveyMonkey. McAllister's (1995) 11-question survey on elements of trust was adapted to evaluate opinions toward live-stream video during remote team meetings and the development of trust, engagement, performance, privacy, and technical challenges. The actual survey questions can be found in Appendix A with the trust, engagement, and performance questions being adapted from McAllister (1995); McAllister (1995) survey questions are found in Appendix B. The survey was distributed by attaching a cover letter and link into the corporate e-mail of each individual after receiving approval from the owners or leaders of participant companies.

Data Collection

Survey recipients had 4 weeks to respond, with a reminder sent after 3 weeks. An extension period of 2 weeks was provided to those who did not reply by the 4-week deadline. Permission to distribute the questionnaire within the company was approved by leadership at all organizations and participation was completely voluntary. An invitation to participate was delivered via the corporate e-mail accounts and worded as shown in Appendix C. The survey was conducted via an online survey program and a link provided in the invitation letter. Confidentiality and anonymity was defined on the welcome page of the survey, and no identifying data were collected with the survey. Consent to participate was assumed if the survey was completed and submitted. After the survey period expired, data were loaded into SPSS for analysis and stored on a password-protected USB drive.

Data Analysis

Responses to the survey were condensed into two categories for the DV: those indicating streaming usage of less than once a week were pooled into the category for no usage and coded as 0; those indicating one to three times per week and more than three times per week were compressed into the category for verified live-stream usage and coded 1. Next the opinion responses were transformed such that results were scaled from *strongly disagree* to *strongly agree*, allowing for a positive opinion to have a higher value on the Likert scale. However, Question 24 on the survey is written in the negative and therefore did not undergo transformation since an effective positive opinion is already higher on the scale.

An internal consistency reliability analysis was performed on the data to verify that the survey was measuring what was intended and there were sufficient questions to capture the intended opinion of the respondent. Cronbach's alpha coefficient above .70 was used to validate, unless there were fewer than four questions included in the scale. If this occurred, the mean interitem correlation of .20 to .40 was used for verification.

Limitations

This research utilized a convenience sample from an industry with which the researcher was familiar. When pulling participants from a convenience sample, there is the risk that those choosing to take part in the research may have some level of bias due to the association with the researcher. In addition, this convenience sample limits participation to a particular industry and people with like experiences within the industry. Since this sampling was restricted to those in the field of electronic component design and supply, populations working in other segments such as retail may not have been fully represented.

This study also does not address why trust development is furthered by personal interactions or under what context the development of trust with expanded personal interactions may flourish. There is an underlying assumption that time spent in the presence of another, either virtual or otherwise, will advance trust between the two parties. While accepting this assumption was a basis for this study, later research may choose to consider other factors for developing trust such as cultural compatibility, generational bias, historical streaming usage, or gender preferences.

Another limitation of the research was related to the frequency or quantity of responses in each category within the IV for a binomial logistic regression to function

correctly. One result of this requirement was that the Likert scale results needed to be compressed from a 5-point scale to a 3-point scale of *agree*, *neither agree nor disagree*, and *disagree*. While this allowed for the analysis, it reduced the range of the scale and prevented further distinction of opinions that would help evaluate how strongly an opinion may be required to determine likelihood of streaming usage.

Finally, the survey questions did not consider learning styles of the participants (i.e., visual/auditory/reading/kinesthetic). Visual learners will have an opinion of live-streaming that may not align with that of kinesthetic learners. The research does not discern the learning style of the participants and was thereby group together with similar learning styles before analyzing opinions of live-streaming with volume of remote meeting participation. For this reason, further understanding of the population motives (e.g., whether visual learners are more inclined to use streaming for sharing knowledge) was not pursued.

Summary

This research study associates opinions toward live-streaming as a tool for trust- and relationship-building activities with actual streaming usage in a virtual meeting environment. Survey respondents were asked whether participant streaming was effective at building trust, improving decision-making quality, and if streaming is a positive contributor to meeting outcomes. Survey participants included sales people, remote engineers, program managers, and project coordinators from a global manufacturing firm and contracted affiliated companies. Data were collected using an online program and were analyzed with a multiple logistic regression procedure to construct a predicative model from opinions on live-streaming and trust, engagement,

team performance, privacy concerns, and technical challenges. The research was limited by the industry being evaluated and the convenience sample investigated, and may not be generalized to other industries such as retail or banking.

CHAPTER 4: RESEARCH, DATA COLLECTION, AND FINDINGS

Overview

This chapter presents the data collection and findings to address the research objectives. It begins with the purpose statement and research questions used to provide direction for the methodology and analysis. A quantitative method was used for this research, with survey questions utilizing a Likert 5-point scale to assign a value to the responses. The Likert scale is a widely proven means of measuring a person's attitude toward a question, allowing a respondent to express how much he or she agrees or disagrees with a particular statement. A binomial logistic regression analysis and an independent samples *t* test was used to analyze the responses, where the independent variables capture opinions on the value of streaming for developing trust, improving team engagement, and furthering decision-making quality.

The quantitative data were obtained from 145 surveys out of 174 distributed to sales professionals collaborating extensively with remote colleagues. Participants were both mobile and office-based employees from six different organizations clustered in the same electronic-supplier industry. Although the participating companies were based in the United States, each interacted regularly with global associates, with one of the participating companies staffing approximately 5,000 employees globally. Results were presented and a narrative description of each finding provided. Tables and figures were included and referenced in the text body of this chapter as well as indexed for quick reference.

Purpose Statement

The purpose of this study was to explore whether positive, negative, or indifferent beliefs toward live-stream video as a tool for developing trusting relationships, enhancing team engagement, and improving team performance, are a suitable predictor for actual usage during remote team meetings. In addition, this study considered whether employee opinions regarding privacy expectations or technical challenges would alter usage regardless of attitude toward benefits while using live-streaming.

The demographic information from the participants was also reviewed for potential correlation to streaming usage among meeting attendees. A quantitative study was appropriate for this research as it allowed the collection and analysis of ordinal data on an individual's acceptance of the live-stream video mechanism for building trusting engagements and a correlation to user activities (Bennett et al., 2018; Carr, 1994; Mayoux, 2006).

Research Questions

This study aimed to associate positive opinions toward live-streaming as a tool for trust- and relationship-building activities with actual streaming usage in a virtual meeting environment. Establishing the connection is needed if researchers are to correlate other studies on personal interaction (e.g., knowledge spillover, collaboration, etc.) with procedural requirements within an organization, allowing teams to fully enjoy the benefits associated with research findings. In this way, organizations can examine research relevant to their needs and implement a customized setup to duplicate the research findings in their work space.

Figure 19 illustrates the conceptual framework that directs the research and the research problem: three presumed causes of streaming usage, two of which revolve around personal opinions toward streaming and its benefits and one that flows from demographics.

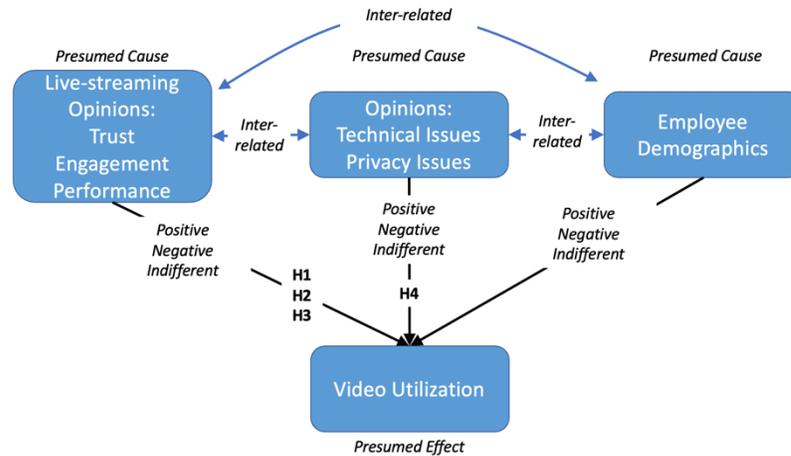


Figure 18. Graphical representation of conceptual framework for research design.

These presumed causes are interrelated and constitute the underpinning for the research questions. For example, research shows that nonverbal cues stimulate trust (Phutela, 2015; Tognetti et al., 2018), that trust stimulates knowledge sharing (Karis et al., 2016; Muethel et al., 2012), and that knowledge sharing stimulates high-performance team dynamics (Banchuen, Sadler, & Shee, 2017; Lee et al., 2016). Participant opinion regarding how positively live-streaming affects the development of a trusting relationship will predict whether live-streaming is used during a remote team meeting. The first three research questions revolve around these triggers and focus on opinions related to the value of using streaming during meetings:

RQ1. What attitudes toward live-stream video as an effective tool for building trusting relationships predict streaming usage among virtual team members?

RQ2. What attitudes toward live-stream video as an effective tool for enhanced team engagement predict streaming usage among virtual team members?

RQ3. What attitudes toward live-stream video as an effective tool for improving decision-making quality predict streaming usage among virtual team members?

Figure 19 also presents a second input for usage that is governed by opinion: attitudes toward technical hurdles and privacy expectations while using streaming in remote meetings. Personal beliefs on how difficult or easy a tool is to operate and how intrusive that tool is into personal space will affect usage and should be factored when establishing streaming training modules (Anderson, 2016; Karlen, 2014; Rojas-Méndez et al., 2017; Seebauer, 2015). Products or procedures that are simple, easily understood, and universally recognized as fit for use are welcomed and adopted into the stream of everyday utility. This understanding drove the final research question for the study:

RQ4. How are opinions about live-streaming in relation to technical challenges and privacy preferences determining whether virtual team members activate their video during remote team meetings?

Research Methods and Data Collection Procedures

The data were collected using SurveyMonkey. McAllister's (1995) 11-question survey on elements of trust was adapted to evaluate whether remote meeting attendees believe that live-stream video furthers the development of a trusting relationship among team members. The original survey questions can be found in Appendix A.

A list of remote meeting attendees was compiled from North American employees at a primary global organization. In addition, five ancillary companies conducting business within the electronics component industry, including but not limited

to the primary organization, were solicited for volunteer survey respondents. The survey was distributed to 174 individuals and 145 responded.

Survey questions collected a series of ordinal measurements to assess opinions on trust, engagement, team performance, privacy, and technical challenges when factoring in live-stream video usage for remote team meetings; these are the independent variables (IVs) used in the binomial logistic regression analysis to determine their influence on streaming usage, the dependent variable (DV). The results of the survey were coded according to the next section and SPSS (Version 26) was utilized for binomial logistic regression analysis and independent-samples *t* testing.

Coding of Data

Condense Usage Category

All participants were asked to rate their remote team meeting attendance in order to confirm that the sample actually represented the intended population: electronic industry workers actively participating in meetings involving remote attendance. The sample achieved this representation, with over 90% of respondents involved in meetings with remote attendees at least once a week, and two thirds attending meetings with remote colleagues three times or more per week. Figure 20 summarizes the distribution of the remote meeting frequency from the sample.

However, as shown in Figure 21, only 20% of those in the survey used streaming one or more times per week, and fewer than 5% used it three times or more per week. As a result of this limited frequency, it is necessary to reduce the grouping from three to two, where one group of the DV will be those not using streaming and the other will be those using streaming during remote meetings. Respondents using streaming less than once a

week are in the “not use” category and coded as zero; respondents using streaming one to three times per week or more than three times per week are included in the “use” category and coded as one. This reduced the DV to a dichotomous variable for use in a binomial logistic regression analysis while increasing the frequency in each category to a quantity that met binomial logistics requirements.

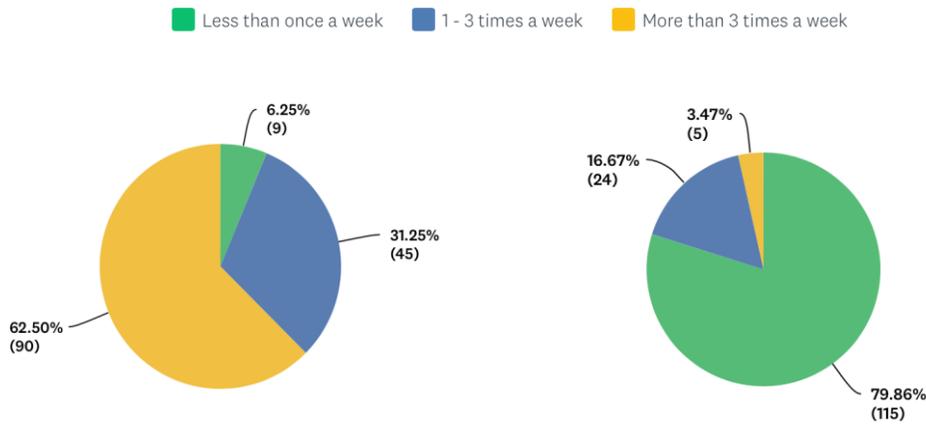


Figure 19. Remote meeting frequency.

Figure 20. Live-stream utilization.

Transform the Likert Scale

The survey was distributed in such a way that a low score would indicate strong agreement and a high score would indicate strong disagreement. The binomial logistic analysis predicts probabilities of a certain action based on independent inputs or variables. When considering probability, it is necessary to establish a reference case that is the lowest denominator, which for this study would be no usage. If the output is to advise what opinions will move the user from a reference value of “no use” to a probability of “use,” the inputs need to be transformed such that a lower assigned value to the variable is associated with a lower inclination of use or interest.

SPSS transform function was executed on the data to replace a variable value for “1” with “5,” “2” with “4,” “3” with “3” (no change), “4” with “2,” and “5” with “1.” This transform operation was performed on all questions with the exception of Question 24. As can be seen in the survey questions in Appendix A, Question 24 was presented in the form of a negative, thereby already associating the lower end of the Likert scale with a negative inclination. As such, the results from this question did not undergo transformation.

Internal Consistency Reliability

The survey included several questions about each IV. It is possible that each question is worded in a manner that does not have a similar scale for the responses, and replies may be on a different scale from one another. If this is the case, then combining the response into one summation for that IV category would be erroneous. One of the most commonly used tests for internal consistency is the Cronbach alpha coefficient. The desired Cronbach alpha coefficient of a scale should be at least .70 (DeVellis, 2012). The Cronbach alpha coefficient was reviewed for each of the five IV categories: trust, engagement, performance, technical challenges, and privacy expectations.

Trust building from streaming video. The overall opinion related to building trust and live-streaming is assessed by Survey Questions 3, 4, 5, 6, 7, and 8. When determining the Cronbach alpha for these six questions, the result was 0.706. Upon further inspection, Question 8 did not direct the participant to consider his or her answer in light of live-stream video usage and was therefore dropped from the overall evaluation, and an internal consistency analysis was performed again. According to DeVellis (2012),

the consistency of scale exists when the Cronbach alpha coefficient reported is at least .70. In the current study, the Cronbach alpha coefficient for building trust was .778.

Team engagement from streaming video. The overall opinion related to team engagement and live-streaming was assessed by Survey Questions 9, 10, 11, 12, and 13. According to DeVellis (2012), the consistency of scale exists when the Cronbach alpha coefficient reported is at least .70. In the current study, the Cronbach alpha coefficient for engagement questions was .832.

Team performance from streaming video. The overall opinion related to team performance and live-streaming was assessed by Survey Questions 14, 15, 16, 17, 18, 19, 20, and 21. According to DeVellis (2012), the consistency of scale exists when the Cronbach alpha coefficient reported is at least .70. The Cronbach alpha coefficient for these eight questions was .838. Upon further inspection, Question 18 was about engagement and not performance; therefore, Question 18 was dropped from this category. In the current study, the Cronbach alpha coefficient for performance questions was .850.

Technical challenges from streaming video. The overall opinion related to technical challenges and live-streaming was assessed by Survey Questions 22, 23, 24, and 25. According to DeVellis (2012), the consistency of scale exists when the Cronbach alpha coefficient reported is at least .70. The Cronbach alpha coefficient for these four questions was .690. This value is below the acceptable threshold. Upon further inspection, Question 25 appears out of scale with the rest of the question set and was dropped from this category. In the current study, the Cronbach alpha coefficient for technical questions was .782.

Privacy expectations from streaming video. The overall opinion related to privacy expectations and live-streaming was assessed by Survey Questions 26, 27, 28, and 29. According to DeVellis (2012), the consistency of scale exists when the Cronbach alpha coefficient reported is at least .70. The Cronbach alpha coefficient for these four questions was .396. Further inspection of Question 29 revealed a poor connection to privacy and streaming and was therefore dropped from this category set. In the current study, the Cronbach alpha coefficient for privacy questions was .600. This was still below the minimum threshold; however, with only three questions remaining in the category, it was acceptable to consider the interitem correlation. Briggs and Cheek (1986) recommended an optimal range for the interitem correlation of .20 to .40. In the current study, the interitem correlation for questions related to privacy expectations was .382 and .358.

Reduce Category Grouping

The opinion results from a Likert 5-point scale resulted in five categories, from *strongly disagree* to *strongly agree*. The dispersion of responses does not provide an understanding across the sample of opinions that will drive probability of behavior. However, knowledge of whether a sample agrees, disagrees, or is indifferent to an opinion is still useful for developing a procedure. For this study, strongly disagree and disagree were coded as *disagree* and given the value “2,” neither agree nor disagree were deemed as *indifferent* and coded with a “3,” and agree and strongly agree were associated with *agree* and coded with a variable value of “4.”

Summation of Variables

As noted earlier, the survey incorporated several questions to evaluate each IV category. The total of these questions was used as an overall coding for each IV, reducing the variables from 29 to five, one variable value for each of the IVs. This summation score results in a scale that can be treated as a continuous value, where the greater the value, the more positive the opinion (Carifio & Perla, 2008; Gliem & Gliem, 2003). Since the variable is now a summation, the scale transformed from 2–4 range depending on the number of questions in each category: Trust has a total scale of 10–20; engagement has a total scale of 10–20; performance has a total scale of 14–21; technical challenges has a total scale of 6–12; privacy expectations has a total scale of 6–12.

Presentation and Analysis of Data

Testing for Probability of Influence

Binomial logistic regression setup. The first analysis completed was a binomial logistic regression where the IVs included opinions related to live-streaming in relation to trust, engagement, team performance, technical challenges, and privacy expectations. The DV was the probability variable. Logistic regression obtains the odds ratio for the DV outcome depending on the effect from each IV. For this study, the DV is the dichotomous value for actual live-stream video usage during remote team meetings. A value of zero indicated no usage and a value of one indicated usage. Logistic regression allows for the use of categorical, continuous, or a mix of both types for the predictor or dependent variables.

Descriptive information from each variable after coding was reviewed and outliers in the data removed from further consideration. As noted earlier, 174 surveys

were distributed and 145 were collected. After outliers were removed, a total of 124 responses contained completed responses across all questions and were deemed usable for the full statistical analysis. This is less than the number suggested by G*Power, but since there still existed a minimum of 15 in both groups of the DV, the analysis was deemed suitable to proceed. Table 2 summarizes the number of responses for each IV category as well as cross-checking and verifying the number of usable cases. In addition, Table 3 shows the frequency for each DV grouping, verifying that after outliers are removed, 15 cases still existed for each group. Fifteen cases were the minimum allowable number of cases if logistic regression was performed.

Table 2

Sample Quantity, Mean, and Standard Deviation

	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>
Trust	130	10.00	20.00	15.5923	2.73846
Engagement	131	10.00	20.00	16.6947	2.86059
Performance	129	3.00	28.00	22.3023	4.01872
Tech challenge	130	6.00	12.00	9.6308	1.00494
Privacy expectations	129	6.00	12.00	9.9302	1.74636
Valid <i>N</i>	124				

Table 3

Dependent Variable Frequency for Each Group

Group	Frequency
No streaming usage	109
Streaming usage	15

One of the assumptions that the data must pass for a robust logistic analysis was the assumption of linearity (Hilbe, 2016). Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962)

procedure. A Boferroni correction was applied using all 12 terms in the model resulting in statistical significance being accepted when $p < .00417$ (Tabachnick & Fidell, 2013). Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable.

As noted above, outliers must be removed to avoid a statistically greater impact on the analysis than normally distributed data. Similar to ordinary multiple regression, the model fit needs to be checked for goodness of fit. In logistic analysis, this can be accomplished by checking for standardized residuals with an absolute value greater than 2.50. SPSS summarizes these outliers in a casewise list with all cases having a standardized residual shown.

Inspection of Table 4 shows that case numbers 2, 73, 96, and 145 all have standardized residual values larger than 2.50 and should be removed from the analysis. However, rather than remove each at once, only one case was removed and the analysis run again to check for outliers. After repeated cycles, cases 2, 18, 35, 40, 41, 50, 73, 96, 97, 98, 102, 128, and 145 needed to be removed from the analysis and the finalized

Table 4

Casewise List of Outliers

Case	Selected status ^a	Observed streaming frequency	Predicted	Predicted group	Temporary variable		
					Residual value	ZResid	Sresid
2	S	S**	0.101	N	0.899	2.981	2.161
73	S	S**	0.137	N	0.863	2.508	2.036
96	S	S**	0.119	N	0.881	2.725	2.109
145	S	S**	0.129	N	0.871	2.603	2.046

^aS = Selected, U = Unselected cases.

**Misclassified cases.

frequency table is shown in Table 3. The remaining values were then entered into SPSS for logistic regression to determine the odds ratio for that variable. However, as shown in Table 2, when SPSS processed the analysis, only cases that included a value for each of the IVs were included; the total cases processed were 124.

Binomial regression results. With all assumptions checked and fulfilled, a binomial logistic analysis was performed on the data. The first item to note is that nine cases were eliminated from the analysis due to incomplete survey questions, reducing the total number of cases from 145 to 137. After removing the aforementioned 13 cases that violated the outlier assumption, the total number of cases included was 124 and the frequency is shown in Table 3.

Results from the binomial logistic regression are shown in Table 5. The continuous variables (trust, engagement, performance, tech challenge, privacy expectation) are the result of the summation of responses for that variable, loaded into the analysis and used to predict the odds of changing streaming usage. Significance occurs from the engagement and performance independent variables only, although trust shows near significance. When considering the odds ratio results ($\text{Exp}[B]$) value, persons with the opinion that streaming during meetings positively influences the performance of the team are 1.422 times more likely to use streaming during meetings; persons with the opinion that streaming during meetings positively influences the engagement of the team are 1.957 times more likely to use streaming during meetings. Opinions on technical challenges or privacy concerns do not significantly affect usage. Gender also does not predict usage.

Table 5

First Binomial Logistic Analysis With All Potential IVs

Step 1 ^a	B	SE	Wald	df	Sig.	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
Gender (1)	0.063	0.795	0.006	1.000	0.937	1.065	0.224	5.062
Trust	0.332	0.190	3.051	1.000	0.081	1.394	0.960	2.023
Engagement*	0.672	0.340	3.897	1.000	0.048	1.957	1.005	3.812
Performance*	0.352	0.178	3.891	1.000	0.049	1.422	1.002	2.017
Tech challenge	-0.448	0.305	2.152	1.000	0.142	0.639	0.351	1.162
Privacy expectation	0.186	0.209	0.788	1.000	0.375	1.204	0.799	1.814
Constant	-26.424	8.717	9.190	1.000	0.002	0.000		

^aVariable(s) entered on Step 1: Gender, Trust, Engagement, Performance, Tech_Challenge, Privacy_Expectation

As noted earlier, results from the analysis on trust show near significance and bear consideration for potential implications to any utilization program. However, without true statistical significance, the logistic regression analysis is not an appropriate test to evaluate. Trust is further evaluated later in the chapter when considering the two-tailed independent samples *t* test of the means between each dependent variable groupings. The regression model correctly determined positive streaming usage 50% of the time and correctly determines no streaming usage 90% of the time.

The frequency table for each demographic category is shown in Tables 6 to 9. As a predictor of usage, none of the collected demographic standings proved significant and all but the inclusion of gender degraded the predictive model performance.

Independent samples *t* testing. An independent samples *t* test is used to evaluate whether there is a difference between the means of two independent groups within a continuous dependent variable. For this study, the independent samples *t* test compared the mean value of the “no use” streaming group with the mean value for the “use” streaming group across every

Table 6

Frequency Table on Gender

Gender	Frequency
Female	36
Male	93
Total	129

Table 7

Frequency Table of Generation

Generation	Frequency
Gen Z & millennials	17
Millennials & GenX	31
GenX	47
Boomer	34
Total	129

Table 8

Frequency Table of Education

Education	Frequency
High school/some college	20
Undergraduate degree	67
Graduate degree	42
Total	129

Table 9

Frequency Table of Employment

Employment	Frequency
Up to 5 years	42
More than 6 years	87
Total	129

demographic and opinion variable. Group statistics for all variables are listed in Table 10 and include the number of total responses for the variable, the mean value, and the standard deviation. Each of these values follows a different scale and the mean value should be considered according to the possible responses shown in Appendix A. For example, the gender coding is 0 for females and 1 for males. The gender mean for both streaming usage groups indicates that more men participated in this study across both groups, a reasonable conclusion considering the gender descriptive shown in Figure 22.

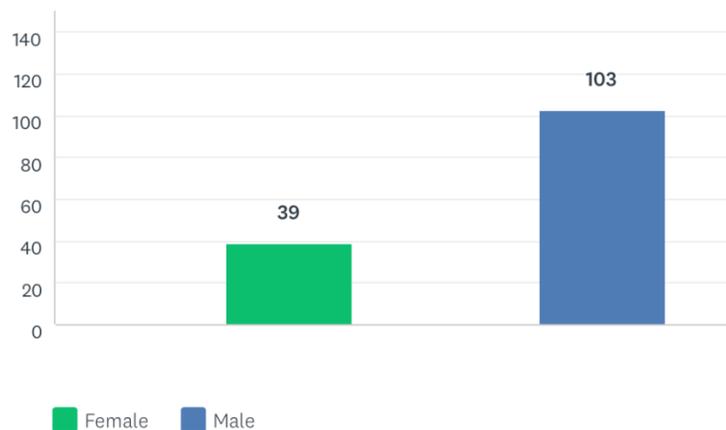


Figure 21. Gender distribution of survey participants.

However, the scale for generation or education is much different and it is important that any assessment of the descriptive statistics be considered alongside the appropriate scale. For the purposes of this independent samples *t* test, the descriptive information in Table 10 should be considered alongside the results of the significance testing found in Tables 11 and 12. The scale of the mean value is different for the demographic data and therefore cannot be interpreted by comparison across the variables; however, SPSS evaluated within the DV groups the IV category when determining significance.

Table 10

Descriptive Statistics for IVs in the Independent Samples t Test

	Streaming frequency	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SEM</i>
Trust	No streaming usage	112	15.2411	2.70550	0.25565
	Streaming usage	18	17.7778	1.80051	0.42438
Engagement	No streaming usage e	113	16.3894	2.85493	0.26857
	Streaming usage	18	18.6111	2.09028	0.49268
Performance	No streaming usage	114	21.7807	3.93027	0.36810
	Streaming usage	15	26.2667	1.98086	0.51146
Tech challenge	No streaming usage	113	9.6460	0.98126	0.09231
	Streaming usage	17	9.5294	1.17886	0.28592
Privacy expectation	No streaming usage	112	9.9821	1.69781	0.16043
	Streaming usage	17	9.5882	2.06334	0.50043
Age range	No streaming usage	112	1.7857	0.97194	0.09184
	Streaming usage	17	1.5882	1.12132	0.27196
Education	No streaming usage	112	1.1786	0.66053	0.06241
	Streaming usage	17	1.1176	0.78121	0.18947
Longevity	No streaming usage	112	0.7054	0.45793	0.04327
	Streaming usage	17	0.4706	0.51450	0.12478
Gender	No streaming usage	112	0.7411	0.44002	0.04158
	Streaming usage	17	0.5882	0.50730	0.12304

A review of the sample size was performed using G*Power to evaluate whether the sample could significantly apply to the population. When considering the effect size of trust, engagement, and performance, the usable sample was over the required number of participants to validate significance when considering an alpha of 0.05 and a power of .80. However, all other measured IVs reflected an effect size in the sample that was too small to establish significance to the overall population.

Also, before significance could be established on each variable, Levene's test for equality of variances was considered. This test identified whether the quantity in each of the DV groups was uneven, a condition that violates the homogeneity of variances and negatively affects the testing results. When the population variance is equal, Levene's test will result in an insignificant value greater than .05 and the homogeneity of variances

assumption will be fulfilled. As can be seen in Table 11, trust, engagement, and performance have significance when using Levene's test and therefore have violated the homogeneity of variances assumption. Table 12 lists each demographic variable; there are no violations of homogeneity. Fortunately, SPSS (Version 26) will run a compatible independent samples t test when there is heterogeneity of variance in the DV groups, also shown in both Table 11 and Table 12.

Statistical significance occurred in the mean score for trust between those using live-streaming and those not, $t(30.9) = -5.12, p < .0005$. Engagement and performance also resulted in significance, $t(28.2) = -3.96, p < .0005$ and $t(31.2) = -7.12, p < .0005$ respectively. Neither technical challenges nor privacy concerns resulted in a significant difference in means between those using streaming and those not. Similarly, no demographic information investigated had significance between the two groups.

Review of Survey Responses

Meeting volume, streaming usage, and group socialization. The sample included a large volume of remote meeting participation, with over 90% of respondents involved in meetings with remote attendees at least once a week, and two thirds attending meetings with remote colleagues three times or more per week. However, the need to involve remote participants did not translate into live-streaming. Only 20% of those in the survey used streaming one or more times per week, and fewer than 5% used it three times or more per week. Opinions on simulated proximity were nearly evenly split, with just over one third agreeing that live-streaming eliminated the physical distance, while 30% disagreed and another 30% were indifferent (see Figures 23 and 24).

Table 3

Results of Independent-Samples t-Testing: Mean of Opinion Variables

	Levene's Test for Equality of Variables		<i>t</i> Test for Equality of Means						
	<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2- tailed)	<i>M</i> difference	<i>SE</i> difference	95% CI of the difference Lower Upper	
Trust	5.501	0.021		128					
Equal variances assumed			-3.837	30.952	0.000	-2.53671	0.66112	-3.84485	-1.22856
Equal variances not assumed			-5.120		0.000	-2.53671	0.49544	-3.54722	-1.52620
Engagement	7.145	0.008		129					
Equal variances assumed			-3.165	28.226	0.002	-2.22173	0.70203	-3.61071	-0.83275
Equal variances not assumed			-3.959		0.000	-2.22173	0.56113	-3.37074	-1.07272
Performance	5.203	0.024		127					
Equal variances assumed			-4.338	31.222	0.000	-4.48596	1.03415	-6.53237	-2.43956
Equal variances not assumed			-7.119		0.000	-4.48596	0.63015	-5.77079	-3.20114
Tech challenge	1.257	0.264		128					
Equal variances assumed			0.445	19.479	0.657	0.11661	0.26224	-0.40228	0.63550
Equal variances not assumed			0.388		0.702	0.11661	0.30045	-0.51119	0.74440
Privacy expectation	1.755	0.188		127					
Equal variances assumed			0.866	19.428	0.388	0.39391	0.45501	-0.50648	1.29429
Equal variances not assumed			0.750		0.463	0.39391	0.52552	-0.70438	1.49219

Table 12

Results of Independent-Samples t-Testing: Mean of Demographic Variables

	Levene's Test for Equality of Variance		<i>t</i> Test for Equality of Means				95% CI of the difference		
	<i>F</i>	Sig.	<i>t</i>	<i>df</i>	Sig. (2- tailed)	<i>M</i> difference	<i>SE</i> difference	Lower	Upper
Age range	1.120	0.292							
Equal variances assumed			0.765	127	0.446	0.19748	0.25821	-0.31347	0.70843
Equal variances not assumed			0.688	19.820	0.499	0.19748	0.28705	-0.40164	0.79660
Education	0.827	0.365							
Equal variances assumed			0.346	127	0.730	0.06092	0.17620	-0.28774	0.40958
Equal variances not assumed			0.305	19.627	0.763	0.06092	0.19949	-0.35571	0.47755
Longevity	3.246	0.074							
Equal variances assumed			1.938	127	0.055	0.23477	0.12115	-0.00496	0.47450
Equal variances not assumed			1.778	20.037	0.091	0.23477	0.13207	-0.04070	0.51024
Gender	3.707	0.056							
Equal variances assumed			1.308	127	0.193	0.15284	0.11688	-0.07846	0.38413
Equal variances not assumed			1.177	19.826	0.253	0.15284	0.12987	-0.11823	0.42390

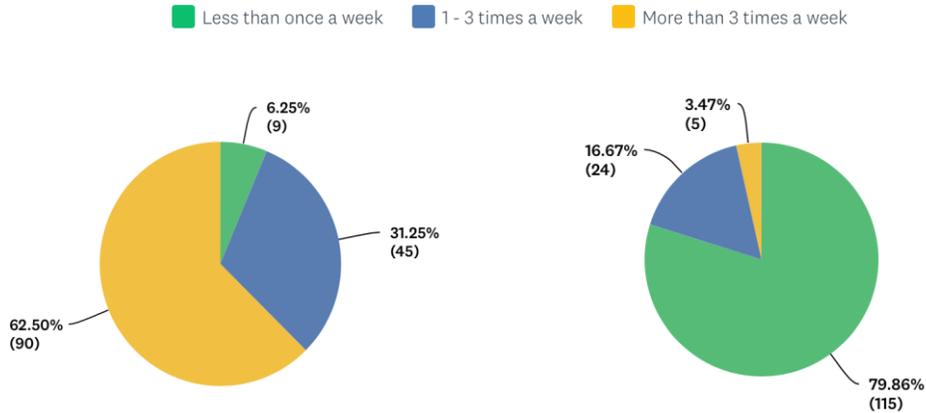


Figure 22. Remote meeting frequency.

Figure 23. Live-stream utilization.

Opinions on meeting interactions shifted depending on whether the question implied an objective response or an emotional interaction. When asked whether live-streaming improved constructive interactions, 45% agreed, more than double those who disagreed (see Figure 25). However, when questioned about whether live-streaming enabled participants to share problems, an identifier that introduces possible personal considerations, opinions on live-streaming dipped, with over 80% either indifferent or disagreeing with a positive opinion (see Figure 26). This indifference was also apparent when participants responded regarding opinions of loss when teams using live-stream video are disbanded. Once again, 50% were indifferent and 30% did not feel a sense of loss.

Motives, intent, and focus. Survey respondents continued to associate live-streaming with positive opinions when assessing objective actions among participants. A majority of 55% agreed that live-stream video allowed them to determine the motives of others better than purely audio conversations; only 15% disagreed with this opinion (see Figure 27). Additionally, nearly twice as many agreed than disagreed when asked if live-streaming improved their ability to discern whether other participants approach their job

with dedication, while respondents believing they can determine the intent of another's contribution outpaced those seeing no difference by nearly three to one (see Figure 28).

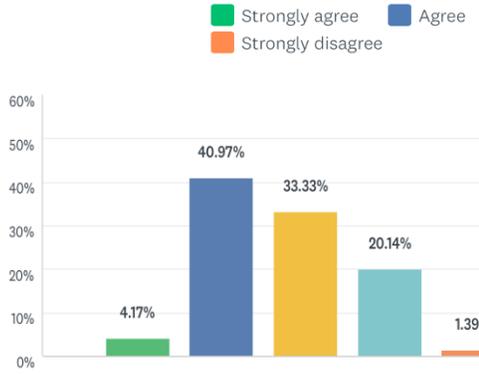


Figure 24. Constructive response to challenges.

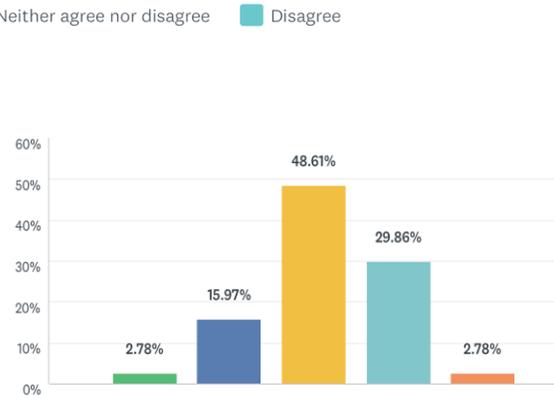


Figure 25. Comfortable sharing problems.

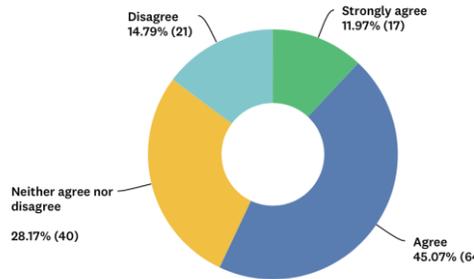


Figure 26. Live-stream helps determine motives.

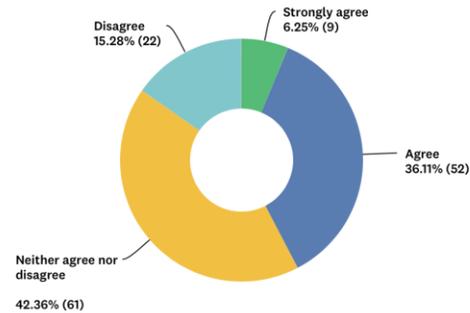


Figure 27. Live-stream helps determine intent.

Very strong opinions related to focus were provided by participants. When asked whether live-streaming improved concentration and forced participants to avoid distractions or multitasking, 75% of respondents agreed and only 5% disagreed (see Figure 29). This question also represented one of the lowest levels of indifference, with only one in five neither agreeing nor disagreeing. Opinions on collaboration appeared to align with this added concentration, with twice as many agreeing than disagreeing with

the statement that collaboration is more productive with live-stream video than purely audio meetings (see Figure 30).

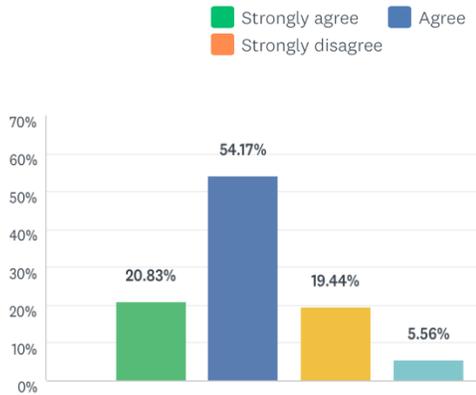


Figure 28. Live-streaming improves focus.

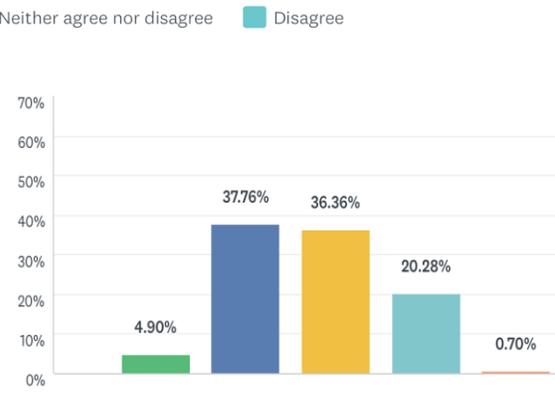


Figure 29. Live-streaming improves collaboration.

Knowledge sharing and decision-making. The improved focus did not necessarily translate into knowledge transfer. When asked opinions on knowledge transfer or ability to understand, responses were nearly evenly split across *agree* and *indifferent*, while those disagreeing numbered one in four of the replies. The questions did not define the type of meeting or whether the meeting may require additional presentations modes (e.g., PowerPoint presentations), but simply asked opinions on whether remote meetings with live-streaming of participants improved knowledge transfer and understanding.

Contribution of information was also not considered heavily improved upon when using live-streaming, with responses nearly evenly split across *agree*, *disagree*, or *indifferent*. However, although the contribution of knowledge may not have improved, the ability to remember who actually made the contribution was greatly enhanced with

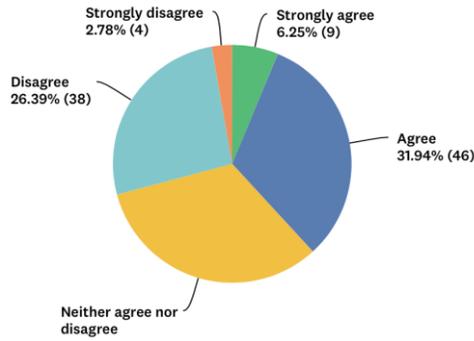


Figure 30. Live-stream helps transfer knowledge.

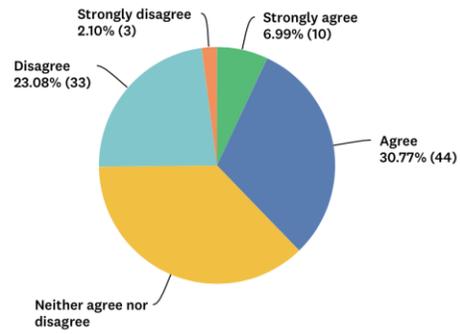


Figure 31. Live-stream improves understanding.

live-streaming. Almost three times more replies agreed with an improved ability to recall the contributor when seeing him or her on video than those disagreeing with the notion that live-streaming helps capture the contributor (see Figure 33).

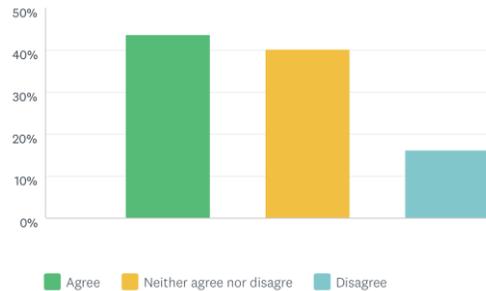


Figure 32. Live-streaming improves recollection of the contributor.

Twice as many survey respondents disagreed than agreed with the opinion that making the correct decision would be influenced by live-streaming during the meeting. When asked whether live-streaming improved uniform interpretation or aligned the attitudes toward the subject matter, the majority (i.e., approximately 40%) were indifferent, neither agreeing nor disagreeing with the benefits of live-streaming of participants during remote meetings. Questions did not specify the meeting purpose or

whether additional presentation material (e.g., PowerPoint slides) would be transmitted along with the streaming content.

Technology challenges and privacy considerations. Technology concerns continue to plague the perception of live-stream utilization during remote team meetings. Sixty-five percent believed that starting meetings with streaming is difficult and bandwidth issue will result in poor call quality while less than 10% disagree with this statement (see Figure 34). This unease extends to international meetings as well. The anxiety is much different when engaging with office-based equipment (e.g., telepresence or office conference room equipment) rather than public networks or personal equipment. Respondents overwhelmingly agreed, 55% versus 15% disagreeing, with the opinion that office-based conferencing with live-stream video will perform better than remote operation (see Figure 35). It should be noted that the overall responses are not indicative of actual usage, which was considered when performing statistically significant testing comparing the responses between user and nonuser groups.

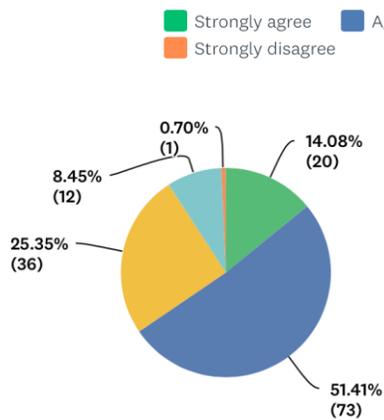


Figure 33. Meeting with live-stream are difficult to start, bandwidth issues.

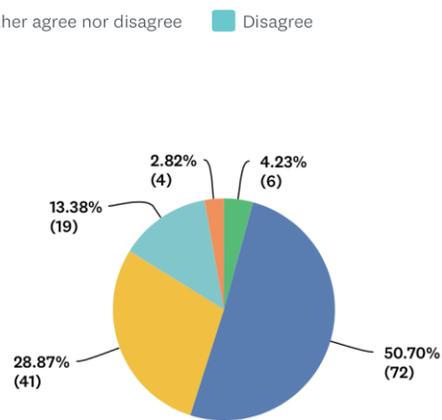


Figure 34. Remote meetings with streaming work better in the office.

Regarding privacy concerns, less than half do not want to participate in live-streaming as it exposes their personal space. Appearances are relevant to people being asked to use live-streaming during remote meetings, with a decisive portion, 60%, expressing concern with how they look to their colleagues and just over half confirming that they are distracted when seeing themselves on the streaming equipment (see Figure 36). Survey questions did not delve into why (e.g., looking unprofessional and appropriately prepared for the meeting), and some members even preferred to see themselves regardless of the distraction (see Figure 37). Less than a majority identified personal space as an issue, although only slightly less at 44%.

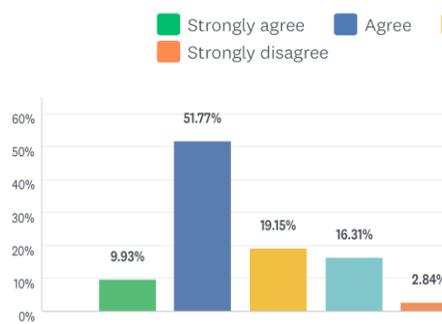


Figure 35. Concerned with appearance during live-streaming.

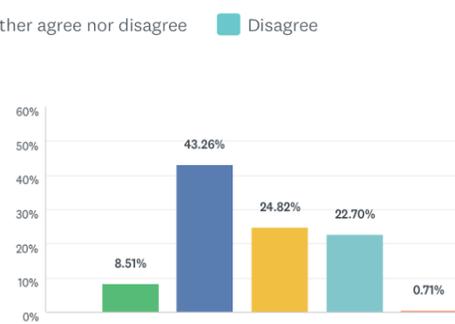


Figure 36. Distracted by image during live-streaming.

Summary

The survey responses provide a range of opinions on the benefits of live-stream video, from effectiveness of interactions to challenges with utilizing streaming as a communication method. The binomial logistic regression analysis provided a predictive model that is significantly better than a model without the independent variables of trust, engagement, performance, technical challenges, and privacy expectations. The model did not find that each independent variable category contributed to the predictive odds ratio

significantly but only categorical groupings from performance and engagement providing independent predictor significance.

The results of the independent samples *t* test showed that some of the survey groupings did have a significant mean difference when comparing the two groups from the dichotomous dependent variable of streaming usage. Similar to the binomial logistic regression, performance and engagement also had a significant mean difference when comparing the two dependent variable groups. However, the third opinion, variable of trust, also had a significant mean difference between the two groups of use and no streaming usage. None of the demographic variables showed a significant mean difference between the two groups.

CHAPTER 5: FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to explore whether positive, negative, or indifferent beliefs toward live-stream video as a tool for developing trusting relationships, enhancing team engagement and team performance, are a suitable predictor for actual usage during remote team meetings. In addition, this study considered whether employee opinions regarding privacy expectations or technical challenges altered usage regardless of attitude toward benefits from using live-streaming. Demographic information was collected and evaluated for possible triggers to usage as well.

Research questions revolved around opinions regarding streaming, accessing social cognitive theory (SCT), the theory of planned behavior (TPB), and the theory of reasoned action (TRA) to develop a study model that could predict behavior based on attitudes. One of the attitudes targeted was related to developing trust among colleagues and whether streaming could be a positive mechanism for advancing a quality relationship. As the relationship improved, the theory of knowledge spillover of entrepreneurship (KSTE) dictated that containing knowledge within organizations would be more valuable than allowing leakage outside the company. The theory of decision making (TDM) then demands that as knowledge and trust abound, the ability to make quality decisions improves throughout the team.

The study also pulled from the technology acceptance model (TAM) and the innovation diffusion theory (IDT) to determine whether perspectives on technology will prompt streaming in meeting with virtual teams. As technologies move beyond early adopters, it becomes accepted within a culture and barriers to entry (e.g., cultural resistance to usage, equipment variations, privacy) drop. The unified theory of

acceptance and use of technology (UTAUT) bundles all of these theories into one framework, drawing on each aspect to advocate for predictive triggers that bridged each theory. These opinions related to trust, engagement, performance, technology challenges, and privacy expectations are the independent variables collected and used in the binomial logistic regression to determine the odds ratio for each and whether positive opinions are more likely to influence usage. While the demographic data collected were not related to any research question or hypothesis, they were still analyzed for possible significance.

Survey questions collected a mix of scalar and ordinal measurements, utilizing a Likert 5-point scale to assess opinions on the development of trust, employee engagement, team performance, privacy, and technical challenges when using video streaming. These responses, combined with a respondent's actual usage of streaming during remote team meetings, were coded and analyzed using a binomial logistic regression analysis. Personal privacy preferences and technical challenges were included in the logistic regression model as two additional independent variables (IV).

In addition to running a binomial logistic regression, two-tailed independent samples *t* testing was performed to further evaluate both the IVs surrounding opinions and the IVs from demographic data. The target population was U.S.-based corporate users of a video conference portal employed by global organizations in the electronics industry. These users participate regularly in regional and global meetings, either face-to-face (F2F) or via a call-in bridge. The population associated with this research were professionals involved in the electronics manufacturing industry segment in the United States. In 2018, the U.S. Bureau of Labor Statistics published that a total of 1,096,000 professionals were employed in the United States by this industry with 25% operating in

some remote capacity throughout the week. The convenience sample chosen to represent this population were sales executives, managers, and individual contributors employed in the electronic manufacturing industry. Most participants were associated with an engineering and manufacturing firm employing over 5,000 people, based in the United States, and operating globally. Additional participants were solicited from five companies partnering with and working alongside this primary firm, although the primary firm was not their only engagement with the electronics industry.

Major Findings

Analysis of the results confirmed significance between the mean scores for the use and no streaming usage groups when considering opinions of live-streaming and the development of trust, team engagement, and team performance. Review of the two groups shows that as opinions turn positive, the participant falls into the use category. Additional testing completed in a logistic regression provides an odds ratio for opinions on engagement and performance, confirming that as opinions turn positive, there is a significant predictive contribution to a use model. When considering these parallel findings, this research has confirmed triggers for usage that can both significantly predict usage and identify training opportunities within organizations that can affect adoption.

Recalling how TRA predicts behavior (whether action or inaction) from reasoned evaluation, it appears that an actual lack of opinion regarding streaming may exist, and a lack of adoption may not be related to any opinion grounded in examination but simply insufficient interest in the communication medium altogether. Table 13 shows the mean value for each opinion variable along with the minimum and maximum possible, or scale, for each variable. Inspection of the table reveals that the overall survey mean for each

variable is close to the mean of the scale. This indicates that an attitude exists that neither disagrees nor agrees with positive opinions on streaming during remote meetings.

Table 4

Descriptive Values for Independent Opinion Variables

Variable	<i>n</i>	Min.	Max.	<i>M</i>	<i>SD</i>
Trust	130	10.00	20.00	15.5923	2.73046
Engagement	131	10.00	20.00	16.6947	2.86059
Performance	129	3.00	28.00	22.3023	4.01872
Tech challenge	130	6.00	12.00	9.6308	1.00494
Privacy expectation	129	6.00	12.00	9.9302	1.74636
Streaming frequency	132	0.00	1.00	0.1364	0.34448

When combined with the relatively low streaming usage found in the sample, (i.e., the mean value for streaming frequency is much closer to the no streaming usage value of zero), there appears to be little consideration given to streaming. In other words, sample respondents have an apparent indifference regarding the five opinion variables and are therefore not determining any decision regarding use or no use. SCT emphasizes that knowledge acquisition occurs by observing a person's social surrounding, whether via media exposure, interaction, or experiences. With a lack of use within the organization, there is no social situation that would demonstrate use and help employees decide. The indecisive behavior can be influenced by having advocates demonstrate usage and convey the value of each trigger variable (i.e., trust, engagement, performance). With this in mind (i.e., SCT's format for learning), a look at triggers identified by a logistic regression can be considered.

Binomial Logistic Regression

When considering opinions of trust, engagement, performance, technical challenges, and privacy expectations with regard to video streaming of meeting participants, the binomial logistic regression results in a model that predicts positive usage of streaming during remote team meetings 50% of the time and predicts negative or nonusage of streaming 90% of the time. When applying the factors found in the model to changing opinions, upticks in opinions will correctly result in actual improved usage 50% of the time and downturns in opinions correctly predict actual nonusage 90% of the time. Significant predictors with a 95% confidence interval include the opinions from the variable of performance and engagement, with an odds ratio predicting that those with a positive opinion toward streaming's influence on team engagement being 1.957 times more likely to use streaming video. Likewise, employees with a positive opinion toward team performance are 1.422 times more likely to use the communication tool in remote meetings with virtual participants.

Table 14 also shows that the opinion of trust was nearly significant while neither negative opinions regarding technical challenges or privacy expectations have an influence on streaming usage. Trust, engagement, and performance are reviewed further in the following pages.

Trust, Engagement, and Performance

The first research question was derived from literature discussing the building of trust and how this can produce desirable activities within an organization with positive outcomes (Covey & Conant, 2016). These activities may include knowledge sharing to

Table 145

Binomial Logistic Regression Analysis: Five Independent Variables

Step 1 ^a	B	SE	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender (1)	0.063	0.795	0.006	1.000	0.937	1.065	0.224	5.062
Trust	0.332	0.190	3.051	1.000	0.081	1.394	0.960	2.023
Engagement*	0.672	0.340	3.897	1.000	0.048	1.957	1.005	3.812
Performance*	0.352	0.178	3.891	1.000	0.049	1.422	1.002	2.017
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Privacy expectation	0.186	0.209	0.788	1.000	0.375	1.204	0.799	1.814
Constant	-26.424	8.717	9.190	1.000	0.002	0.000		

^aVariable(s) entered on step 1: Gender, Trust, Engagement, Performance, Tech_Challenge, Privacy_Expectation.

spur along innovation, a positive working environment that leads to institutional memory and self-contained talent teams, and ethical operations that spur continuous exchange relationships (Piricz & Mandjak, 2016). Traditional trust-building methods include F2F meetings, but this research was conducted to evaluate how any perceived value of streaming as a reasonable substitute, replacing costly travel and making interactions more convenient for a flexible workforce, can alter streaming usage within the group. The research has demonstrated the value of trust as a transactional catalyst, but if streaming is to be used for building the relationship, shaping attitudes toward the tool's effectiveness is required.

Engagement is an offshoot of a trusting relationship and is the focus of the second research question (Shaik & Makhecha, 2019). Social presence theory (SPT) defines the ability of communication methods to transfer social cues, creating a feeling of community or shared experience. Employees operate under this principle when interacting with live-stream video. In addition, engaged employees advance social

capital by making connections to global colleagues not otherwise possible. This interaction rapidly advances diffusion, encourages similar behaviors, and improves information processing. Add this to the increased productivity resulting from flexible work environments (Regus, 2017), and the use of streaming during remote meetings enhances engagement and establishes an expectation that dictates behavior (Maruping et al., 2017). By demonstrating to employees the benefits and shaping opinions related to the operation and use of streaming during remote meetings, organizations can further team engagement across the entire global footprint.

Ultimately, organizations are looking to improve team performance for profitable results. As trust between team members increases, engagement improves knowledge sharing and decisions are built on a strong foundation (Wen et al., 2018). Leadership can use the findings of this research to demonstrate streaming value during remote meetings, training staff and changing opinions. TPB and TRA come into play when using streaming to develop planned behavior and reasoned action. Users of video will begin to coalesce around a unified concept and promote decision-making quality more quickly than otherwise.

Independent samples *t* testing. The results of the independent samples *t* test provided guidance on which variables contribute significantly and guided participants into one group or the other. Unlike the descriptive statistics shown in Table 13, the independent samples *t* test will separate the participants into two groups: those using streaming and those not. By comparing the means of the two groups, the analysis evaluates whether the mean difference in the two groups is significant enough to apply the difference to the overall population. Drawing directional conclusions (i.e., whether a

positive or negative opinion dominates a group) from the significance, however, was based on the actual values of the means. As noted earlier, the mean of the entire sample is only slightly larger than an indifferent opinion for the variables of trust, engagement, performance, technology challenges, and privacy expectations. Separating out the two means by group allows further evaluation of the attitude that drives behavior, a key supposition of TRA and TPB.

The results of the testing confirm that opinions related to streaming as a tool for building trust, advancing engagement, and improving team performance are significantly different between the groups. This confirms the thinking behind TRA and TPB surrounding behavioral decisions. When an employee views a certain action as having a positive outcome, he or she is more likely to engage in that behavior. What this research has accomplished is to identify what positive beliefs will trigger the behavioral actions. The two-tailed t test results confirm that when a person is convinced that trust development, engagement, and team performance can be positively impacted by using live-stream video during meetings, the person will engage and collaborate with his or her streaming protocols activated.

Inspection of mean values between the two groups shows that the streaming usage group has a more positive opinion of each variable category. The same can be said of the other two independent variables where significance was detected, opinions on engagement and performance. As such, the first three null hypothesis can be rejected and the alternate accepted:

H_{a1}. Positive opinions from team members toward using live-streaming to build trust within the virtual team will result in participants engaging their streaming devices during remote team meetings.

H_{a2}. Positive opinions from team members toward using live-streaming as a tool for fostering active engagement within the virtual team will result in participants engaging their streaming devices during remote team meetings.

H_{a3}. Positive opinions from team members toward using live-streaming during meetings to improve decision quality within virtual team meetings will result in participants engaging their streaming devices during remote team meetings.

These results allow organizations to focus on changing attitudes surrounding specific topics (trust, engagement, performance) in the effort to increase live-streaming adoption within their remote teams. Leadership can deploy training to their employees that instructs and educates them on topics related to trust, engagement, and performance as well as how streaming advances each of these subjects. As the staff moves toward a positive opinion toward each of these topics, they will be more likely to engage their streaming devices.

Almost as important was the discovery that certain areas may not be worth pursuing. Since there was no significance found regarding the fourth null hypothesis, it could not be rejected.

H_{o4}. Negative opinions from team members toward technical challenges and privacy expectations while using live-streaming will not prevent virtual meeting participants from engaging their streaming devices during remote team meetings.

Armed with this information, trainers can construct a policy and procedure that emphasize the values of building trust, engagement, and performance when using streaming and deemphasize the need to convince users of the technical simplicity or privacy concerns related to the tool.

A closer look at the mean value for the no streaming usage group shown in Table 15 is also telling. The mean value of the trust for this group falls squarely at an indifferent measure, while the engagement and performance values are only slightly higher than the indifferent value. This would indicate that people within the sample are not avoiding the live-streaming tool because of any passionate disagreement with the tool, but simply because they have no opinion that will drive behavior. Without such a belief, TPB establishes that there will be no action or behavior. Fortunately, establishing a belief when no opinion exists will require less movement than first needing to break down a negative opinion.

Table 15

Descriptive Data for Independent Variables by Dependent Variable Group

Variable	Streaming frequency	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SEM</i>
Trust	No streaming usage	112	15.2411	2.70550	0.25565
	Streaming usage	18	17.7778	1.80051	0.42438
Engagement	No streaming usage	113	16.3894	2.85493	0.26857
	Streaming usage	18	18.6111	2.09028	0.49268
Performance	No streaming usage	114	21.7807	3.93027	0.36810
	Streaming usage	15	26.2667	1.98086	0.51146
Tech challenge	No streaming usage	113	9.6460	0.98126	0.09231
	Streaming usage	17	9.5294	1.17886	0.28592
Privacy expectation	No streaming usage	112	9.9821	1.69781	0.16043
	Streaming usage	17	9.5882	2.06334	0.50043

Unexpected Findings

There was no significant difference between the opinions of men and women when deciding to use streaming during a remote team meeting. When considering the large discrepancy in cosmetic expenditures, this came as a surprise. Cosmetic marketing to women and their subsequent annual spending is much higher than to men (SWNS, 2017), implying that women are more conscientious of their appearance and have a greater self-awareness. However, the findings of this research showed that there is no significant difference in video usage preferences when it comes to video conferencing. This was supported by Soyoung et al. (2017) who found that there is no significant behavioral difference in streaming usage based on gender for online dating sites. Soyoung et al. noted that both genders prefer streaming videos as it gives them a greater sense of social awareness when participating in dating apps. While men also relied on geographic information for social capital investments, the fact that streaming was desirable for both genders supports the appeal of streaming regardless of personal appearance hesitations.

When considering the indifferent attitude revealed by the mean score for the opinion variables (i.e., trust, engagement, performance, technical challenges, privacy expectations), it appears that the value of streaming is still unknown by employees. This unexpected response does have a silver lining: When opinions are not formed, organizations are more able to influence the desired outcome. For example, those strongly disagreeing with the value of live-streaming are unlikely to change their opinion regardless of leadership efforts to the contrary. The ability to mold opinions was not considered when crafting this research but is an important revelation to be investigated.

As noted earlier when reviewing innovation diffusion theory (IDT), diffusion is a strong vehicle for social acceptance and the adoption of disruptive technologies (Seebauer, 2015). Organizations can act to establish opinions rather than break down and rebuild attitudes.

Also, as shown in Figures 25 and 26 (repeated here for ease of reference), survey respondents were willing to attribute an ability to perceive objective responses (e.g., overcoming challenges at work) for professional contributions to live-streaming, but they were reluctant to agree with live-streaming being able to discern emotional contributions (e.g., sharing personal problems).

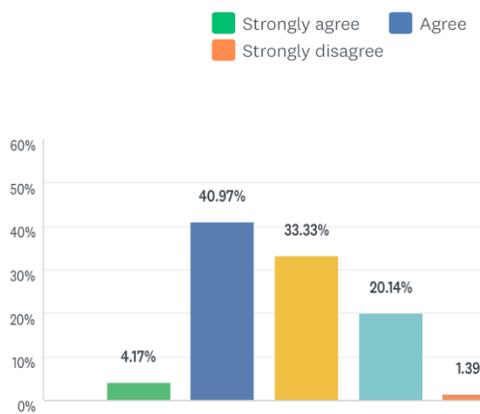


Figure 37. Constructive response to challenges.

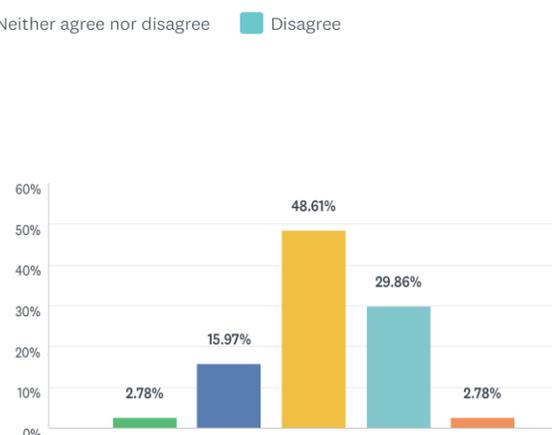


Figure 38. Comfortable sharing problems.

Discussed earlier was the theory surrounding the value of eye contact and nonverbal cues for establishing relationships or gaining trust (Macdonald & Tatler, 2018; Phutela, 2015). When eye contact and face gazing are evaluated during social interactions, people are more inclined to believe that the information and participation is altruistic, assigning trust to the other person. However, the disagreement surrounding streaming as a tool for sharing problems implies that there is still something three

dimensional about the interaction where flat images cannot capture the same association to building trust. The results also indicate an acceptance in the professional environment based on the TRA, where employees reason that live-stream video is an effective communication tool for business transactions but not acceptable when building a relationship that is personal in nature. This could have interesting implications to online dating sites that use virtual interactions for the initial trust-building activities.

Other Findings

A large portion of survey participants replied to the questions with an indifferent response or neither negative nor positive feedback. While this may have prevented some findings of significance from certain variables, it does show that the workforce is ripe for shaping, and that companies can actually move the utilization needle with some effort and policy changes. TRA, SCT, and IDT work hand in hand to promote new technologies and engagement. When workers see the advantages of a certain action played out in their social network, they can reason the value of taking an action. As this action proliferates throughout the organization, the activity diffuses and more people get exposed. With so many respondents lacking an opinion, the diffusion of early adopters is lacking, withholding any positive benefit that might be on display in the employee's social realm. A change of opinion among a small group's members could influence a large number of people and change the entire culture of an organization. Leaders can use the findings of this study to change the opinions of localized influencers, thereby capturing a large impact with minimal effort.

Also, the percentage of respondents believing that streaming would perform better in the office than elsewhere (55%) indicates an area of concern. This finding was not

significant to the population that the sample represented but does seem to support conflicting views on the subject. For example, Edinger (2018) promoted video conferencing from a “get over it” platform while Anderson (2016) still shouts out that choppy calls and frequent disconnects abound. The respondents from this research seem to be on the fence, inclined to accept Edinger’s (2018) view while in the office but side with Anderson (2016) from home. As a result, they are willing to consider streaming when they are comfortable with their meeting surroundings (e.g., the office) but less inclined when there are too many unknown factors involved (e.g., the coffee shop).

Conclusions

The need for remote meeting attendance is increasing. Companies need to reframe their historical approach to team building either because candidates are pulling them in this direction or globalization is pushing them into this new structure. International organizations are relying on diverse talent, both culturally and geographically, which in turn presents challenges to team productivity. Some companies have reframed the problem into a trust-and-engagement situation, turning to video conferencing as the solution, and attempting to deliver the same personal interaction that was historically fulfilled with F2F discussions in a conference room or the hallways of the office. This is not a new technology, with the first wide-scale introduction of video during calls from AT&T in the early 1970s. It was not until the 1980s and the advent of video codecs and increased internet bandwidth that real-time transmission of video became practical. Two decades later, the technology was still relegated to large corporations and universities, but the explosion of smartphones with video capability

created a commercial demand resulting in video conferencing becoming part of the lexicon of the consumer (e.g., FaceTime, WebEx, Skype).

However, when using live-streaming during a call with a sister, father, or friend, users are already comfortable in the relationship. In contrast, opening a conference with multiple international colleagues could be intimidating and presents a barrier to building a relationship from the beginning. The social presence theory (SPT) relies on media to transfer social cues while the media-rich theory (MRT) demands that an appropriate information transfer mechanism be used depending on the importance of the information. Coupling these two theories with the value of eye contact, facial expressions, and nonverbal cues when developing a trusting relationship, and the challenges to communicating remotely become apparent.

This research was completed to fill a gap in determining whether employees in this type of environment (i.e., collaborating with international colleagues on high-engagement innovations) perceived live-streaming as having value for building trust, employee engagement, and team performance, and if a more positive opinion was a predictor of usage. The results indicate that while the opinions of the population support the widely promoted belief in research that video can overcome the strangeness of meeting with remote participants, positive opinions related to trust, engagement, and team performance while using live-streaming are specific topics that will improve utilization. Organizations can focus on training related to these three categories and demonstrate with early adopters the value of using streaming during remote team meetings.

Implications for Action

The results of this study confirm that employees in a global industry value the benefits live-stream video brings to a remote team environment. However, organizations have yet to capitalize on the technology value as utilization is very low. Based on the areas where significance was detected (positive opinions toward trust, engagement, performance), it appears certain that further education is needed within the population to show how streaming can contribute to the development of relationships. Opportunities exist to put the technology into practice and train organizations on the simplicity and advantages of utilization when collaborating.

While positive attitudes toward streaming video in relation to trust, engagement, and team effectiveness will influence usage, the negative potential and misuse of the streaming media can have consequences that poorly affect remote teams and the transfer of knowledge. Consider again the cone of gaze research completed by Lyyra et al. (2017). If one participant observes that the other fails to look him or her in the eye or appears to settle his or her eyes outside a cone of gaze, then the participant will convey feelings of mistrust on the other. However, users of streaming are not always able to determine where their gaze settles. For example, if a user participating in a remote meeting has the video device set up such that the camera used to capture his or her image is not located near the streaming image of the other participant, he or she will appear to be gazing at another location, even though both participants are looking directly into their personal camera lens. This poor setup unwittingly conveys mistrust and negatively influences the relationship. Manufacturers of hardware and software developers must consider this with future products, releasing equipment and procedural instructions that

mitigate this influence before it takes hold on a team and counteracts the efforts of the organization.

In addition to the generally positive opinion toward live-stream video regardless of usage, a lack of significant concern for personal privacy and technical challenges moves this concern to a secondary status when influencing adoption. Individual responses to the survey may show that these areas will continue being a topic of discussion and a need for diligence is prudent, but technical challenges and privacy concerns are not the most significant predictor of usage. The research confirms both the positive rollout of streaming in the workplace and an acceptance of this communication mechanism. Organizations need to maintain their investment into universal utilization protocols while keeping a technically capable workforce that is comfortable with engaging the streaming technology.

Recommendations for Further Research

The results of this study indicate a positive opinion of live-stream video for building trust, employee engagement, and team performance. Readers will also note that while participants of remote meetings seem to value this communication method, they nevertheless hesitate to engage with video communication regularly. The reasons for reluctance should be explored further if leaders are to implement corrective actions with positive results. As part of this exploration, researchers need to further understand what drives the attitudes toward live-streaming video in the workplace. For example, learning methods should be associated with positive or negative opinions of live-streaming, thus allowing developers to improve the tool and leaders to adjust the usage protocols. One way to investigate this would be to evaluate the users and nonusers for the type of

learning preference, such as spatial, auditory, linguistic, physical, or kinesthetic learning styles, and then craft and deploy to the employees a training that is personally tailored for that learning style.

Gaining a deeper understanding of what motivates an attitude will also require survey questions to discriminate between meetings that have presentations and meetings that are collective discussions. Responses may be influenced by the respondent's personal need or desire to have presentation materials (i.e., some like to have the data for reviewing rather than just hear it presented) and thus react to the opinion questions based on an assumption of an either/or situation. In this instance, many may choose to avoid streaming and instead view data. A clarification of the remote meeting purpose, before asking opinions on the effectiveness or benefit when live-streaming, will help researchers interpret the responses more completely. This research method might include scenario-based questions such that the respondent could understand the situation when providing an opinion.

Focusing on generational differences would also be helpful. Maintaining a generationally diverse workforce will provide intellectual stability and maintain institutional knowledge. As noted previously, the recruitment of talent continues to challenge organizations; disregarding a large segment of available experience will only stress the organization further and ultimately damage the performance. For this reason, it is important for researchers to identify implementation techniques that reach across generational divides or are tailored to specific age groups.

Concluding Remarks and Reflections

Strong relationships are required for collaborative team dynamics, and these relationships demand a foundation of trust (Muethel et al., 2012). The expansion of organizations into a global footprint introduce limitations to establishing this foundation, a condition that stresses the overall performance of the team (Covey & Conant, 2016; Piricz & Mandjak, 2016). With the clear trajectory of future collaboration including colleagues outside of one's immediate proximity, an alternative to F2F communication that also fosters a trusting relationship is required. One solution that has been proposed for several decades is the use of live-streaming during remote meetings. This alternate mechanism for communication simulates F2F interactions and may be the virtual conduit for building trust as well. By bringing talent closer and creating a "local" talent pool with live-stream video meetings, Marshallian principles can apply as external contributors become integrated into the culture of the organization. When the culture embraces video conferencing, the localization of the knowledge results in a lower overall cost of knowledge, and organizations are able to convert their access to knowledge into innovative and disruptive technologies.

However, utilization is not widely accepted and dispersion within organizations is lacking. With such a small ratio embracing streaming, the majority of a remote teams lose the opportunity to advance trusting relationships and expand collaboration and knowledge sharing for the benefit of the company. While this research could not eliminate gender, personal privacy, or technical challenges as a source for the low exploitation of the video tool, it was able to identify key opinions that could move adoption into the overall culture. Regardless, one thing is clear: users have not fully

accepted live-stream video as a replacement for F2F interactions and organization leaders need to improve the training offered to demonstrate the advantages as their global workforce continues to disperse.

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APPENDICES

APPENDIX A

Survey Questions



California Baptist University

Live-feed video during remote team meetings

Volume of use

The following questions will be used to categorize the volume of conference meetings you join with remote participants. For the purpose of these questions, a remote participant is anyone not in the same room with you during the meeting.

1. How frequently do you join conference meeting with remote participants?

Less than once a week

Between 1 and 3 times a week

More than 3 times a week

2. When participating in a conference meeting with remote participants, how frequently do you or another meeting participant use live-stream video (i.e. activate the camera and project real-time video of themselves during the meeting)?

Less than once a week

1 - 3 times a week

More than 3 times a week



California Baptist University

Live-feed video during remote team meetings

Introduction to Likert Scale

The following questions will use a Likert 5-point scale to assign a value to your responses. The Likert scale is a widely proven means of measuring a person's attitude toward a question, allowing a respondent to express how much they agree or disagree with a particular statement.



Live-feed video during remote team meetings

Evaluating Trust

When collaborating with colleagues at work, establishing trust can be an important ingredient to sharing information. With this in mind, use the Likert scale to profess your opinion on the following questions related to trust.

3. Live-stream video feels as if the physical distance between me and other participants is eliminated, allowing me to freely share ideas as though the participant was in the same room.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. When interacting with participants using live-stream video, I can more easily share my challenges (whether personal or professional) and know that those participating will respond constructively.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. When interacting with other meeting participants while using live-stream video, I am more comfortable sharing my problems and know that those participating will respond with concern.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. After working on a team where live-stream video was commonly used, I feel a greater sense of loss when the team is disbanded or no longer required.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. During meetings where participants use live-stream video, I can determine the motives of participants more easily than purely audio meetings

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Feelings of uncertainty will discourage engagement with the team.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Live-feed video during remote team meetings

Employee Engagement

Employee engagement determines the extent to which employees are committed to their organization, and how much discretionary effort the employee applies to a task (i.e. going above and beyond). Using the Likert scale, please respond to the following questions as it relates to your experience.

9. When observing meeting attendees via live-stream video, I am better able to determine whether the participant approaches her/his job with dedication than I am with purely audio meetings.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. When participating in meetings where attendees are using live-stream video, I focus more on the topic and the speaker by avoiding multi-tasking or other distractions.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. When participating in live-stream video with colleagues that I trust, I can more easily determine the intent of their contributions (i.e. why they think their contribution is necessary).

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. When collaborating with fellow workers that I have developed a trusting relationship with, it is easier for me to transfer knowledge or receive knowledge while using live-stream video than purely audio conversations.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Collaboration is more productive when engaging with colleagues during live-stream video meetings than purely audio meetings.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Live-feed video during remote team meetings

Performance

High performance team members have complimentary skills and are committed to a common purpose, resulting in superior solutions. Using the Likert scale, please reply to the following questions to assess performance within teams.

14. I believe meeting attendees are better able to understand the discussion when participating in a meeting with live-stream video of *all* participants, rather than meetings where some contributions are through purely audio connections (i.e. when everyone is on video, the discussion is more easily understood).

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Issues that are open to more than one interpretation will delay team decision making.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. I believe meeting attendees are better able to contribute to the discussion when participating in a meeting with live-stream video rather than purely audio connections.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. It is easier to remember a participant’s contribution when I see them make the contribution via live-stream video than when I capture the contribution using only audio or email transactions.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. A teammate's attitude toward the subject matter will drive their engagement.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. It is more likely that my trusted colleagues and I will agree on the right decision when using live-stream video in meetings than when we rely solely on audio or email discussions.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Live-stream video meetings allow participants to uniformly interpret issues and align the *understanding* of the problem, preventing delays in decision making.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Live-stream video meetings align the *attitude* of everyone on the team toward the subject matter.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Live-feed video during remote team meetings

Technical Consideration

Live-streaming during conference meetings can be affected by network bandwidth or other infrastructure. When considering this, use the Likert scale to state your opinion on the following statements.

22. Starting meetings with live-stream video is challenging and bandwidth issues will more likely result in choppy or dropped calls.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. I am concerned with using live-stream video during international meetings due to streaming variations across the network.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

24. Participating in large virtual meetings with live-streaming does not represent a technical challenge.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. Video conferencing with live-streaming is more likely to function at the office than in a remote setting (i.e. using the office conference room system will result in better connection performance than a personal device on a public network).

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Live-feed video during remote team meetings

Personal Privacy

Live-streaming during conference meetings displays participants and their surroundings. When considering this, use the Likert scale to state your opinion on the following statements.

26. I would rather participate in a virtual conference without live-stream video because I don't want to share my personal space, regardless of my attitude toward the benefits of live stream video.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. When participating in a remote meeting with live-stream video, I am concerned with how I look to my colleagues.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. The ability to see myself on the conferencing device during a live-stream video meeting is distracting.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. I prefer to see what I look like to others during a live-stream video meeting.

Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



California Baptist University

Live-feed video during remote team meetings

Demographics

The following demographic information is being collected to help group responses.

30. Please advise your age range.

18 - 25 years	26 - 35 years	36 - 45 years	46 - 55 years	55+ years
<input type="radio"/>				

31. What is the highest level of education completed?

High school	Associates degree or Technical degree	Bachelor's degree	Master's degree	Terminal degree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. How long have you been working for your current employer?

Less than 6 months	6 months - 1 year	1 - 2 years	3 - 5 years	6 - 10 years	More than 10 years
<input type="radio"/>					

33. What is your employment status?

Full time	Part time	Temporary employment
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. What is your gender?

Female	Male	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>				

APPENDIX B

McAllister's Survey Questions to Assess Trust in an Organization

McAllister (1995) - items:	Trust content
1. We have a sharing relationship. We can both freely share our ideas, feelings and hopes.	Benevolence
2. I can talk freely to this individual about difficulties I am having at work and know that (s)he will want to listen.	Benevolence
3. We would both feel a sense of loss if one of us was transferred and we could no longer work together.	?
4. If I shared my problems with this person, I know that (s)he would respond constructively and caringly.	Benevolence
5. I would have to say that we have both made considerable emotional investments in our working relationship.	?
6. This person approaches her/ his job with professionalism and dedication.	Competence
7. Given this person's track record, I see no reason to doubt her/his competence and preparation for the job.	Competence
8. I can rely on this person not to make my job more difficult by careless work.	Predictability/ Competence
9. Most people, even those who aren't close friends of this individual, trust and respect her/him as a co-worker.	General
10. Other work associates of mine who must interact with this individual consider her/him to be trustworthy.	General
11. If people knew more about this individual and her/his background, they would be more concerned and monitor her/his performance more closely.	Integrity [r/c]