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Higher Education Information and Communication Technology Implementation Project Success: The Effect of Organizational Culture

by

Reginald W. Brinson

A Dissertation Submitted to the Department of Leadership,

School Counseling & Sport Management

in partial fulfillment of the requirements for the degree of

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This dissertation titled Higher Education Information and Communication Technology Implementation Project Success: The Effect of Organizational Culture is approved:

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Dr. David Hoppey, Committee Member 1

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Dr. Deb Miller, Committee Member 2

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Dr. Matthew Ohlson, Committee Member 3

DEDICATION

To Lucie, Femi, and Biola—your encouragement will always cause me to shoot for the moon and expect to get there and beyond

ACKNOWLEDGMENTS

To the men and women who are committed to the cause of improving student experience and driving student success through the pursuit of technology innovation for the benefit of all who have taught me how to be a good Information Technology practitioner

"The function of the university is not simply to teach breadwinning, or to furnish teachers for the public schools, or to be a centre of polite society; it is, above all, to be the organ of that fine adjustment between real life and the growing knowledge of life, an adjustment which forms the secret of civilization."

— *W. E. B. Dubois.*

I would not be the son of Leonard and Willie Mae Brinson, nor the son-in-law of Gabriel and Paulette Viakinnou, if I did not first give honor to my Lord and Savior Jesus Christ for the grace and mercy that is my life.

I tell the story of being a little boy riding in the back seat of my father's car when I proclaimed that I was going to be a firefighter. My father pulled immediately to the side of the road (I thought I was in trouble) and he stared at me and said "Boy, you are going to college". It wasn't that daddy thought less of firefighters, no, it was because he rose every morning and used his hands and his back to make a way for his family. He didn't finish high school, but wanted more for us, even to the extent of sending my mom back to college to earn her degree. I honor

him and the mother who was the toughest Math teacher because she wanted her students, and her children too, to get it right. I acknowledge their impact on my life and on the notion of being a lifelong learner even before the thought and saying became popular. Thank you for your examples.

I acknowledge all of the wonderful men and women throughout my life who served as my teachers and mentors: Doris Haynes, my second-grade teacher; Martha Sue Gregory my high school chorus teacher: the incomparable Roland Carter at Hampton Institute (now University), all of whom instilled a pursuit of excellence in me. Dr. William Brown poured even more excellence in my life in my first experience as an UNF student. To the professors who brought so much enthusiasm to the Education Leadership program, thank you for suffering me.

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I dedicate this effort to my wife and sons. Thank you all for making me a better man, and for the conversations around the dinner table and your commitment to excellence in all you do. Thank you for not allowing me to quit, because I was too afraid of disappointing you by not finishing what I started. I am enormously blessed to have you all and proud to be both husband and father of the most brilliant wife and sons a man could ever have. It's done now.

Peace.

TABLE OF CONTENTS

Page

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

This dissertation employed a non-experimental quantitative research method to examine the relationship between organizational culture and perceptions of Information and Communication Technology implementation project success in higher education institutions. The study used Sociotechnical Systems Theory to frame the higher education institution's work system and the Competing Values Framework (CVF) in distinguishing the cultures of the institution, its colleges/divisions, and its departments to determine if differences in culture tendencies impacted faculty, staff, and administrators' perception of project success. A survey consisting of the Organizational Culture Assessment Instrument (OCAI, © Kim Cameron) and a Project Success scale was used to gather data. The OCAI scoring algorithm, exploratory factor analysis, and linear regression analysis were used to analyze the data. In addition to uncovering the culture and subculture types of participating institutions, analysis of the data revealed a relationship between the CVF Market Culture type and project success ((β=-.95, $p<.05$), and between the CVF Hierarchical Culture type and project success (β=-.70, $p<.10$), both at the college/division organizational level only.

Keywords: Information Communications Technology, Organizational Culture, Project Success, Higher Education, Competing Values Framework, Organizational Culture Assessment Instrument, Sociotechnical Systems Theory

CHAPTER 1: INTRODUCTION

"Are universities about to be disrupted the way Kodak, Borders and Blockbusters were disrupted?" (Lucas, 2014). American universities are poised for, if not already in the throes of, "a disruptive change that will potentially threaten to undermine their business model, governmental support and operating mission" (King & Sen, 2013). This perspective seems to have been confirmed by Moody's Investor Services, which predicted that the number of colleges closing would triple from six to 18 per year (Woodhouse, 2015). King and Sen (2013) documented four "economic attacks"—the internet, distance learning, for-profit universities, and online startups—that exert tremendous pressure on higher education institutions (HEIs) and threaten the long-term viability of many. Some HEIs, including Stanford, Harvard, MIT and Princeton, are responding to these attacks by experimenting with mass open online classes (MOOC), in which a single instructor teaches thousands of students concurrently online (Ahmad, 2015). Other innovative ideas include the joint ventures edX and Coursera (free online courses offered by some of the world leading universities). Ahmad (2015) suggested that other HEIs should follow suit by pursuing alternative paths outside of the traditional higher education model and making such innovative technologies part of their academic and administrative strategic plans.

Ahmad (2015), King and Sen (2015), Lucas (2014), and Zhu (2015) all suggested that information and communication technology (ICT) must play a significant role as an enabler of innovation for HEIs that seek to stave off competition from technology alternatives, reduction in government funding, and fallout from the economic conditions that make it more difficult for students to afford the traditional higher education experience. However, ICT innovations across all industries frequently fail for a variety of reasons, many of which can be traced to

organizational culture (OC) issues (Cooper, 1994). While there has been a significant amount of research to investigate the impact of an organization's culture on ICT implementation in the business context, few studies have investigated the impact of OC on an HEI's ability to successfully implement ICT solutions.

Background

Vesisenaho and Dillon (2013) asserted that the term ICT "is used as an umbrella term covering a range of technological resources and media" (p. 240). Extant literature addressing ICT has evolved since the 1970s, at which time ICT was referred to as Management Information Systems (MIS). Subsequently the term MIS was replaced by Information Systems (IS), Information Technology (IT), and finally ICT. ICT has become an important tool for organizations seeking to respond to market changes, threats from existing or emerging competitors, or a change in customer demand.

The process of embracing new ICT is referred to as ICT adoption. Extant literature addressing ICT adoption is found across the domains of innovation, management science, organizational development, and information technology. Theories about the ICT adoption process include the Technology Acceptance Model (TAM) (Davis, 1989); Unified Theory of Acceptance and Use of Technology (UATAUT) (Venkatesh et al., 2003); Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1974); Technology Organization and Environment (TOE) (Tornatzky et al., 1990); and the Diffusion of Innovation Theory (DOI) (Rogers, 2003). TAM, UATAUT and TRA explain and evaluate ICT adoption and acceptance at the individual level of analysis, whereas TOE and DOI explain and evaluate ICT adoption and acceptance at the organizational level.

The TOE framework (Tornatzky et al., 1990) asserts that an organization's adoption of ICT must be understood in context, and suggests three relevant contexts—technological, organizational, and environmental. Tomatzky and Fleischer opined that these three contexts could be used to understand the constraints or opportunities for an organization to acquire and leverage innovative technology. The technological context considers all of an organization's technologies, including those currently in use and those the organization might adopt. This context considers whether the organization has the capacity to embrace incremental, discontinuous, or radical change (Baker, 2012). The organizational context looks primarily at the size of the organization and the way in which it aligns and uses its resources: for example, is the workforce managed so tightly that there are not available resources to research potential innovative ideas? It also considers whether and how the organization leverages cross-functional teams and intra-company communication among the leadership team and across the organization. More specifically, how does the organization communicate about innovations under consideration or explain factors that may require the organization to approach its work in a different manner? Finally, environmental context considers the industry in which the organization participates and the external influences that drive the organization, such as competitive measures taken by a peer organization, the basis upon which industry participants compete (e.g., low cost, innovative features), and how the industry is regulated or funded by governmental entities. The environmental model is used to assess and explain technology adoption within and across interorganizational boundaries.

DOI is the theory most referenced in research about ICT adoption (Borkovich et al., 2015; Hameed et al., 2012; Larsen, 2001; Liu et al., 2008; Nguyen et al., 2015; Peansupap &

Walker, 2006). DOI explains innovation adoption in general and ICT adoption in particular as a process that consists of five phases: (1) knowledge, in which an organization, through a perceived need, becomes aware of an innovation; (2) persuasion, in which a favorable attitude towards the innovation is formed; (3) decision, in which the decision making team chooses to adopt the innovation; (4) implementation, in which the organization takes action to acquire, install, and use the innovation; and (5) confirmation, in which the organization seeks to reinforce the adoption decision and gain the perceived benefits (Rogers, 2003). ICT adoption literature frequently refers to the first three stages (knowledge, persuasion, decision) of the process as the initiation phase leading to implementation, and the final phase as benefit realization (Larsen, 2001). With regards to the present study, DOI is the most appropriate theory, given its focus on an organization's behavior and interaction as it seeks to identify, assess and decide to pursue incorporating a new innovation, in this case ICT, into its work environment.

The introduction of new technology in any organization is disruptive. It changes the way work is done, relationships, interactions, processes, problem solving, the centralization or decentralization of decision-making and responsibilities, and the layers and hierarchy of an organization, and impacts the morale of employees (Mirvis et al., 1991). Mirvis et al. documented four factors that influence an organization's ability to assimilate new technology to respond to competitive pressures and internal perceptions of performance gaps. These factors are: (1) how a company approaches technology strategy and planning, (2) how it manages implementing new technology, (3) the attitudes and experiences of the organization's workforce, and (4) OC. The implementation process is appropriately identified as a key factor in the success of an organization's ICT efforts as it is the point of intersection of the other three factors:

technology strategy and planning, implementation of management practices, attitudes and experience of workers, and the organization's culture. As pointed out by Mirvis et al., literature that examines organizations' ability to adopt new ICT rightly focuses on the implementation process. However, studies tend to focus on strategy planning and management practices associated with implementing new ICT and give little attention to the relevant OC and people implications. This gap is evident in a review of literature concerning whether implementation efforts fail or succeed.

A plethora of research has examined the failure or success of ICT implementation projects. However, given the complexity of the ICT implementation process, there does not exist broadly accepted definition of ICT failure or ICT success. Lyytinen and Hirschheim (1988) hypothesized that ICT failure occurs when an implementation project does not deliver the values expected or meet the goals or performance expectations of stakeholders. Even so, because the values pursued may sometimes be in conflict with one another, there could exist a debate between the stakeholders of the ICT effort as to whether the effort is a failure. Many factors can contribute to the perception of failure. Lyytinen and Hirshheim (1988) identified four subcategories of ICT failure described in the literature: (1) correspondence failure, when an ICT solution does not meet the design objectives established by the organization; (2) process failure, when an ICT effort cannot be successfully delivered or is delivered with substantial overruns in both cost and time; (3) interaction failure, when the resultant ICT is not used, evokes negative user attitudes, or has low usage statistics; and (4) expectation failure, when the ICT solution does not fulfil expectations, values or perceptions of stakeholders. Consolidating these observations, Lyytinen and Hirschheim concluded that ICT failure is the inability of an ICT solution to meet

the expectations of any stakeholder group. In a subsequent review of literature, Dwivedi et al. (2015) confirmed Lyytinen and Hirschheim's observations and defined ICT failure as "either the implemented system not meeting the user expectations or inability of creating a working or a functioning system" (p.145).

Dwivedi et al. (2015) posited that ICT success is the other side of the ICT failure coin. McLeod and MacDonnell (2011) defined ICT success as a high-quality development process outcome and/or a high-quality product outcome. This definition encompasses both positions of ICT success articulated in the literature, in which various researchers viewed ICT success as a well-defined and executed process or a well-designed, engineered and delivered product outcome. These definitions further underscore what Dwivedi (2015) defined as the dichotomy of the ICT failure and ICT success phenomena. Note that the drivers of ICT implementation failure or success all coalesce around implementation of management principles or whether the resulting product meets stakeholder needs or expectations and lacks consideration of factors that may be rooted in or driven by OC or context. Similar tendencies can be discerned in the examination of literature on ICT adoption in higher education (summarized by Then & Amaria, 2013). Factors examined included cost of IT adoption, return on investment, total cost of ownership, staff training levels, competition, strategic goals, use of existing physical infrastructure, integration with existing legacy equipment, and perceived worker skillsets. While researchers also examined beliefs about the degree to which new technologies would benefit the institution in terms of attracting new students and faculty, quality of computer services, and maintaining academic standing, there is no discernible investigation of OC or context.

Goulielmos (2003) offered an approach to assessing ICT implementation outcomes from an organizational perspective, arguing that ICT failure is strongly influenced by organizational pathology that often existed before the ICT implementation effort was conceptualized. He advocated the use of a model that would allow a diagnosis of potential organizational failure before the implementation effort begins. He further argued that ICT implementation efforts were perceived as technical efforts only and suggested that such efforts should be approached as sociotechnical processes in the context of an organization, which itself is a socialized entity. Thus, Goulielmos argued that ICT failures are also organizational failures rooted in group- or organizational-level pathologies and interactions. Furthermore, he observed that organizational stakeholders are key to identifying what constitutes failure and success of an ICT implementation.

The organizational context can be seen in Ives and Olson's (1984) review of literature, which placed significant emphasis on user involvement in ICT projects, assuming that their input in specifying the product outcome would result in their buy-in to the values embedded in the solution. Such efforts were rooted in the theories of planned organization change and participative decision-making. In addition to reducing resistance to change, these efforts sought to increase ICT solution acceptance by managing expectations, gaining user commitment, assuring system ownership and providing a forum for resolving conflict (Ives & Olson, 1984; Robey et al., 1993). The typical measurement of user involvement included system quality, data quality, user satisfaction, individual impact, and organizational impact (DeLone & McLean, 1992). Ives and Olson (1984) proposed a model of user involvement which included user characteristics, organizational climate (a snapshot of culture in time), and development

characteristics to ensure system quality and system acceptance, taking into account intervening cognitive and motivational factors. A similar model that includes factors of participation, influence, conflict, conflict resolution and project success was proposed by Robey et al. (1993). Like the overarching factor categories of process, people, product and technology, the overarching factor categories of task, structure, people, and technology were proposed by Petter et al. (2013) to understand ICT success.

Rogers (2003) noted that implementation of an innovation in an organization is a serious undertaking that involves different people and departments in decision making, implementation, and use of the adopted ICT. ICT implementation research specifically confirms Rogers' observation as there exists a plethora of research on the disagreements and unexpected difficulties that occur during ICT implementation. Of particular interest to researchers are the phenomena of implementation failure and success. The Standish Chaos Report surveyed 365 firms and found that only 16.2% of software projects were successful, with 52.7% of projects incurring significant cost overrun and 31.1% of projects cancelled (The Standish Group, 1995). Whittaker (1999) reported on a similar survey of 1400 Canadian private and public organizations across ten industry segments, including education. Of the 176 responses received, 61% of respondents reported a failed project. Reasons for failures included not only cost overruns, schedule overruns, and missing scope, but also weak business cases, poor top management leadership, poor project management, failure of new or unproven technology, poor vendor performance, and inadequate information systems staff. Missing from these evaluations of failed ICT implementation is any mention of what Rogers called the social system. Observing that such implementations occur in a social system, Rogers (2003) noted two quotes to elucidate the point:

anthropologist Edward Spicer stated, “Changing people’s customs is an even more delicate responsibility than surgery” (p. 436); and sociologist Elihu Katz stated “It is as unthinkable to study diffusion without some knowledge of the social structures in which potential adopters are located as it is to study blood circulation without adequate knowledge of veins and arteries” (p. 25). These quotes reinforce the notion that in order to understand ICT failure or even ICT success, it is necessary to consider both the context of the organization in which the phenomenon occurred and the social nature of introducing change in organizations which can lead to heralded cooperation or festering conflict.

While factors impacting the failure or success of ICT implementation are process- and ICT-centric, they are also social and that means they are people-centric, thus the presence of conflicting values and interests. However, much of the ICT implementation research has focused on the technology and technology-related processes, but not the role the constituents of an organization play in the success or failure of an implementation. Recognizing the impact of the organization constituents on the implementation process, some researchers, such as DeLone and McClean (1992), have expanded their view of ICT implementation success factors to include user involvement, user satisfaction and other factors to measure stakeholder involvement. Similarly, Al-Ahmad et al. (2009) identified six high-level factors that influence ICT project failure: project management, top management, technology, organizational, complexity, and process factors. Al-Ahmad et al. further defined the organizational factors to include OC, structure, and conflicting interests. While some studies have addressed higher education ICT project failure and HEI culture, there is a gap in research with respect to understanding in what ways an HEI’s culture impacts its ICT implementation efforts.

Problem Statement

HEIs face tremendous pressure to change in response to non-traditional competition, reductions in governmental funding, demands for more affordable tuition, and a need to improve student success in the form of retention and graduation rates. As in other industries facing similar challenges, ICT must play a significant role as an enabler for HEIs seeking to find solutions to changing constituent demands (Zhu, 2015). However, ICT solutions frequently fail for a variety of reasons. Only 39% of technology projects in all industries surveyed are implemented successfully (Hughes et al., 2016), and 30% of ICT projects are delivered over budget (Jørgensen & Moløkken-Østvold, 2006). Doherty and King (1998) suggested that only 10% of project failures are due to technical problems, and the other 90% can be attributed to organizational or managerial issues. Warren and Myungsin (2007) found that such failures are influenced not only by ICT attributes, but also by issues of political power, cultural inertia, and organizational resistance. While there has been a significant amount of research to investigate the impact of an organization's culture on ICT implementations in the business context, few studies have investigated the impact of OC on HEIs' ability to implement ICT solutions. An understanding of OC is important to the study of ICT implementation because culture can influence the success of ICT adoption (Leidner & Kayworth, 2006).

Purpose Statement

The purpose of this study is to examine the relationship between OC and perceptions of ICT implementation project success in HEIs. The outcome of this study will provide insight to administrative, academic and technology leaders seeking to lead their institutions' efforts to respond to constituent demands and ever-increasing challenges from non-traditional competitors.

Managing successful ICT implementations and digital transformation initiatives will improve an HEI's ability to respond to challenges from its constituents and other external factors and to change its business model.

Research Question

This research was guided by the following question: Do the institutional, college/division and department cultures of an HEI impact faculty, staff, and administrator perceptions of ICT implementation project success?

Overview of Theoretical Framework

Because research focused on ICT implementation is at the intersection of innovation, management science, and information technology, a combination of theories was used for this research. This study will focus on the implications of organizational factors, specifically OC, for the interactions required to conduct a successful ICT implementation.

Many researchers have argued that an ICT implementation is a social process because it is pursued in the context of an organization which itself is a social institution. As such, a recognition and understanding of the OC is relevant to examining ICT implementation. The sociocultural aspects of the ICT implementation process have been examined by Allen et al. (2014), Cooper (1994), Heeks (1999), Leidner and Kayworth (2006), and Mahmud and Gope (2009). While there is no singularly embraced definition of OC, most literature coalesces around the definition offered by Edgar Schein (1990), who defined OC as "a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those

problems" (p. 111). The extant literature is dominated by two approaches to evaluating the characteristics of an organization's culture. Hofstede's culture dimensions (Hofstede, 2011) were originally developed through research on national culture, but because of the popularity of the dimensions they are often applied at the organizational level even though Hofstede subsequently identified dimensions derived from studying organizations. Quinn and Rohrbaugh's (1981) Competing Values Framework (CVF) was designed specifically for organizational and work group levels of analysis and was thus adopted for this study.

The CVF originally consisted of three sets of competing values that influence an organization's focus, structure and methods used to accomplish strategic outcomes (Quinn & Rohrbaugh, 1981). The CVF was subsequently extended by Kimberly and Quinn (Denison & Spreitzer, 1991) to distinguish shared values, assumptions, norms, and cultural values of an organization. This framework is useful for understanding not only the overarching culture of an organization, but also differences in the OCs of departments of that organization and is described in more detail in Chapter 2.

The CVF is appropriate to this study in that it focuses on the implementer and adopters of ICT innovations and addresses alignment of constituents with the OC needed to adopt a new ICT innovation. In the case of an HEI, the various levels of the institution offer an opportunity to distinguish different cultures and determine to what degree the different levels and their cultures are associated with ICT project success.

Several researchers have considered the sociotechnical implications of the ICT implementation process (Ernst et al., 2016; Goulielmos, 2003; Lyytinen & Hirschheim, 1988; Markus, 2004). In explaining sociotechnical systems theory (STS), Pasmore (1988) postulated

that an organization consists of a social subsystem comprised of the people who work in it and a technical subsystem which is the knowledge, tools and techniques utilized to produce goods and services. He argued that how well the social and technical subsystems work together in meeting the demands of the external environment determines the effectiveness of the organization. Changing the design of either the technical or the social subsystem will affect the other, hence the two subsystems must be kept in balance. Approaching the two as an integrated whole promotes the optimization of the work system and the organization. Markus (2004) argued that this approach is applicable to implementing new ICT given that many large projects transform how people in the organization work. Because ICT implementations often carry organizational change implications, institutions should organize the adoption effort in such a way that it addresses both the technology being implemented and the implications for the social system of the organization.

This study seeks to understand how the different OCs (as represented by the institutional, college/division and department levels of the institution) influence perceptions of and support by faculty, staff and administrator for ICT implementation. Perceptions of the culture at these three organizational levels will be measured using the CVF-derived Organizational Culture Assessment Instrument (OCAI) (Cameron & Quinn, 2011). Success of the ICT implementation project will serve as a measure of how constituents perceive the success of the change to the STS technical subsystem.

Definitions

CVF: A theoretical framework created by Quinn and Rohrbaugh (1981) and subsequently extended by Kimberly and Quinn (1984) to distinguish shared values, assumptions, norms and

cultural values of an organization based upon three sets of competing values that influence an organization's focus, structure and methods used to accomplish strategic outcomes.

ICT: Shorthand for Information Communications Technology, a term popularized by the New Labour party in the United Kingdom 1997 election manifesto. It is a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information (Owusu-Ansah, 2013).

ICT adoption: Generally understood as the process by which an individual or organization investigates and selects an ICT for use (Govender & Pretorius, 2015).

ICT failure: occurs when an implementation project does not deliver the values expected or meet the goals or performance expectations of stakeholders

ICT implementation: An effort that starts with a thought of selecting or developing a system that continues until the system is implemented or abandoned (Larsen, 2001).

ICT project: A project to implement an ICT solution to achieve a specific objective, which involves a series of activities and tasks which consume resources.

Organizational culture (OC): "A pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schein, 1990, p. 111).

Project management: The process of controlling the achievement of the project objectives. It includes defining the functional and technical requirements, establishing the workstreams, allocating the resources, planning the execution of the work, monitoring the progress, and communicating project status to the project sponsor and other stakeholders.

Project success: Success of a project, typically based upon how well the project performed in terms of meeting cost, time and scope objectives, but expanded to include sponsor satisfaction and user engagement/satisfaction.

Sociotechnical Systems Theory (STS): An organizational design theory that postulates that an organization consists of a social subsystem which is comprised of the people who work in it and a technical subsystem consisting of the knowledge, tools and techniques the organization uses to produce goods and services for the benefit of the constituents of the organization. It argues that both the social system and technical system should receive equal consideration when implementing new ICT (Pasmore, 1988).

Significance of the Research

This study will provide insight to administrative, academic, and technology leaders who are responsible for their institutions' ICT implementations. Managing successful ICT implementations will improve an HEI's ability to change its business model to respond to challenges from its constituents, non-traditional competitors, and other external factors. More broadly, it will add to the body of knowledge and understanding of how OC impacts ICT implementation and offer a framework by which leaders can improve their likelihood of success by assessing their organization before undertaking an ICT initiative.

Overview of Methodology

Consistent with a post-positivist mindset, this study used a survey instrument to gather data from respondents in the form of perceptions about their HEIs' institutional cultures. Each respondent was asked to assess the various culture levels at their HEI (institutional, college/division, and department) by responding to six questions on the OCAI. Responses were

scored using the methodology designed by the creators of the instrument. The results were analyzed and interpreted, looking first at the differences in cultures of the HEIs represented by the respondents. Secondly, data collected at the college/division level was examined in the context of the HEI to which they belonged and compared to each other to understand how the differences in each college/division culture aligned with the institutional culture. Lastly, the data collected at the department level was compared to the college/division the department was associated with, as well as to the other departments reported as being associated with the same college/division.

Data was also gathered using a five-item scale to measure respondents' assessment of ICT implementation project success—how well the project met expectations of cost, time, quality, and satisfaction of end users, project sponsors, and stakeholders. After analyzing the OC data, three regression analysis models were run to analyze the relationship of department culture, college/division culture, and institutional culture to perceptions of implementation success.

Chapter Summary

This chapter describes external challenges that face HEIs, specifically factors that impact the traditional higher education business model. Such challenges are typically addressed by implementing new ICT solutions to support the institutions' academic and administrative missions. This chapter provides insight into the difficulty associated with the implementation of ICT projects and connects the success of such projects to the institution's culture and subcultures. The chapters that follow extend this discussion and provide new data relevant to the cultural problems of implementation. The Literature Review (Chapter 2) reviews the relevant literature on STS, project management, project success, and OC and its diagnosis, both in general

and specifically related to HEIs. Next, the Methodology chapter (Chapter 3) provides details of the proposed study setting, research design, population sampling and data collection, including the dependent, and independent variables. The Results chapter (Chapter 4) presents the collection and analysis of data, followed by the findings. Lastly, in the Discussion chapter (Chapter 5), context, conclusions, and analysis of the findings are offered, along with a discussion of limitations and suggestions for future work.

CHAPTER 2: REVIEW OF LITERATURE

This chapter reviews literature germane to this study. It situates this work in the context of STS in order to understand why and how OC influences the outcomes of efforts to change how an organization produces its product. In the context of this study, we consider the effort to adopt innovative ICT as a means to improve a work process and ultimately the product. The change to the product, be it administrative or academic, could be a significant but incremental, discontinuous, or radical change to how any organization produces the product offered to its constituents. Mirvis et al. (1991) pointed out that how an organization manages implementing new technology is critical to its success. As such, this chapter examines literature regarding project management as a critical process and methodology that impacts ICT implementation project success. Also important to the evaluation of the ICT implementation process is what constitutes project success, and as such literature regarding ICT project success is examined. Lastly, HEI OC and the ways in which culture is diagnosed are discussed. This literature review establishes a sound foundation for the study.

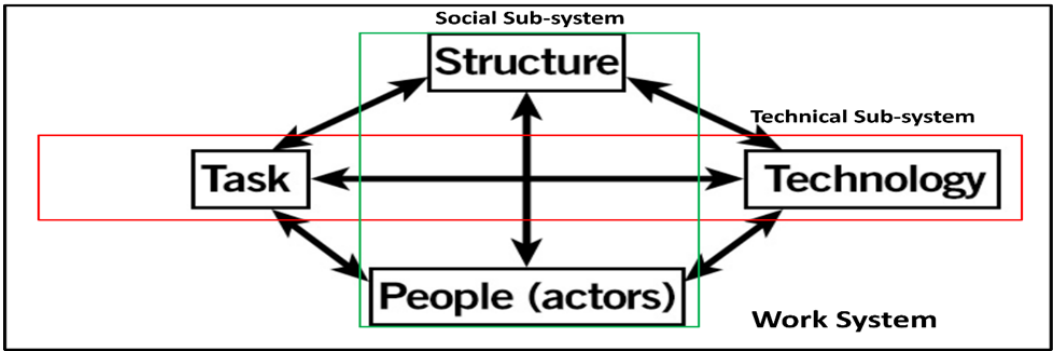
Sociotechnical System Theory

STS has been attributed to the research efforts of the Tavistock Institute in the 1960s (Land, 2000; Mumford, 2006). Its original design aim was to improve the work environment in organizations by developing a new framework for designing and assessing the organization's work system (Whetton & Georgiou, 2010). Founded on a humanistic concept, STS posits that an organization's work system consists of a social subsystem and a technical subsystem (Figure 1). The STS approach views the two subsystems as interdependent but equal and posits that they should be optimized as a single unit (Chen & Nath, 2008). The social subsystem involves the

people; their relationships with other people; their values, skills, behaviors, and attitudes; organizational reward systems, structures, and delegation practices; department design, coordination and control; and the functions of employee experts in work design (Bostrom & Heinen, 1977a; Pasmore, 1995). Cherns (1990) identified the mission of the social subsystem as the attainment of organizational goals; adaptation to the organization's environment; providing occupations and critical roles; and socialization and integration of people's activities, including resolution of task, process, and interpersonal conflict. On the other hand, the technical subsystem consists of the processes, tasks, and technology needed to transform raw inputs into products; level of automation; operational procedures within units; physical setting; and interdependency of tasks (Bostrom & Heinen, 1977b; Pasmore, 1995). Working together, the two subsystems jointly produce the output of the working system.

Figure 1

STS Perspective



Source: Leeds University Business School. (2019). *Socio-technical systems theory*. https://business.leeds.ac.uk/research-stc/doc/socio-technical-systems-theory

STS is based on the concept of an organization as an open system, which, according to Emery (2000), grows by internal elaboration but is influenced by its external environment. The

organization seeks a state of equilibrium between internal and external influences, a state at which it can accomplish a continuous throughput of raw material to make the product demanded by its external environment. Emery further posited that STS as a concept has two functions. First, it establishes a frame of reference for analyzing an organization in three stages: (1) it analyses the components of an organization to reveal how each contributes to organizational performance and interacts with the other components, with a specific focus on the technical component, structure of work relationships, and occupational roles; (2) it considers the interrelationship of these three components with a focus on the problem of internal coordination and control; and (3) it analyzes the external environment and how the organization manages its interactions with its external environment. The second function of the STS concept is to leverage several frames and hypotheses to examine the organization and its members. Concepts leveraged range from general system theory to consideration of work group and task interdependency.

Land (2000) argued that STS is founded on two apparently contradictory philosophies. In the managerialism philosophy, all work efforts and changes to the work system are selected and intended to improve market performance objectives, instrumental objectives that are focused on improving market performance, adding to shareholder value, and making the organization more competitive in the marketplace. The humanistic welfare philosophy, on the other hand, is focused on the workers' well-being and improvement of quality of work life. Differences between STS-designed processes that fail or succeed are typically driven by how well these two philosophies are integrated within an organization. As such, Mumford (2006) opined that the downside of STS is that it is difficult to deploy if the groups involved do not get along or are not motivated to develop work strategies or cooperate with others. Also, the conflict between instrumental and

humanistic work objectives suggests how different institutional culture perspectives or preferred management style and outcome could lead to very different perceptions of the success of an ICT implementation project.

The STS approach has been applied to technology in the workplace and to ICT initiatives as a means of mitigating poor adoption and performance of ICT solutions in organizations (Whetton & Georgiou, 2010). However, the most significant use and focus of STS has been efforts to use its principles to guide the design of new ICT solutions. Goulielmos (2003) argued that ICT implementation is a social process although its focus is the implementation of new ICT. He observed that many of the factors contributing to ICT failures do not result from the specific ICT or implementation methodology, but rather from issues of frame of reference in the specific context of the targeted organization. He argued that an organization design perspective such as STS is needed to provide a framework for approaching ICT implementation at the work system level while considering both the technical and social subsystems. Similarly, Bostrom and Heinen (1977a) contended that the major reason ICT implementations fail is because organizations ignore organizational behavior issues when designing ICT solutions. Disagreeing with researchers who claimed social system problems were caused by inflexible ICT, Bostrom and Heinen argued that ICT is essentially neutral, and failure or success is influenced by the quality of organization decision making regarding how ICT should be used. ICT, from their perspective, is but one of multiple inputs into the design process and it competes with inputs such as the values, skills, and knowledge of designers. STS addresses these concerns by analyzing not only the ICT, but also work relationship structures, occupational roles, the interrelation of these components, and relevant external environmental considerations (Emery, 2000). Bostrom and

Heinen argued that basing ICT implementation upon STS would change the frame of reference of system designers (managers, employees, engineers, and other interested constituents) and improve the likelihood of success. Understanding the cultures of various stakeholders and what they deem important could aid in identifying a path or at least in taking measures to appropriately align and/or manage expectations.

In their efforts to re-envision the ICT implementation process, several researchers have contributed to STS literature. As a complement to their research assessing the shortfalls of the typical ICT process, Bostrom and Heinen (1977a) identified seven conditions that contribute to ICT failure: (1) system designers' implicit perceptions of the organization, its employees and how change should be implemented; (2) system designers' concept of organizational responsibility; (3) system designers' non-systemic conceptualization of the organization's work system; (4) system designers' incorrect understanding of the goals of the ICT implementation; (5) failure to include relevant representatives in the design group; (6) the view of the system development process held by system designers; and (7) the limited set of change management tools and processes to improve the organization available to system designers. These conditions are consistent with the primary antecedents of ICT failure and success documented in other extant literature. Bostrom and Heinen proposed that if system designers' frame of reference and implementation methodology incorporated STS principles, many of the seven conditions identified could be remedied. During an implementation it is important to have the right groups represented on the implementation team, but it is also equally critical that leaders understand the frame of reference of each team member and how to align the frames of reference. Schein (1990) would argue that the team members' frames of reference are rooted in the culture of the groups

from which they originate. Assessing the culture of each group is one way of achieving agreement on the frame of reference from which the technical change will be implemented.

Mumford (2000) put forward an STS design approach, similar to that of Bostrom and Heinen (1997a) called Effective Technical and Human Design of Computer-based Systems (ETHICS). The methodology consists of six stages: (1) diagnosis of needs, (2) setting of objectives, (3) identification of solutions, (4) choice and implementation of solution, (5) follow-up evaluation, and (6) a report on the project to the company. Given Mumford's commitment to the quality of work life and employee satisfaction embodied in the STS approach, the methodology she proposed includes surveys pertaining to employee job satisfaction and job control. Mumford's approach also cataloged the knowledge, resource, psychological, organizational, and ethical capabilities perceived to be critical to effective system design. Similar worker competencies across the same categories are also considered.

Arguing that STS should form an axis of cohesion for ICT research, Sarker et al. (2019) conducted a meta-analysis of 991 ICT studies published in the MIS Quarterly and Information Systems Research journals to discern whether they conceptualized and presented the relationship between the social and technical subsystems postulated by STS. Sarker et al. assumed that any such articles would apportion emphasis between the social and technical subsystems, suggest integration between the two subsystems, and identify an endproduct of a humanized and efficient workplace. Six different categories of conceptualization were named according to the degree to which one or both subsystems could be identified in the articles: (1) predominantly social, in which the investigation focused solely on the social (psychological, sociological, economic or philosophical) aspects of the phenomenon studied; (2) social imperative, that is, social shaping of

the considered technology as an outcome of a social structure or process; (3) social and technical additive, in which social and technical factors additively explained outcomes; (4) social and technical producing outcomes through interplay; (5) technical imperative, in which technology was more important than a social outcome; and (6) predominantly technical, showing limited concern about the social subsystem. The researchers observed that 56% of the articles they analyzed had a predominantly social focus (Type 1), while 7% of the articles had a predominantly technical focus (Type 6). Hence 63% of the articles focused on either the social subsystem only or technical subsystem only and lacked an apportioned treatment of both subsystems. Both the social and technical subsystems were addressed in 37% of the articles, but only 13% of the articles demonstrated interplay between the two subsystems. Arguably this suggests that failure in addressing the two subsystems together in 87% of the 991 articles reviewed could explain the high failure rate (70–80%) of ICT projects. The final observation offered by the researchers was that 91% of the articles documented focused on instrumental goals (seeking improved efficiencies or profitability), while 2% of the articles focused on humanistic outcomes (quality of work life or job satisfaction). Only 7% of the articles reviewed had both instrumental and humanistic goals. This would suggest that 93% of the ICT projects in their sample started from a position of conflict if the groups impacted by the project came from significantly differing cultures.

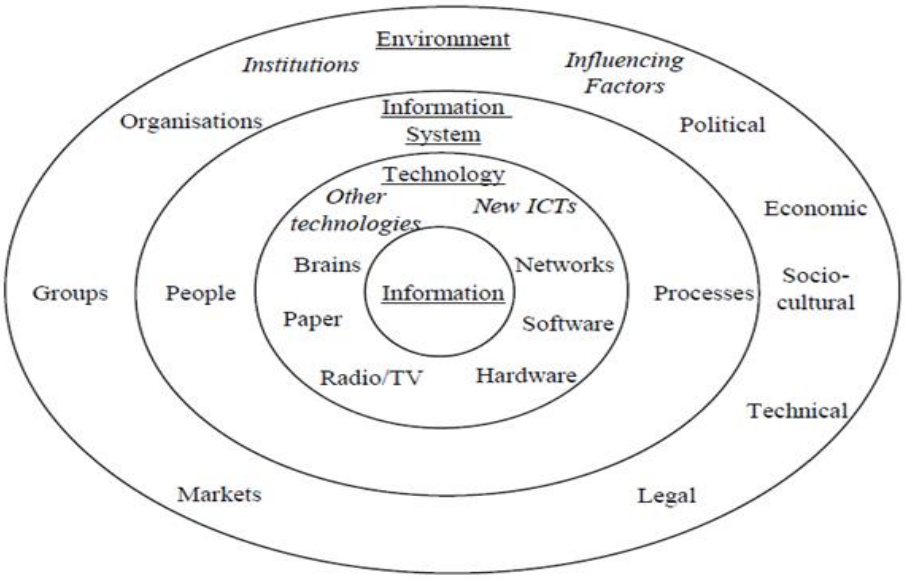
Information Communications Technology

Neil Selwyn (2008) credited the New Labour party in the United Kingdom with popularizing the term “ICT” as a component of its 1997 election manifesto. Selwyn noted that an outcome of New Labour’s proposal to leverage technology to improve education was the

introduction of the term “ICT” in place of the previously accepted term “IT”. The relabeling sought to underscore networked computing as a newly minted political idea and to underscore the potential benefits to the education sector of joining other sectors whose business models were revolutionized by the internet. According to a United Nations report, ICTs cover internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centers, commercial information providers, network-based information services, and other related information and communication activities” (Amin, 2013, p. 1). Researchers have underscored the connectivity inherent in the ICT concept and emphasized the importance of the internet and digital technologies creating, accumulating, storing, and disseminating information in various forms (Rose & Kadvekar, 2015; Victor & Bolanle, 2017).

Figure 2

A Systemic View of ICT



Adapted from Heeks, 1999

Heeks (1999) suggested a systemic approach to understanding the implications of the term ICT (Figure 2). At its core is information—its management, creation, collection, and administration—as a means of managing communications between humans, between humans and various systems, and between systems. The second layer represents the various technologies that enable the manipulation of information. Note that the technologies are not static, as indicated by the reference to new ICTs. The third layer speaks to the people and processes critical to accomplish the information objectives of ICT. The outer layer depicts the environmental variables and factors that influence the adoption and implementation of ICT solutions. It acknowledges that a critical contributor to ICT use and research are the sociocultural interactions inherent in its development, implementation, use, and diffusion.

Rouse (2019) contended that "ICT is the infrastructure of modern computing... [that has] drastically changed how people work, communicate, learn and live" (p. 1). This statement captures the role of ICT as an important contributor to digital transformation and underscores that ICT implementation projects will impact and be impacted, either positively or negatively, by an organization's culture. The existence of multiple cultures in an HEI must therefore be considered when deciding which goals (instrumental or humanistic or both) to pursue during an ICT implementation project.

Project Management

A project is a series of activities and tasks with a specific goal to be reached within a specified period of time (Hornstein, 2015). Traditionally, a project has been defined as a temporary endeavor pursued to create a product or service of value (Hall, 2012). It has a specific objective to meet a specific requirement within a decided timeframe (Morris & Pinto, 2004).

Schwalbe (2015) defined a project as a temporary endeavor to create a unique result, service or product. While there are many definitions, common threads are evident. Essentially a project is time bound, with a specific beginning and end, and a focus on producing a product or service of value, within a specified scope and defined cost. Schwalbe posited attributes that define a project, including a unique purpose, a primary customer, the expending of resources from multiple sources or departments, development in a progressive manner, varying degrees of uncertainty, and a defined beginning and end. A project can also be complex, dynamic, discrete, require progressive elaboration, fraught with conflict, have a distinct life cycle, and incur part-time resources cost (Kyakulumbye et al., 2018). Thus, a project is process, not an end result or product. It consumes input and produces an output whose value frequently cannot be judged until long after the project has been completed. A project may be influenced by several constraints including cost, time, scope, risk, quality, and available resources. Organizations undertake projects to improve their competitive position, enhance products, take advantage of new knowledge, and enable workforce downsizing, hence projects must be managed to accomplish their objectives.

So then, what is project management? Al-Hajj and Zraunig (2018) posited that the purpose of project management is to be consistent in achieving project success. Although it is argued that project management owes its foundations to Henri Fayol (Howell et al., 2004), Seymour and Hussein (2014) posited that project management is evident in some of humanity's greatest accomplishments, such as the Egyptian pyramids and the Great Wall of China. Fayol, a French mining engineer, developed the early management paradigm upon which more recent project management thought is based (Howell et al., 2004). Howell et al. described Fayol's

project management model, historically called the command-and-control model, as consisting of five functions: (1) forecasting and planning, (2) organizing people and materials, (3) directing activities, (4) coordinating efforts, and (5) controlling in the context of established policies and plans. The five functions of Fayol's model, embraced and refined by Henry Ford, align with the five process groups articulated in the seminal Project Management Book of Knowledge (PMBOK) established by the Project Management Institute (PMI), the current dominant association of project management (Hornstein, 2015).

"Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (Project Management Institute, 2013, p. 5). Project management is the second factor identified by Mirvis et al. (1991) as having a critical influence on the success or failure of an ICT implementation effort. It involves developing and coordinating a plan to accomplish a project within the specified scope, quality, time, and cost (Kyakulumbye et al., 2018). Although it finds its basis in classical management approaches, project management as a process is normally applied to specific, non-repetitive activities detached from the normal operations of an organization. As in Foyal's management model, project management is typically discussed in the context of five process groups: initiation, planning, execution, monitoring and controlling, and closing (Cicmil & Hodgson, 2006; Kyakulumbye et al., 2018; Project Management Institute, 2013; Schwalbe, 2015). PMBOK documents 47 subprocesses categorized within these five overarching groups (Kerzner, 2013). Project initiation includes selecting the project to focus on within resource limits, identifying desired benefits, authorizing the project, and identifying a project manager. Project planning involves defining the requirements of the work to be accomplished, identifying the resources

needed, establishing quality targets, creating a high-level schedule of activities, and evaluating risks. Project execution includes negotiating with operational or unit managers to obtain project team members, managing the team members, and directing and coordinating the daily work efforts. Project monitoring and controlling requires the project leaders to track project progress toward accomplishing the plan, recursively evaluate the quality of outcomes versus target, analyze and correct variances in schedule or quality, and adjust the plan as needed to respond to problems or issues encountered. Closing a project involves confirming and attesting to the completion of all project-related work efforts, determining the final costs, completing project documentation, and turning the resulting product over to the operations area that will be responsible for deriving the benefits.

Stretton (2007) observed that the 1970s could be summarized as the period of proliferation of project management and its application across multiple industries, and the 1980s and 1990s could be synopsized as the period of integration of cross industry experiences and the development of standardized project management practices and principles. The origin of this latter movement is traceable to the growing influence of project management professional associations in the 1960s (Stretton, 2007). The two most prominent were the International Project Management Association (IPMA), based in Europe, and PMI, based in the United States and Canada. The initial purpose of these bodies was to provide a means for project management professionals to exchange ideas and experiences relevant to the utilization of network planning tools and techniques to manage projects across a number of industries, and to support planning, costing, scheduling, managing resources for, and controlling projects. The British Association of Project Management (APM), the Project Management Association of Japan (PMAJ), and the

Project Management Forum (Australia) also offered professional certification designations to members, typically by way of a standardized exam.

Literature documents that the most influential professional association was PMI (Kerzner, 2013; Kyakulumbye et al., 2018; Morris & Pinto, 2004; Schwalbe, 2015; Seymour & Hussein, 2014; Stretton, 2007). PMI's early approach to ethics, standardization and accreditation was published in 1983 with a focus on six project management functions: (1) cost, (2) time management, (3) scope, (4) quality, (5) human resource management and (6) communications. PMI expanded on its standardization approach with the publication of the first version of the PMBOK in 1983, which introduced a seventh project management function, project contract and procurement management. A later edition of the PMBOK added an eighth project management function, project risk management, in 1987 (Project Management Institute, 2013).

In addition to the standardization of principles and practices, the 1980s and 1990s also saw the focus of project management expand from the implementation or execution phase to front end practices such as management of project scope, risk, communication, and human resources, with an emphasis on feasibility analysis, value analysis and project start up tasks (Stretton, 2007). Additionally, attention was given to factors external to a project that could influence project outcomes, such as stakeholder interests and other environmental concerns. Project management began to be leveraged as a tool to initiate or respond to internal and external pressure for change in organizations. In view of such broadened concerns, the value of STS as a means of assessing and understanding project management and its impact on organizations is evident (Morris & Pinto, 2004).

Most project management literature that addresses the PMBOK knowledge areas draws on the 2013 edition (Project Management Institute, 2013). That edition identifies ten core project management knowledge areas: integration, scope, time, cost, quality, human resources, communications, risk, procurement, and stakeholder management (Kerzner, 2013; Kyakulumbye et al., 2018; Morris & Pinto, 2004; Schwalbe, 2015; Seymour & Hussein, 2014; Stretton, 2007). With the addition of focus areas such as communications and stakeholder management as components of good project management, the areas that must be addressed to deliver a project began to embrace social subsystem components, although as Sarker et al. (2019) indicated, most projects are still focused on instrumental goals such as improved efficiency and increased profitability. The question remains, does the focus on the management of communications and stakeholder interest result in buy-in, participation and the perception of constituents with differing cultural values such that the project is successful?

Project Success

Project success as a research topic has received much attention. Researchers have noted that gaining consensus on what constitutes a successful project is much like gaining consensus on what is good art: opinions vary (Jugdev & Muller, 2005).

Literature contains a significant amount of research regarding project success and failure during the period from 1960s through the 2000s. While definitions of project failure can be found, researchers struggled to find a definition for project success (Cuellar, 2010; Ika, 2009; Jugdev & Muller, 2005). However, researchers did find agreement that project success consists of efficiency and effectiveness. Efficiency, according to Ika (2009), is best understood by Peter Drucker's adage "do things right" (p. 7), meaning gaining the maximum output for minimal

input. Effectiveness, also according to Drucker, is to "do the right thing," or attain the targeted project goal or objective (p. 7). These measures are typically tangible, whereas measures of effectiveness are intangible, requiring more time to observe and account. Hence literature of the time indicates that a successful project is one that meets technical requirements according to the project plan (Dvir et al., 2003). The project schedule, focusing on the efficiency of the project, became the early focus of project success research.

Jugdev and Muller, Ika, and other researchers situated early developments in project success research in the early period of emergence of project management from the 1960s to 1980s, which aligns with the timeframe Kwak (2005) associated with the development of management science and Stretton (2007) aligned with the introduction of Project Evaluation Review Technique (PERT), Critical Path Method (CPM) and Precedence Diagramming Metho (PDM) in the defense and aerospace industries to develop complex project scheduling. In discussing project management, Gaddis (1959) noted that the successful project measure of success was the completion of a development product on time, on budget, and meeting the quality expected by the customer. The achievement of these three components, frequently called the iron triangle, was a powerful metric for determining project success when the variables of the project were known with a high degree of certainty. Literature documents that many project managers used the iron triangle as the measure of success for their projects (Jugdev & Muller, 2005; Pollack et al., 2018; Wateridge, 1998; Westervelde, 2003). Jugdev and Muller noted that such projects typically required minimal interaction with the customer and focused on the implementation or execution phase. The profile and prominence of the iron triangle measure was raised when the Standish Group published its Chaos Report (The Standish Group, 1995), which

assessed the failure rate of software projects, showing that only 16.2% of software projects completed in 1995 were successful, 31.1% of projects were cancelled and 52.7% of projects exceeded their original cost estimate. The Standish Group identified a successful project as one that was "completed on time and on budget with all functions and features originally specified" (p. 2). The Chaos Report has since become one of the most referenced reports in evaluating and understanding ICT projects. It has reported marked improvement in project success, as high as 31% in 2013, but still indicating 70% of ICT projects in some state of failure (Hastie & Wojewoda, 2015). However, it has also been the focus of criticism as pertains to the methodology used to generate the sample, the quality of the empirical evaluation, and the use of iron triangle evaluations as the only criteria for assessing a project's success (Glass, 2006; Lech, 2013). Numerous researchers have argued that the iron triangle's weakness is the lack of feedback from the customer with regard to whether or not the project met the intended need. Critics specifically point to the Chaos Report's and other pundits' use of the initial project plan and estimate to determine if a project was delivered as expected, particularly given the likelihood that initial estimates are frequently understated (Lech, 2013). More importantly, the exclusion of the perspectives of key stakeholders, though perhaps less objective than calculated results, is a major determinant of the success of a project (Cuellar, 2010; Jugdev & Muller, 2005; Lech, 2013; Pollack et al., 2018; Prabhakar, 2008), although they can be operationalized (Pinto & Slevin, 1988). This extension to evaluating project success allows for the inclusion of humanistic objectives. For projects that change work systems, humanistic objectives could engender a more inclusive perspective on project success and in doing so capture the impact of different work group cultures.

Baccarini (1999), seeking to further elucidate project success, proposed two components that make up project success: project management success and product success. Project management success addresses success of the project management process and includes schedule, cost, scope, project team management, communications, and stakeholder collaboration and consultation. Product success, on the other hand addresses the success of the product and is typically a post-implementation perspective that addresses the degree to which stakeholders accept and use the product, as well as the degree to which the product realizes the intended organizational and financial benefits. Project management success is viewed as a short-term measure of project success, while product success is indicative of the long-term success of a project and may require several years to determine and realize. While Baccarani postulated that project management success is subordinate to product success, product success is frequently unattainable without some degree of project management success. Project failure literature supports this notion through observations of the negative impact of no user involvement during the project execution phase of certain projects, including ICT projects (Damodaran, 1996). Additionally, Markus (2004) warned that unresolved problems from preceding phases of a project will cause problems in subsequent phases.

While there exist several conceptualized critical success factor frameworks that pertain to project success in general, the most referenced framework (Ika, 2009; Muller & Jugdev, 2012; Padalkar & Gopinath, 2016; Shokri-Ghasabeh & Kavoousi-Chabok, 2009) was created by Pinto and Slevin (1988). Pinto and Slevin found that project success factors could be divided into two themes: projects and clients. They postulated that project success requires technical validity, organizational validity and organizational effectiveness. Technical validity requires that the

project work as intended and, according to Pinto and Slevin, is foundational to the possibility of success. Organizational validity addresses the issue of whether or not the project is right for the organization and compatible with the needs of organizational stakeholders.

The second critical observation of Pinto and Slevin (1988) was that success factors impacting a project can be internal or external to the project. Internal factors are the activity and team engaged in the day-to-day operations of a project, such as time, cost, and performance. External factors impact include client use, client satisfaction and the effectiveness of the product in attaining organizational goals. Ika (2009) would call the internal factors efficiency factors and the external factors effectiveness factors. Ika contended that internal, or efficiency, factors are more influential at the beginning of a project and dissipate in importance through the project life cycle, while external or effectiveness success factors are less influential on project success at the start of a project but become more influential through the project life cycle. As such, an understanding of the work group cultures of critical project participants is important at the beginning of the project. In HEIs, the work group cultures of faculty, staff, and administrators may be very different, and the importance of the different groups may vary with the particular project. Faculty, staff and administrator cultures are important when changes to the work system are implemented and may well have an impact on the perception of project success.

Literature beyond the early deterministic phase and recognition of other criteria and factors that influence project management success includes client satisfaction, organizational benefits, end-user satisfaction, stakeholder involvement, stakeholder benefits, and project team satisfaction (Dvir et al., 2003; Ika, 2009; Lech, 2013). Analyzing project management articles written between 2000 and 2015, Padalkar and Gopinath (2016) noted that articles regarding

project success could be found in both the deterministic category, in which project performance was determined by the how well the project stayed on time, within cost, and with acceptable quality—all of which are efficiency measures—and the explanatory category, in which the bases for judging project performance extended to include sponsor and stakeholder satisfaction in the first five years after implementation. This distinction between deterministic and explanatory is important, as different OCs have different measures and expectations of success. Research in the explanatory category was discernible for the full fifteen years surveyed, reflecting a change in approach in project success research since the 1960s.

A multi-dimensional approach has emerged as the predominant method of determining project success, but there is lack of agreement around success factors and the universality of the influence of these factors on projects (Dvir et al., 2003; Imran et al., 2016; Jugdev & Muller, 2005; 2016; Lech, 2013). The challenge in developing a universal project success framework may be due to the number of perspectives represented by the constituents of a project, including top management, customers, other internal stakeholders, and external stakeholders. Amplifying this challenge is the number of factors that influence project success, including project control (time, budget, cost), customer satisfaction, the development process, system use, quality of the product, impact on the organization, environmental events, profit, internal and external politics, urgency, clear vision and objectives, realistic expectations, clear scope requirements, technology competence, proper planning, user involvement, and alignment with organizational goals and communications. This list of factors that may possibly influence the success of a project underscores the plethora of different perspectives and the likelihood that a project may be deemed successful based upon some factors, yet unsuccessful when using others.

Organizational Culture

Understanding an organization's culture and subcultures is important to understanding project success. As in the general study of culture across anthropology, sociology, psychology, and cross-cultural studies, the definitions of OC reflect disagreement (Ahmadi et al., 2012; Chatman & O'Reilly, 2016; Ovseiko & Buchan, 2012). The study of the term "organizational culture" within ICT- and IT-enabled business change initiatives, for example Business Process Management (BPM), Business Process Re-engineering (BPR), and Total Quality Management (TQM), reflects the disparate definitions and conceptual debate influenced by anthropology, sociology, critical theory, psychology, and postmodernism, as documented by Baldwin et al. (2006), Kroeber and Kluckhohn (1952), and Jahoda (2012). As noted by Baldwin et al., most of the definitions coalesce around the structuralist-functionalist perspective that defines OC as "a pattern of beliefs, values and artifacts" (p. 31).

Geert Hofstede and Edgar Schein, both social psychologists, have had the most impact on culture studies as they relate to OC. Hofstede's and Schein's contributions to OC research came out of their work with major corporations in the 1980s. Although his Ph.D. was in social psychology, Hofstede's work was focused on organizations and was anthropological in nature. Hofstede defined OC as "the collective programming of the mind which distinguishes the members of one group or category of people from another" (Hofstede et al., 2005, p. 5). His conceptualization of OC addresses not only the organization at the corporate level, but also its subunits (Hofstede, 1998a). Working with data drawn from 116,000 employees of IBM Corporation, Hofstede developed what has come to be known as the Hofstede doctrine, consisting of six national culture (NC) dimensions: power distance, uncertainty avoidance,

individualism vs. collectivism, masculinity vs. femininity, long term vs. short term, and indulgence vs. restraint, which consistently predicted the values of respondents based upon their nationality (Minkov & Hofstede, 2011). Hofstede postulated that his six NC dimensions represented more than just an amalgamation of personal values; he indicated that the six dimensions could not be used to describe the values of any one individual but were indicative of the values of a group. Hofstede also derived six dimensions of OC: process- vs. goal-oriented, employee- vs. job-oriented, parochial vs. professional, open vs. closed system, loose vs. tight control, and normative vs. pragmatic (Hofstede, 1998b). Hofstede discouraged the use of the word culture to describe both NC and OC because they are two different types of culture. He postulated that NC is mental software acquired in the first ten years of life, while OC is acquired when one enters the workforce as an adult (Minkov & Hofstede).

Though Schein's work can be classified as management and organizational studies literature, he acknowledged that his perspective on culture is rooted in anthropology but influenced by culture research and predicates articulated by his contemporaries Pasquale Gagliardi and Chris Argyris (Schein, 1990). Schein's concept of OC, which he referred to as levels of culture, postulates that OC can be understood in terms of artifacts, espoused beliefs and values, and basic underlying assumptions. He conceptualized OC as a problem of socialization, behavior, and assumptions. Schein argued that not all groups can be said to have an OC, but that culture exists where a group has developed shared values based upon a set of unspoken assumptions that leads to common behavior. Though Schein focused on organizations, he used the term "group" to represent culture at all levels, including nations, occupations, organizations, and work groups. In keeping with Jahoda's (2012) recommendation that research define culture

as it applies to the specific study, the current study adopts Schein's definition of OC, that is "a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schein, 1990, p. 111).

A plethora of studies examine OC's impact across a broad array of organizations and industries. Topics of research include the impact of culture on strategy (Ahmadi et al., 2012) , business performance (Naor et al., 2008; Ogbonna & Harris, 2000), organizational effectiveness (Gregory et al., 2009), innovation (Ali Taha et al., 2016; Naqshbandi et al., 2015), new product development (Belassi et al., 2007; Naranjo-Valencia et al., 2010) organizational change (Burnes & James, 1995; Rashid et al., 2004), leadership of ICT (Gallivan & Srite, 2005; Tams, 2013; Walsh & Kefi, 2008), TQM (Prajogo & McDermott, 2005), BPR (Vom Brocke & Sinnl, 2011), higher education (Ernst et al., 2016; Fralinger & Olson, 2007; Tierney, 1988), as well as the various levels of OC itself (Cameron & Ettington, 1988; Naidoo, 2002; Odor, 2018). OC as a factor in corporate organizational life rose to significance in the 1980s as consultancies and corporate executives became enthralled with shaping their OC as a means of gaining performance improvement and market prominence (Chatman & O'Reilly, 2016). The importance of OC in higher education has been the subject of much research to gain insights into not only how HEIs work, but the impact of culture on performance and hence success.

HEI Organizational Culture

William Tierney is an oft-referenced researcher in the culture of HEIs. He states "An organization's culture is reflected in what is done, how it is done, and who is involved in doing it.

It concerns decisions, actions, and communications both on an instrumental and a symbolic level" (Tierney, 1988, p. 3). The culture of many HEIs is based on the notion of academic freedom which equates to significant faculty autonomy. The result of this is a faculty perspective in which ethical behavior and expertise are recognized and sanctioned (Peruski, 2006). This perspective is juxtaposed with the cultural perspective of administrators and creates the interesting dynamic of multi-layered and sometimes competing cultures within an HEI (Dill, 2012). In fact, Dill proposed the typical HEI has three cultural perspectives: the enterprise, the discipline, and the academic profession. Tierney (1988) suggested that the dynamics of multiple cultural perspectives and subsequent conflicts in the context of decisions in the academy lead to frustration when a decision or project effort fails. Describing a case that seems to underscore Tierney's observation and the contributions of Dill's various levels, Skoumpopoulou and Nguyen-Newby (2015) documented an ICT vs. culture related conflict in a case study of the implementation of a new integrated system at a university in the U.K. Their research addressed the question: To what extent does the implementation of an integrated ICT solution alter the organizational life and employee relationships in the higher education sector? Skoumpopoulou and Nguyen-Newby interviewed 22 faculty and administrators concerning the implementation of a new student information system. Observations were categorized by themes such as rise of uncertainty, loss of trust, willingness to innovate, and the power and control game. The ICT project was initially intended to be authorized by a committee but was ultimately authorized via dictate, with poor results. The implementation resulted in a shift in power, loss of status in the minds of the academicians, confusion about the new process on the part of the administrators,

loss of access to critical data, frustration regarding inability to use the system, and a dramatic change to the culture and identities across the institution.

Tierney, who has been a defender of academic culture, has acknowledged the significance of the changes occurring in the academic landscape—technological advances, changes in higher education economics, and globalization of higher education. He conceded that these changes are of such significance that the "Ivory Tower" culture of HEIs needs to engage with the external environment it has held at arm's length in the past, if HEIs are to be viable entities in the 21st century (Tierney, 2006, p. 2). The unique cultural dynamics of HEIs make the question of how HEI culture impacts the adoption of ICT innovation important for HEIs, which operate in a disruptive and continually changing environment. Given the unique multiple cultures of HEIs, this study seeks to determine if there are material differences between the OC of an HEI and its subgroup cultures.

Diagnosing Organizational Culture

Two methods are described in extant literature by which cultural attributes of an organization can be quantitatively measured. One method is the use of dimensions, as popularized by Hofstede and his six dimensions of culture. The other method leverages typologies that combine multiple measures to provide insight into the cultural behavior of a group, be it an entire organization or a department within an organization.

Cultural dimensions describe the extent to which cultural groups are found empirically to differ from one another in terms of psychological attributes such as values, beliefs, self-construal, personality, and behaviors (Smith & Bond, 2018). Dimensions are typically bipolar measurements of a particular value preference. The use of dimensions was popularized by

Hofstede to measure value preferences of employees of large multinational corporations, the most noted of which was IBM. Other developers of well accepted dimensions include the GLOBE Team led by Robert House (Hofstede, 2011), and Ronald Inglehart, Fons Trompenaars and Shalom Schwartz (Taras et al., 2009). Hofstede's six NC dimensions are widely used in OC research, in particular cross-cultural studies involving multinational corporations that have employees with different national origins. While useful, culture dimension research typically focuses on one of the dimensions, such as power distance, to assess an organization's culture and may miss other significant factors that drive behavior. Hofstede's dimensions have been appropriately applied to HEIs (Dennehy, 2015) for investigating cross-cultural phenomena.

The other popular tool for assessing OC is cultural typology. According to Yamazaki (2005), cultural typologies offer the ability to identify how culturally dominant ways of thinking vary from one organization to another. A cultural typology offers a framework to guide inquiry and distinguish between different types of OC based upon values and offers an approach to assess the degree to which an organization, division, department, or subunit of an organization exhibits consistent tendencies, typically with a focus towards the study of organizational effectiveness (Smart & St. John, 1996). These characterizations of collective behavior are useful in understanding central tendencies that can help explain certain group preferences in receiving feedback, disseminating data, communicating, and interacting with others. The typical typology employs at least two dimensions and assesses a group typical behavior style or norms along bipolar continua, for example collaboration vs. competition and stability vs. adaptability.

As is the case with OC dimensions, a number of cultural typologies, derived from factor analysis and small space analyses, have been developed to gain a foundational understanding of

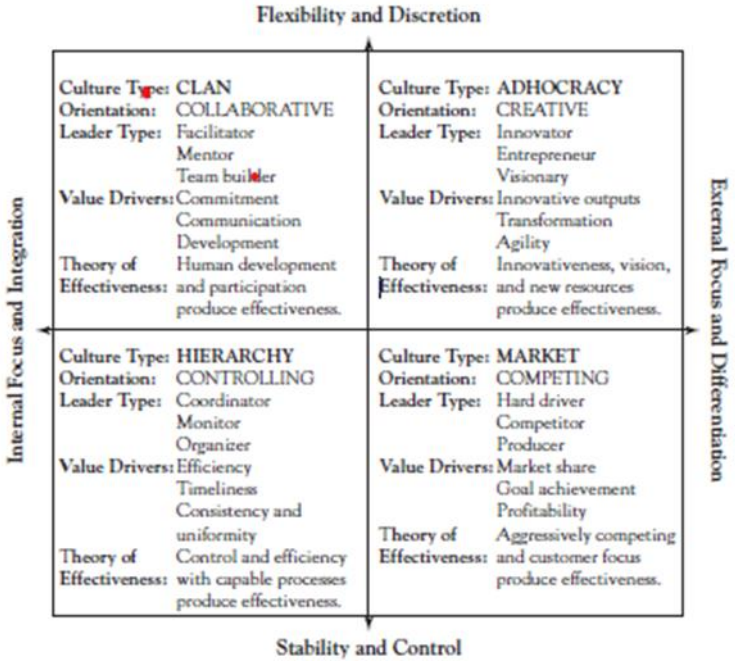
a group's tendencies, behaviors, and norms (Chanchani & Theivananthampillai, 2009). Chanchani and Theivananthampillai suggested that the strength of a cultural typology can be determined by its simplicity, usefulness for multiple levels of analysis, applicability to multiple research methods, ability to identify dominant cultural themes, and flexibility in identifying cultural change. Four basic orientations or conceptual domains appear to be common to most cultural typologies: (1) people orientation, reflecting perceived support, cooperation, mutual respect and consideration between organizational members; (2) innovation orientation, which indicates general openness to change and propensity to experiment and take risk; (3) control orientation, which focuses on the level of work formalization, the existence of rules and procedures and the importance of the hierarchy; and (4) results/outcome orientation, that measures the level of productivity or performance expected inside an organization (Delobbe et al., 2002). Popular typologies include the Goffee and Jones (1996) Social-Solidarity framework, Handy's (1976) OC typology, Denison and Mishra's (1995) Theoretical Model of Culture Traits, Bergquist's (1992) Framework for Higher Education, and Quinn and Rohrbaugh's (1981) CVF. Though all of these typologies are popular, the CVF has been used in a large number of organizations internationally (Yu & Wu, 2009) and has undergone several validation studies in different countries.

The CVF was initially designed as a model to analyze and assess organizational effectiveness. It originally consisted of two sets of competing values (internal vs. external focus and adaptability vs. stability) that influence an organization's focus, structure and methods used to accomplish strategic outcomes (Quinn & Rohrbaugh, 1981). The CVF was subsequently extended by Kimberly and Quinn (Denison & Spreitzer, 1991; Kimberly & Quinn, 1984) to

distinguish shared values, assumptions, and norms of an organization. This framework is useful not only in understanding the overarching culture of an organization, but also differences in the OCs of departments within that organization. Four culture archetypes are identified by the CVF (Cameron, 2008). The four CVF culture archetypes—Clan, Adhocracy, Hierarchy and Market—are shown in Figure 3. The Clan culture is like an extended family with key characteristics of loyalty, collaboration, and tradition. With a high level of commitment, the emphasis is on benefit to the employee and success is defined by the internal climate and employee focus. The Adhocracy culture is a dynamic, highly entrepreneurial and creative workplace. Adhocracies are motivated by experimentation and innovation, with an emphasis on new knowledge. They are always ready for change and a new challenge. The Hierarchy culture is formalized and structured with well-defined processes and procedures. Leaders are seen as coordinators, organizers, and mavens of efficiency. The organization is stable and predictable. Finally, the Market culture places an emphasis on winning and its leaders are perceived as hard drivers and demanding. The focus is external with an objective of outpacing competitors (Cameron, 2008). Though all organizations have a dominant culture, Cameron asserted that an organization can exhibit tendencies of all four culture types. This is important because the degree to which cultural tendencies are shared may offer a bridge between work groups and drive consensus that could enhance the possibility of ICT project success. At least, understanding how the culture types conflict and between what work groups such conflict can occur positions leaders to develop strategies to minimize and negative effects.

Figure 3

The CVF



Source: Adapted from Fig. 3.2, The competing values of leadership, effectiveness, and organizations theory, in *Diagnosing and Changing Organizational Culture* (Cameron & Quinn, 2011) p. 53.

Chapter Summary

STS offers a way to think about ICT implementation that bifurcates the topic into consideration of changes to the technical and social subsystems. Accepting both as interdependent and equal parts of the implementation process allow for an examination of the social subsystem, specifically the implications of OC for the success of ICT implementation projects. The CVF offers an opportunity to identify and align the different cultures that exist in an institution. Understanding the varying cultures in an HEI allows us to determine which culture type at a given organizational level influences faculty, staff, and administrator perceptions of the

success of ICT implementation projects, taking into account time, cost, scope, sponsor satisfaction, user engagement, and preparedness to leverage the resultant project.

CHAPTER 3: METHODS

The purpose of this study is to examine the relationship between OC and perceptions of ICT implementation project success in HEIs. The study was guided by the following research question: Do the institutional, college/division and department cultures of an HEI impact faculty, staff, and administrator perceptions of ICT implementation project success? The remainder of this chapter will discuss the research study design, participants, data collection, measures, data analysis, and validity and reliability methodological limitations. The study gained Institutional Review Board (IRB) approval from the University of North Florida (Appendix A).

Study Design

While the interaction of each of these three levels of an HEI OC (institutional, college/division and department) with project success has been examined by examining each level in isolation (Kleijnen et al., 2009; Kwan & Walker, 2004; Ramachandran et al., 2011; Sanderson, 2006), in this study I sought to measure all three in a more holistic interconnected model. This non-experimental study employed a quantitative approach to determining any relationship between an HEI's institutional, college/division and department OCs and implementation project success by gathering responses from participants about perceptions of institutional culture, college/division culture, department culture, and ICT implementation project success at their institution.

Participants

OC varies by institution, and such differences were important to this study. Therefore, to gain as much diversity as possible across the solicited sample, I did not exclude any institution during the recruitment process. The participant population included HEI faculty, staff and

administrators from seven institutions who had been involved in or impacted by an academic or administrative ICT implementation in the preceding two years. Individuals under the age of 18 were excluded. Based upon the consent information provided by respondents, the sample contains no one under the age of 18.

I emailed members of the Educause Chief Information Officer (CIO) listserv with an invitation to participate and encourage their campus constituents (faculty, staff, and administrators) to do likewise. The listserv included over 300 public, private, undergraduate, graduate, and research member institutions. The email solicitation, recruitment letter and informed consent form can be found in Appendices B, C, and D respectively.

Data Collection

I administered a web-based survey through Qualtrics to collect responses from the targeted population. The initial emailed invitation and recruitment letter (sent to the CIO listserv) included a link that solicited participation and brought respondents to an informed consent page. I had several exchanges of email with respondents who sought additional information about the study. Respondents who consented to participate were advanced to the survey. Responses were anonymized using Qualtrics settings to ensure that each respondents' responses could not be traced back to their IP address. To further protect the confidentiality of the respondents and their associated institutions, the names of the institutions and departments were de-identified via data editing on the Qualtrics platform. The 48 responses received were screened for completeness. Three responses were incomplete and excluded. The remaining 45 responses were screened for alignment within an institution. Six responses received from institutions with fewer than three responses were excluded because the study sought to collect data on three levels of each HEI's

organization. The institution and department names were then deidentified by assigning unique alphabet names to each institution and Greek alphabet name to each department. The master list of institutions and departments was stored separately on an UNF OneDrive account to ensure the de-identified file and master list could not be compromised. The downloaded dataset used to perform the analysis was stored in a different OneDrive account with the same level of security and encryption.

Measures

Two scales were used to instrument this study.

Organizational Culture

OC was measured using the OCAI (©Kim Cameron), which was built on the work of Cameron and Ettington (1988)'s CVF (Cameron & Quinn, 2011). The OCAI was used by permission (Appendix E) with slight modifications to make the questions more applicable to the higher education setting. The OCAI assesses cultural tendencies that influence how a given group works across four cultural archetypes (Clan, Adhocracy, Market and Hierarchical), all of which may be present in an organization. It gathers information about six dimensions of the organization, within each of which are four statements that describe the four culture archetypes. Respondents distribute 100 points across the four statements presented under six OC dimensions: (1) dominant characteristics, (2) organizational leadership, (3) management of employees, (4) organizational glue, (5) strategic emphasis and (6) criteria for success. Each of the four statements identifies the characteristic of one of the four CVF culture types. Upon completion of the instrument, the points assigned to the statements across the dimensions that align with each culture type are summed and divided by six to determine the average score of each of the four culture archetypes for that work group per the OCAI scoring algorithm. To interpret the scores,

Cameron and Quinn (2011) created an algorithm for scoring the existence of the four CVF culture types, using a radar chart that reflects the scores in a two-dimensional graph. Cameron and Quinn noted that the process typically results in the identification of the one or more culture archetypes that predominate in a work group. Rarely does the scoring result in an equilateral figure, though that is a possibility. The statements were presented to the respondent in three sets of 6 groups of questions (72 questions in all), first asking the respondents to assess their department, then their college/division, and lastly their institution.

Table 1 lists the six characteristics and their associated statements that describe each of the four culture archetypes.

Table 1

OCAI Measures and Items

Dominant Characteristics	
A	The organization is a very personal place. It is a lot like an extended family. People seem to share a lot of themselves.
B	The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.
C	The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented
D	The organization is a very controlled and structured place. Formal procedures generally govern what people do.
Organizational Leadership	
A	The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.
B	The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, and risk.
C	The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.
D	The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.
Management of Employees	

A The management style in the organization is characterized by teamwork, consensus, and participation.

B The management style in the organization is characterized by individual risk-taking, innovation, freedom, and uniqueness.

C The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.

D The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships.

Organizational Glue

A The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.

B The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.

C The glue that holds the organization together is emphasis on achievement and goal accomplishment. Aggressiveness and winning are common themes.

D The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.

Strategic Emphases

A The organization emphasizes human development. High trust, openness, and participation persist.

B The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.

C The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.

D The organization emphasizes permanence and stability. Efficiency, control, and smooth operations are important.

Criteria for Success

A The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.

B The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.

C The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key.

D The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.

Project Success

A Project Success scale aligned with STS was constructed by the researcher based upon the literature. The scale included the universally accepted iron triangle scale (Jugdev & Muller, 2005; Pollack et al., 2018; Wateridge, 1998; Westervelde, 2003) which incorporates three measures (time, cost, budget) identified as measures of project success (Glass, 2006; Hastie & Wojewoda, 2015; The Standish Group, 1995). These items measure success of hard factors that are typically associated with the technical subsystem of a work system. Added to these three items are two measures of what some researchers (Dvir et al., 2003; Ika, 2009; Lech, 2013) termed soft factors that are more aligned with the social subsystem of a work system. These items measure perceptions regarding user and sponsor satisfaction with the implementation project results. The scale used a 5-point Likert like scale to record respondents' assessment of project success (Table 2).

Table 2

Project Success Measure Items

	Project Success
1	The project was completed on time.
2	The Project was completed within budget.
3	The project was completed with the expected quality.
4	Users were satisfied with the results of the project.
5	The project sponsor was satisfied with the results delivered.

Demographic Information

Additionally, several demographic questions were posed to understand the respondents and to associate the respondents with their institution, college/division, and department of the institution. The institution and department names were necessary to aggregate responses across

the three OC levels. Steps to deidentify the institution and department names were taken to maintain confidentiality as discussed earlier.

Data Analysis

The data analysis for this study was completed in two parts. First, as described previously, the OCAI scoring algorithm (calculation of the scores assigned to each culture type and construction of the radar chart as designed by the OCAI creators) was used to analyze respondents' assessment of the CVF culture types exhibited in their department, college/division, and institution. Using the data respondents provided about the name of their institution, college/division, and department, respondents' responses were aggregated and scored to provide insight into the culture of the respective institution and identified organization sublevels. The data was then used to compare cultures across and within institutions.

Based on insight into which cultures were present at the various institutions, SPSS 29 was used to conduct regression analysis on the OCAI scores to determine if there was a relationship between OC and project success at each organizational level. Given the small sample size (n=39), regression analysis was performed on the complete sample. Three models were run. The first model was run using OCAI department scoring as the independent variable and project success as the dependent variable. The second model considered the college/division OCAI scoring as the independent variable and project success as the dependent variable. The third model considered the institution level OCAI scoring as the independent variable and project success as the dependent variable.

Validity and Reliability

The validity and reliability of the OCAI has been established by its creators (Cameron & Quinn, 2011) and in international settings (Abbasi et al., 2013; Andreou et al., 2020; Choi et al., 2010; Heritage et al., 2014; Kwan & Walker, 2004; Van Huy et al., 2020). To establish the validity of the Project Success scale, a factor analysis was conducted in SPSS 29 using the five project success items to ensure the items adequately measured the latent construct project success. Scores ranged from .84 to .94. Cronbach's Alpha analyses were conducted in SPSS 29 to determine the internal consistency of the results for the OCAI Clan (.82), Adhocracy (.84), Market (.63) and Hierarchical subscales (.63), and separately to verify the internal consistency of the five-item Project Success scale (.95).

Chapter Summary

This chapter explains the methodology chosen to evaluate the study research question. The non-experimental, quantitative model used is consistent with the postpositivist perspective of the research, the assessment of the OC of an institution and its sublevels, and the use of that assessment to determine the relationship of the institution's OC to success of its ICT implementation projects. I describe the design of the study, the identification of an appropriate population to sample, the measures chosen to gather the data, the use of the OCAI scoring algorithm to assess OC, and the regression analysis used to determine the relationship between the three layers of an institution's culture and ICT Implementation project success.

CHAPTER 4: RESULTS

The purpose of this study is to examine the relationship between OC and perceptions of ICT implementation project success in HEIs. To examine these relationships, this inquiry was framed by the research question: Do the institutional, college/division and department cultures of an HEI impact faculty, staff, and administrator perceptions of ICT implementation project success?

Data Collection

As described in Chapter 3, an online survey consisting of the OCAI and five-item project success scale developed by the researcher was used to gather the perceptions of 48 respondents. Three responses were incomplete and excluded. Six responses were received from institutions from which fewer than three responses were obtained. Since this study's structure is based upon observations from three organizational levels (institution, college/division, and department), the author excluded these responses, hence 39 responses from three institutions were further analyzed. The institutions included two with Carnegie R2 Doctoral University High Research Activity status and one Carnegie Classification Medical School Medical Center. For confidentiality, these characterizations will not be tied directly to the specific institutions discussed in this study but are intended to add some context to understanding the data. The demographic profiles of the 39 respondents is described in Table 3.

Table 3

Respondent Characteristics

Characteristic	N[a]	%
Role		
Administrator	8	20.5
Faculty	9	23.1
Staff	22	56.4
Gender		
Female	18	46.2
Male	21	53.8
Age		
26-30	5	12.8
31-40	9	23.1
41-50	25	64.1
Education		
Some College	1	2.6
Master's	9	48.7
Doctorate	22	48.7
Experience (yr)		
1 – 5	12	46.2
6 – 10	7	53.8
11 – 15	5	0.0
16 or more	15	0.0

[a] N=39

The 39 respondents identified with three institutions. The institutions include two Carnegie Classification R2 Doctoral University High Research Activity status and one Carnegie Classification Medical School Medical Center. For confidentiality, these characterizations will not be tied directly to the specific institutions discussed in this study but are intended to add some context to understanding the data.

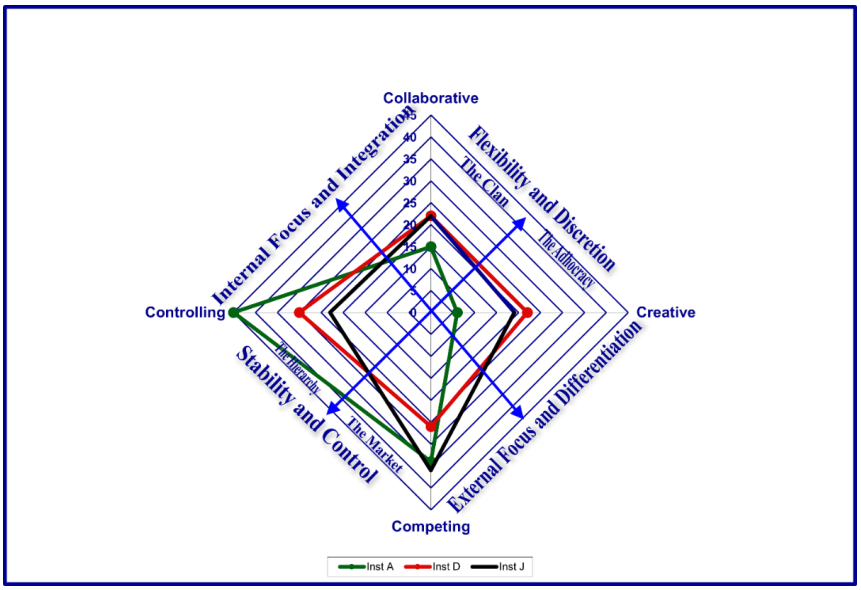
Data Analysis

OCAI Results

The OCAI instrument and scoring algorithms were used to assess the respondents' perceptions of the OC of their institution, division, and department. Responses were aggregated by institution, college/division, and department. Figure 4 displays the radar chart for the three institutions in the study. The points on the X and Y axes reflect the dominance of the culture type at the organizational level being examined: Clan (collaborative), Adhocracy (creative), Market (competitive), and Hierarchical (controlling). Institution A respondents indicated dominant Hierarchical culture dominant, with strong secondary Market, tertiary Clan, and quaternary Adhocracy culture tendencies. Institution D respondents perceived dominant Hierarchical, secondary Market, and equal Clan and Adhocracy tertiary culture tendencies. Institution J respondents indicated dominant Market, secondary Hierarchical, tertiary Clan, and quaternary Adhocracy culture tendencies.

Figure 4

Radar Chart: Institutions A, D, and J

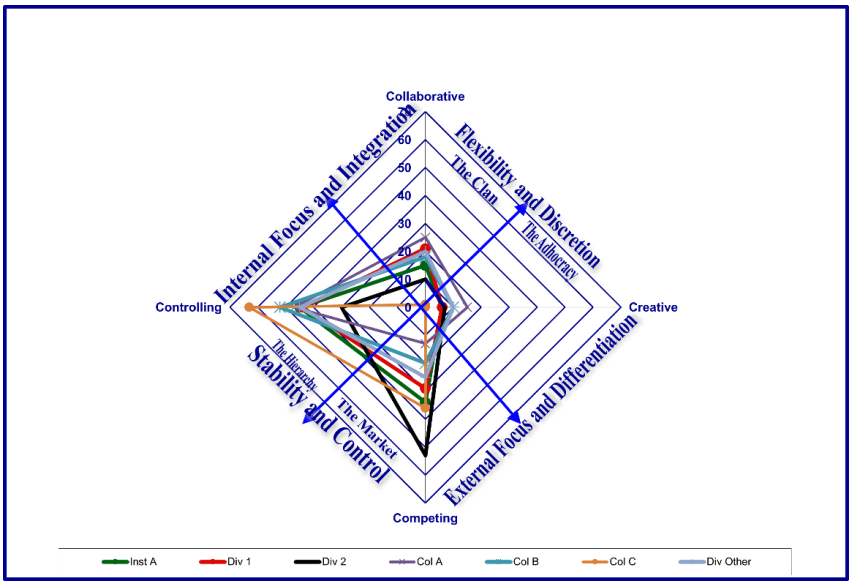


Respondents from Institution A were drawn from three colleges and three divisions (Figure 5). Except for Division 2, the three colleges, Division 1 and Division Other respondents indicated their division's dominant culture tendencies as Hierarchical, which aligns with the dominant culture of the institution. Division Other may represent more than a single division, as it connotes a respondent did not identify with the division type included in the survey and chose to list his/her division as "Division other". Note that the respondents from the colleges reported that their colleges' Hierarchical tendencies are stronger than those of the institution, while Division 1 and Division Other reported a Hierarchical culture that was equal to that of the institution. College B and Divisions 1 and Other showed secondary Market, tertiary Clan and quaternary Adhocracy culture tendencies aligned with the institution's tendencies. College C reported no Adhocracy or Clan culture tendencies. College A's secondary culture was Clan,

followed by Adhocracy and Market culture. Division 2's dominant tendencies were Market, secondary culture was Hierarchical, tertiary was Clan and quaternary, Adhocracy.

Figure 5

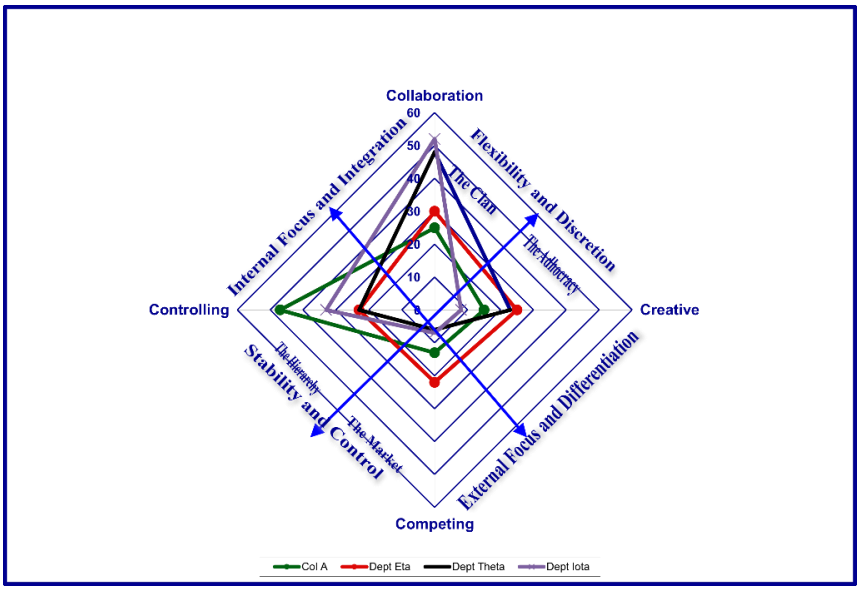
Radar Chart: Institution A with Colleges and Divisions



Institution A respondents indicated membership in twelve different departments across its colleges and divisions. Respondents associated with College A reported membership in three departments (Figure 6). Each of the three departments reported dominant Clan culture, however the secondary, tertiary, and quaternary cultures of each department varied. Department Eta reported secondary Adhocracy tendencies, tertiary Market tendencies, and quaternary Hierarchical tendencies. Department Theta reported a tie for secondary cultures between Adhocracy and Hierarchical. Department Theta's quaternary tendencies aligned with a Market culture. Department Iota reported secondary Hierarchical tendencies and a near tie between tertiary (Adhocracy) and quaternary (Market) cultures,

Figure 6

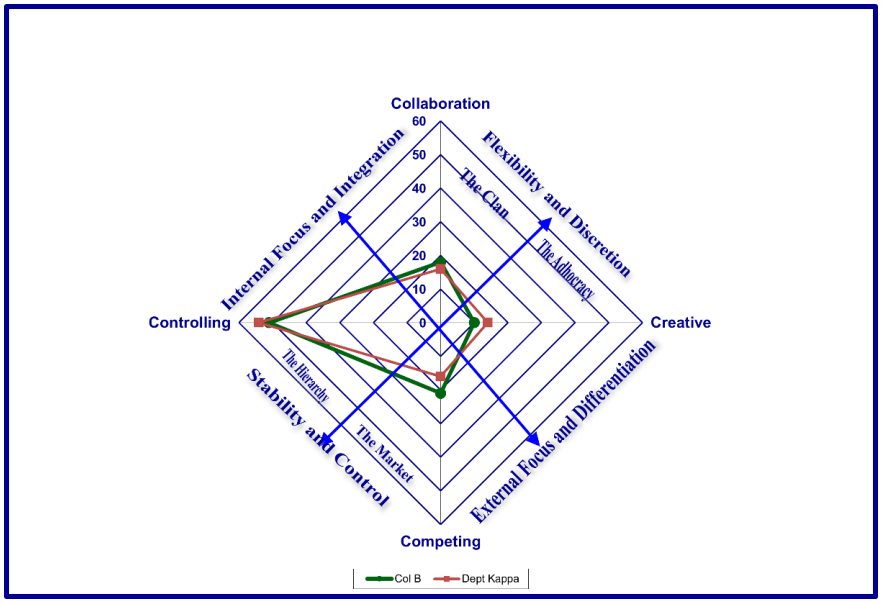
Radar Chart: Institution A, College A with Departments



The respondents for Institution A's College B reported only one department (Figure 7). Department Kappa aligned with College B's dominant Hierarchical culture and reported a tie for secondary culture tendencies between Clan and Market, with quaternary Adhocracy culture tendencies.

Figure 7

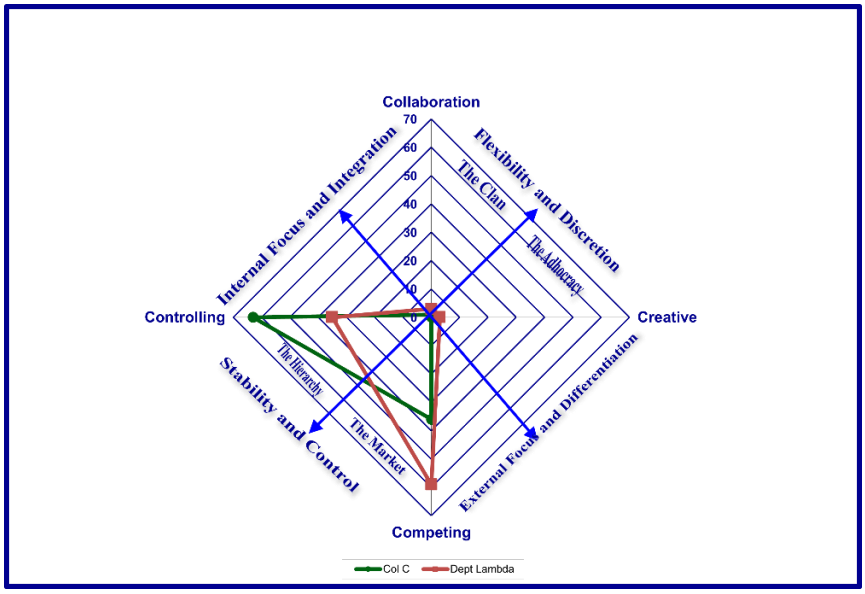
Radar Chart: Institution A, College B with Department



College C's respondents also reported membership in a single department (Figure 8). Department Lambda's dominant Market culture did not align with the dominant Hierarchical culture of College C. Department Lambda demonstrated secondary tendencies of a Hierarchical culture and a tie for its tertiary culture tendencies between Clan and Adhocracy.

Figure 8

Radar Chart: Institution A, College C with Department



Division 1 respondents reported membership in three departments (Figure 9). Department Alpha aligned with the Division's dominant Hierarchical, secondary Market, tertiary Clan, and quaternary Adhocracy culture tendencies. Department Beta respondents reported dominant Clan, secondary Hierarchical, tertiary Market, and no Adhocracy culture tendencies. Department Gamma reported a dominant Market culture, with secondary Hierarchical, tertiary Clan and quaternary Adhocracy culture tendencies.

Figure 9

Radar Chart: Institution A, Division 1 with Departments

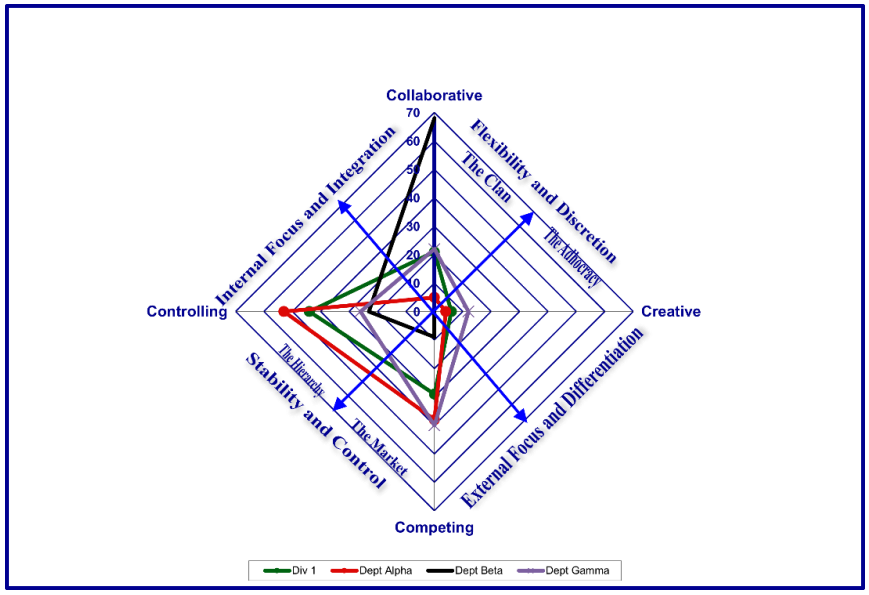
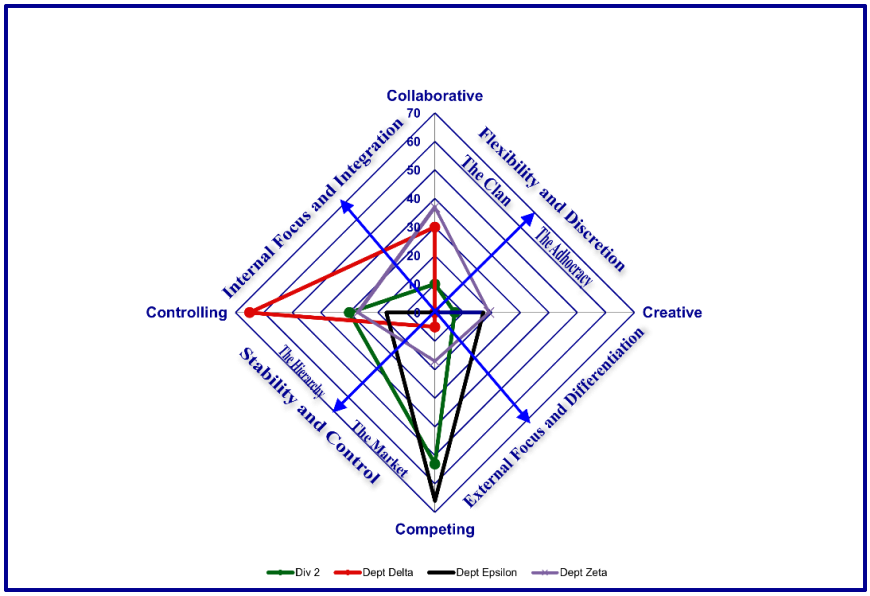


Figure 10 shows Division 2 with its three Departments. None of the departments aligned with Division 2's dominant Hierarchical culture, although respondents from Department Epsilon reported a dominant Market culture and a tie for secondary culture tendencies between Hierarchical and Adhocracy. The department reported no Clan culture tendencies. Department Delta, on the other hand, reported a dominant Hierarchical culture, with secondary Clan and tertiary Market culture tendencies. Department Delta reported no Adhocracy culture tendencies. Respondents from Department Zeta reported a dominant Clan culture, with secondary Market, tertiary Adhocracy, and quaternary Market culture tendencies.

Figure 10

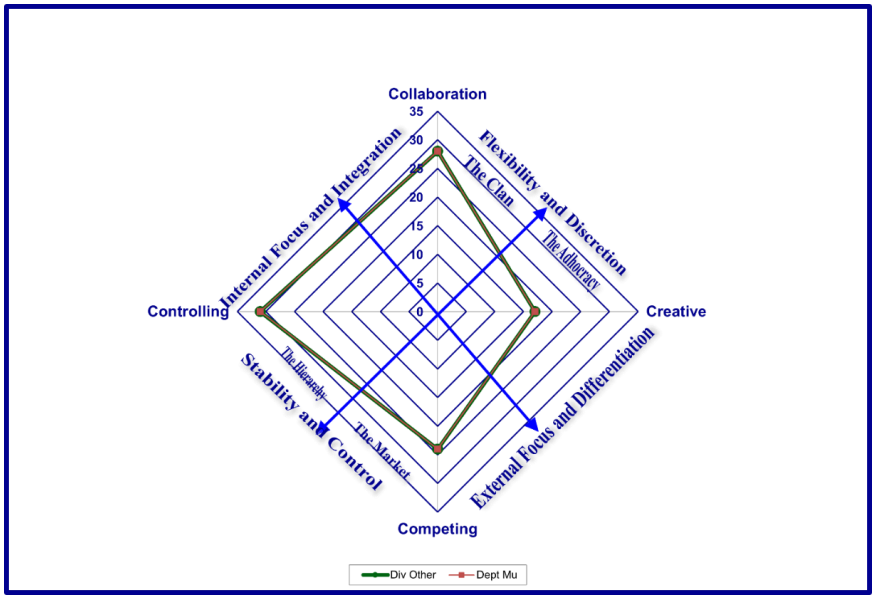
Radar Chart: Institution A, Division 2 with Departments



Respondents reporting from Division Other of Institution A held membership in a single department (Figure 11). Department Mu reported exact alignment with Division Other, with dominant Hierarchical, secondary Clan, tertiary Market, and quaternary Adhocracy culture tendencies.

Figure 11

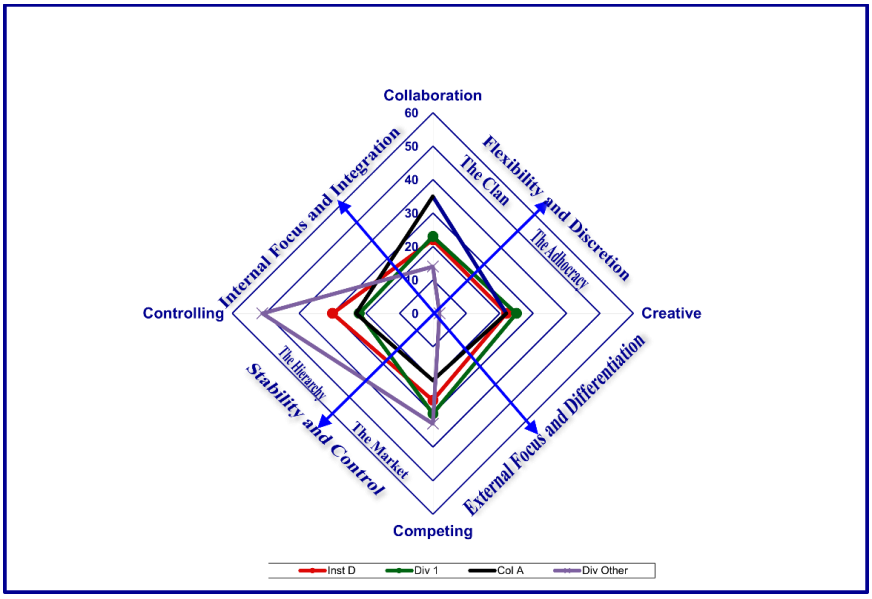
Radar Chart: Institution A, Division Other with Department



Institution D respondents reported from two divisions and one college (Figure 12). Only Division Other aligned with the institution's culture tendencies (dominant Hierarchical, secondary Market, tertiary Clan, quaternary Adhocracy). Division Other was more strongly Hierarchical than its institution. Division 1 reported a dominant Market culture with secondary Adhocracy, tertiary Clan, and quaternary Hierarchical culture tendencies. College A's dominant culture was Clan, with secondary Hierarchical and tertiary Adhocracy culture tendencies. College A reported no Market tendencies.

Figure 12

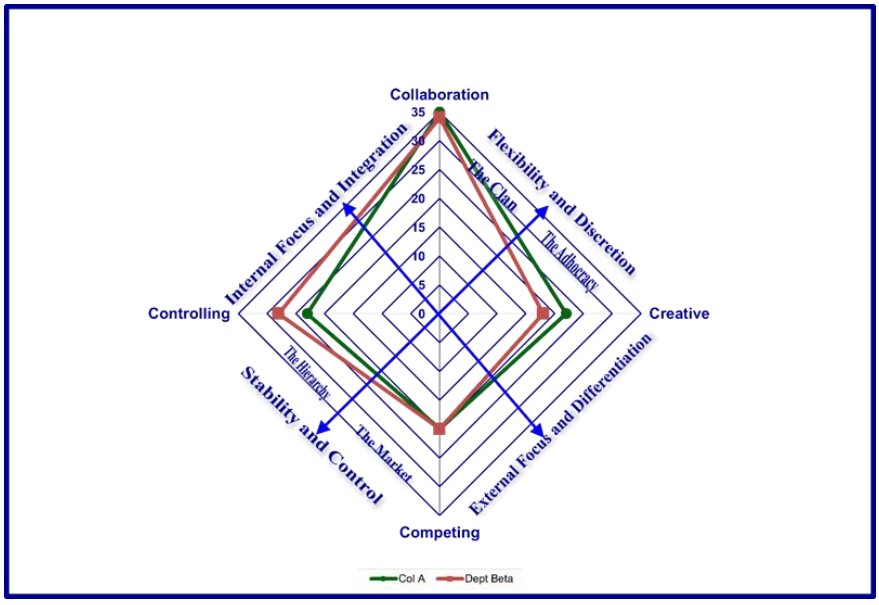
Radar Chart: Institution D with College and Divisions



Respondents from Institution D reported membership in three departments, one each in College A, Division 2, and Division Other. Department Beta aligned with the dominant Clan culture and the secondary Hierarchical culture of College A. However, its tertiary Market and quaternary Adhocracy culture tendencies (the latter only slightly weaker than its tertiary culture) differed from those of College A (Figure 13).

Figure 13

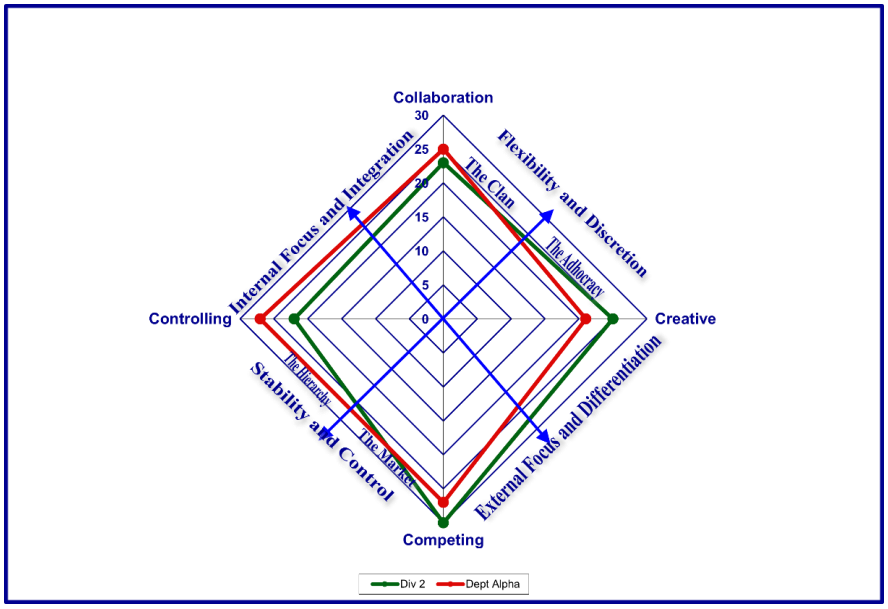
Radar Chart: Institution D, College A with Department



As shown in Figure 14, Department Alpha of Division 2 reported a dominant culture tie between Hierarchical and Market, with tertiary Clan and quaternary Adhocracy culture tendencies.

Figure 14

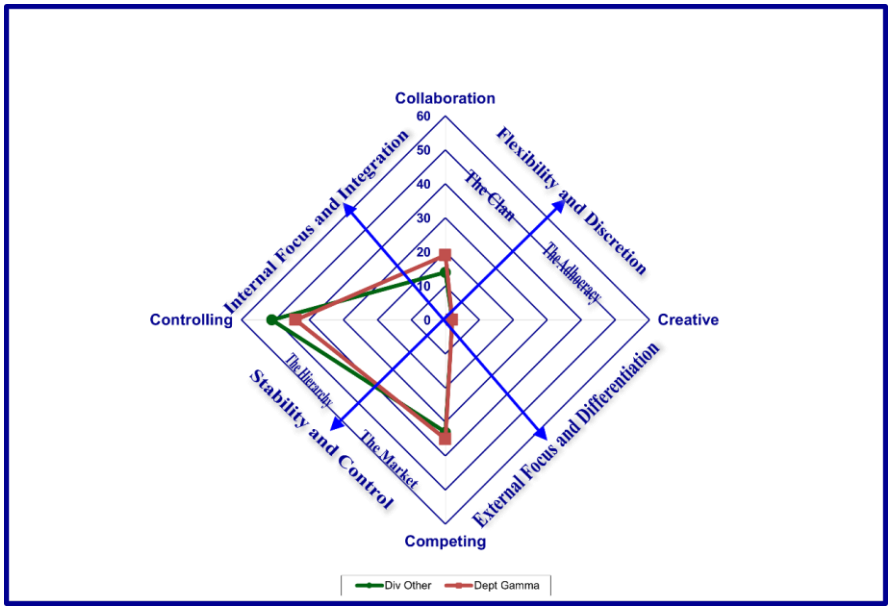
Radar Chart: Institution D, Division 2 with Department



As shown in Figure 15, Department Gamma of Division Other aligned with the dominant Hierarchical, secondary Market, tertiary Clan, and quaternary Adhocracy culture tendencies of Division Other.

Figure 15

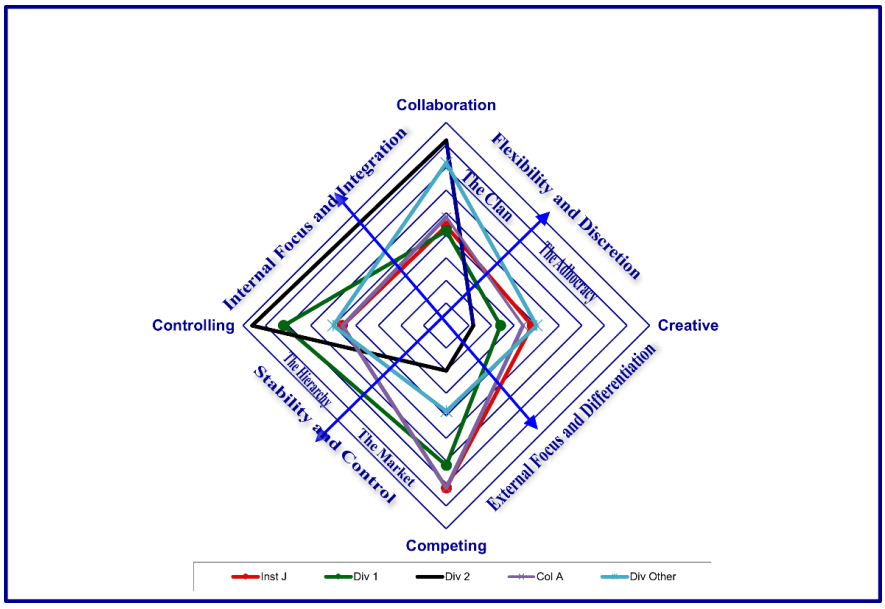
Radar Chart: Institution D, Division Other with Department



As reflected in Figure 16, Institution J's respondents reported from three divisions and one college. Neither the divisions nor College A aligned directly with the culture tendencies of Institution J. College A did align with the dominant Market culture of the institution. However, it reported secondary Clan, tertiary Hierarchical, and quaternary Adhocracy culture tendencies. Divisions 1 and 2 reported dominant Hierarchical cultures but differed in other tendencies. Division 1's secondary tendencies aligned with Market, tertiary with Clan, and quaternary with Adhocracy cultures. Division 2's secondary tendencies aligned with Clan, tertiary with Market, and quaternary with Adhocracy culture. Division Other reported dominant Clan tendencies, with secondary Hierarchical, tertiary Adhocracy, and quaternary Market cultures.

Figure 16

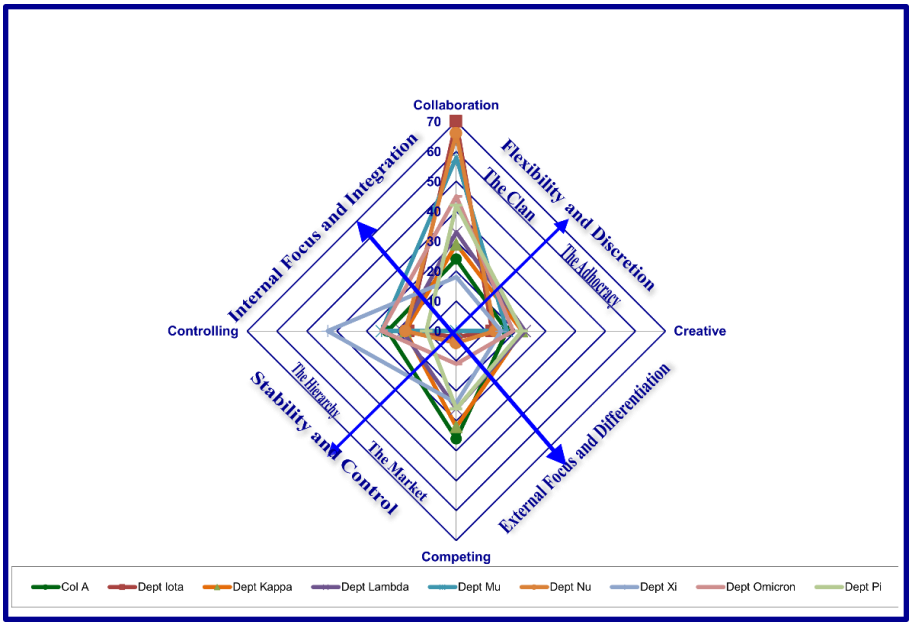
Radar Chart: Institution J with College and Divisions



Respondents from Institution J reported 20 departments across its college and divisions. Those departments reporting an association with College A indicated membership in eight departments, none of which aligned with all the culture tendencies of College A (Figure 17). Department Kappa, however, did align with College A's dominant Market and secondary Clan culture tendencies. It differed in that it reported tertiary Adhocracy and quaternary Hierarchical culture tendencies. Departments Iota, Mu, Nu and Omicron all reported dominant Clan cultures with secondary Hierarchical, tertiary Adhocracy, and quaternary Market culture tendencies. Departments Lambda and Pi reported dominant Clan, secondary Market, tertiary Adhocracy, and quaternary Hierarchical culture tendencies. Department Xi reported dominant Hierarchical, secondary Market, tertiary Clan, and quaternary Adhocracy culture tendencies.

Figure 17

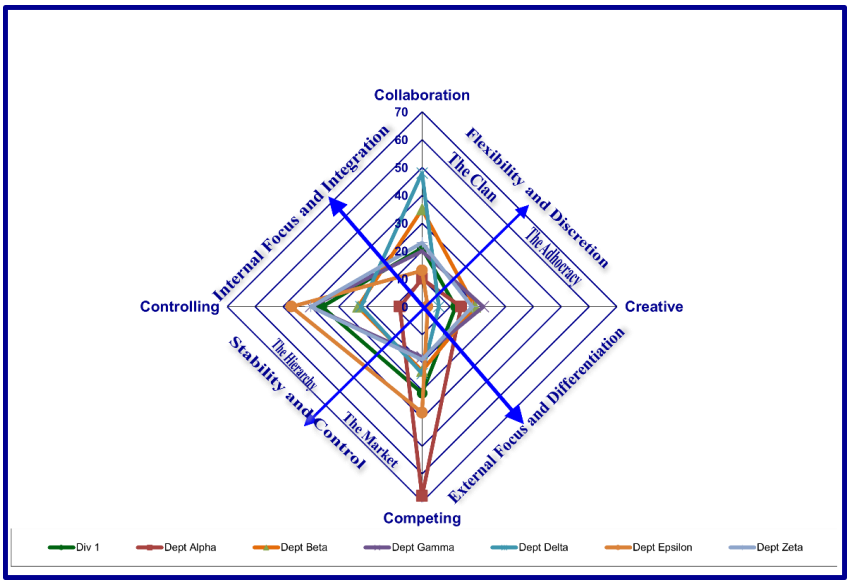
Radar Chart: Institution J, College A with Departments



As depicted in Figure 18, Institution J's Division 1 respondents reported membership across six departments, only one of which, Department Epsilon, aligned with Division 1's dominant Hierarchical, secondary Market, tertiary Clan, and quaternary Adhocracy culture tendencies. Department Epsilon's dominant and secondary tendencies were stronger than those of Institution J, however. Departments Gamma and Zeta also reported dominant Hierarchical cultures but differed in their other culture tendencies. Department Gamma reported secondary Adhocracy, tertiary Clan, and quaternary Market culture tendencies. Department Zeta reported secondary Market, tertiary Clan, and quaternary Adhocracy culture tendencies. Department Alpha reported dominant Market, secondary Adhocracy, tertiary Clan, and quaternary Market culture tendencies. Departments Beta and Delta reported dominant Clan cultures. Department Beta's secondary tendencies were tied between Market and Hierarchical, with quaternary Clan tendencies. Department Delta indicated secondary Market, tertiary Hierarchical, and quaternary Adhocracy culture tendencies.

Figure 18

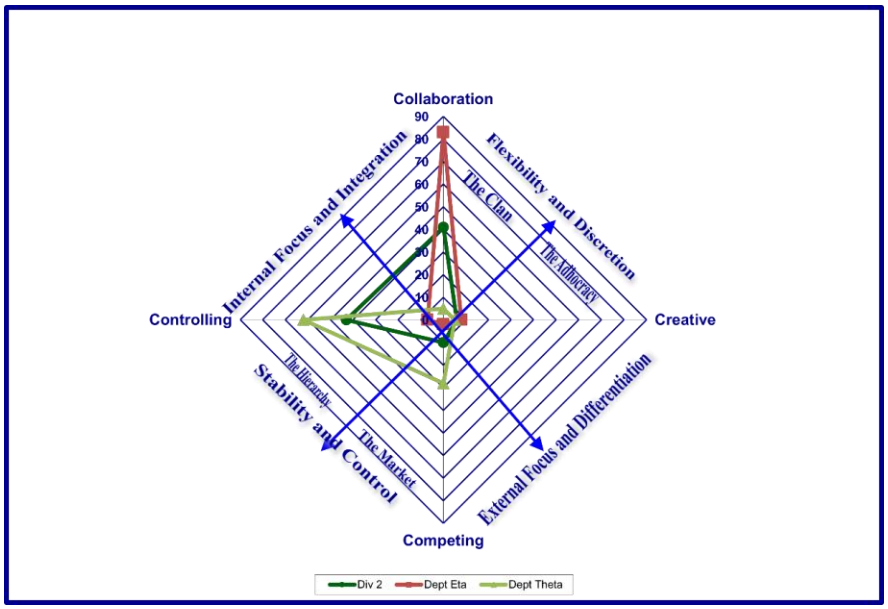
Radar Chart: Institution J, Division 1 with Departments



As shown in Figure 19, respondents associated with Division 2 of Institution J reported membership in two departments, neither of which aligned exactly with the division's culture profile (dominant Hierarchical, secondary Clan, tertiary Market and quaternary Adhocracy). Department Eta reported a strongly dominant Clan culture, with weak secondary Adhocracy, weak tertiary Hierarchical, and weak quaternary Market tendencies. Department Theta reported a dominant Hierarchical culture, which aligned with the division's dominant culture. However, Department Theta differed from the division in that its respondents reported secondary Market and weak tertiary culture tendencies tied between Clan and Adhocracy.

Figure 19

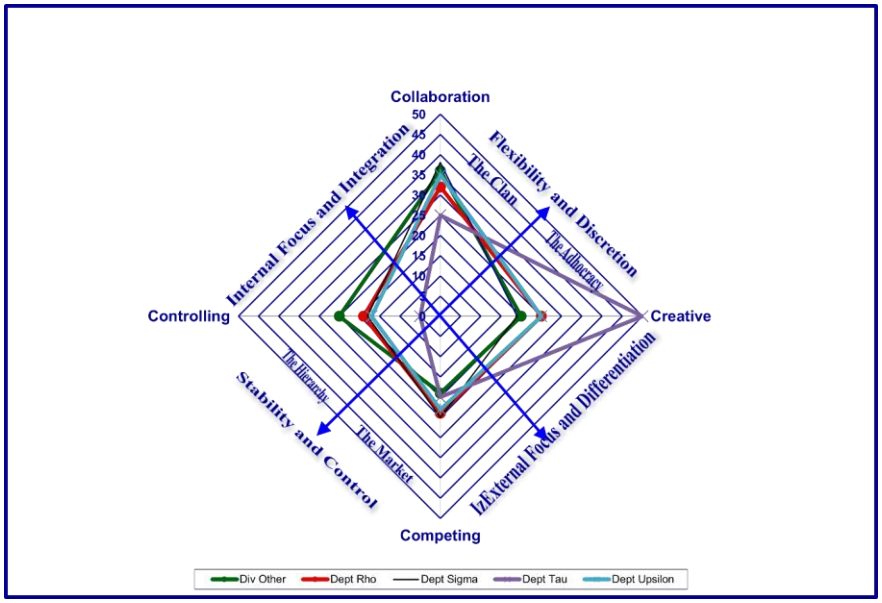
Radar Chart: Institution J, Division 2 with Departments



Institution J's Division Other respondents spanned four departments, three of which, Rho, Sigma, and Upsilon, aligned with the dominant Clan culture of the division (Figure 20). Departments Rho and Upsilon indicated secondary Adhocracy, tertiary Market, and quaternary Hierarchical culture tendencies. Department Sigma reported secondary Market, tertiary Adhocracy, and quaternary Hierarchical culture tendencies. Department Tau reported dominant Adhocracy, secondary Clan, tertiary Market, and quaternary Hierarchical culture tendencies.

Figure 20

Radar Chart: Institution J, Division Other with Departments



In summary, respondents indicated that Institutions A and D both have dominant Hierarchical institutional cultures, whereas Institution J has a dominant Market culture. However, the underlying cultures reported at the college/division and department levels reflect the diverse cultural makeup of the institutions and provide insight into the complex network of norms, beliefs, and assumptions about the best way to accomplish work. Understanding these differences offers insights that allowed the researcher to focus on whether these differences

influence respondents' perceptions of project success by examining via regression analysis which of the culture types seem to influence such perception.

Regression Analysis

Three regression models were run to determine the impact of OC on an HEI's ICT project success. Project success was the dependent variable and the CVF culture types were the dependent variables. The culture type scores generated via the OCAI scoring algorithm were used. In the initial running of the model the Adhocracy scale received a variance inflation factor (VIF) score greater than 10, indicating multicollinearity (high intercorrelations that could undermine the statistical significance of an independent variable) (Allen, 1997). As a result, the Adhocracy culture type was dropped from the model.

The first regression model focused on department cultures' impact on project success. The three independent variables used were departmental Clan, Market, and Hierarchical cultures. None of the results were significant (F=.449, p=.72, R^2=.046) (Table 4).

Table 4

Linear Regression: Department Culture on Implementation Project Success

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std Error	Beta	t	Sig.
(Constant)	3.238	1.394		2.323	0.026
Clan	0.000	0.018	-0.006	-0.016	0.988
Market	0.005	0.020	0.094	0.279	0.782
Hierarchy	-0.010	0.016	-0.164	-0.632	0.531

The second model used college/divisional culture as the independent variable. The results were significant for Hierarchical and Market cultures (F=3.392, p=.029, R^2 adj=.159) (Table 5).

Table 5

Linear Regression: College/Division Culture on Implementation Project Success

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std Error	Beta	t	Sig.
(Constant)	5.990	1.577		3.798	0.001
Clan	-0.026	0.021	-0.508	-1.222	0.230
Market	-0.044	0.019	-0.955	-2.258	0.030**
Hierarchy	-0.030	0.016	-0.701	-1.865	0.071*

Note R^2 =.225 at p <.05
*denotes p <.10
**denotes p <.05

The third model used institutional culture as the independent variable. None of the results were significant (F=2.059, p=.062, R^2 adj=.117) though they approached significance (Table 6).

Table 6

Linear Regression: Institutional Culture on Implementation Project Success

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	2.157	1.430		1.508	0.141
Clan	0.030	0.023	0.460	1.279	0.209
Market	0.012	0.017	0.276	0.733	0.468
Hierarchy	-0.003	0.015	-0.066	-0.199	0.843

Instrument Validity and Reliability

Validity is an assessment of how well a scale construct measures what it is designed to measure (Drost, 2011). The OCAI has been used thousands of times to assess the culture of organizations, including higher education institutions. In all these studies, the tool has been found to have strong validity (Cameron & Quinn, 2011). Additionally, several studies focusing

on the validity of the tool across different international settings have been published, verifying the OCAI's validity (Abbasi et al., 2013; Andreou et al., 2020; Choi et al., 2010; Heritage et al., 2014; Kwan & Walker, 2004; Van Huy et al., 2020).

The Project Success scale was compiled by the researcher based upon the literature review, hence there was no prior validation in literature. Per Rahn (2018), factor analysis is a good tool to determine to what degree a variable relates to the underlying latent construct. A factor analysis was performed on the 5-item Project Success scale to determine if the items adequately measured project success (Table 7). Rahn stated that while most studies target a .70 correlation, correlations as low as .20 may be acceptable depending upon the research and researcher, but.40 is an acceptable cutoff. All items in this scale met acceptable validity standards.

Table 7

Factor Loading for Project Success

Construct	Factor Loading
The project was completed on time.	.92
The project was completed within budget.	.84
The project was completed with the expected quality.	.94
Users were satisfied with the results of the project.	.89
The project sponsor was satisfied with the results delivered.	.90

Reliability is a test of the internal consistency of a scale and measures the degree to which the items of the scale measure the same construct (Taherdoost, 2016). Using SPSS 29, a reliability analysis was performed for each scale to ensure that the instrument would return consistent results (Table 8). According to Hinton et al. (2014), though there is some debate regarding reliability scores, a score of .90 or above is considered excellent, .70 to .90 is considered high, and .50 to .70 is moderately reliable. As such, the reliability of the Clan scale

and Adhocracy scales, at .82 and .84 respectively, are high. The Market and Hierarchy scales, at .69 and .63 respectively, are moderately reliable, and the Project Success scale, at .95, has excellent reliability.

Table 8

Reliability Analysis of OC and Project Success

Measure	Reliability
Clan	.82
Adhocracy	.84
Market	.69
Hierarchy	.63
Project Success	.95

Chapter Summary

In this study I sought evidence of discernible differences in OCs and subcultures in HEIs. The results from the OCAI assessment of respondents' perception of the cultures present at the institutional, college/division, and department levels demonstrated that such differences exist. The CVF typologies indicated the varied and complex mixture of cultural tendencies throughout the social subsystems of an HEI. Regression analysis models were used to examine the impact of institutional culture and subculture on the perception of implementation project success. While respondents' perceptions of what constitutes project success, as reflected in their responses to the questions in the five-item project success scale, could not be tied to their institutional or department culture (no statistical significant results were found), respondents' perceptions of project success could be associated with college/divisional Market culture ($\beta=-.95$, $p<.05$) and college/divisional Hierarchical culture ($\beta=-.70$, $p<.10$).

In chapter 5, the findings will be discussed in light of literature and their implications for ICT implementation project success.

CHAPTER 5: DISCUSSION, LIMITATIONS, AND IMPLICATIONS

The purpose of this study was to examine the relationship between OC and perceptions of ICT implementation project success in HEIs. To examine these relationships, this inquiry was framed by the research question: Do the institutional, college/division and department cultures of an HEI impact faculty, staff, and administrator perceptions of ICT implementation project success?

HEIs continue to be faced with demands to change their business model in response to the changing dynamics of governmental support, declining philanthropy, declining enrollment, and demands from potential students for more flexible, tuition-friendly options for obtaining a college degree. Like many other industries, HEIs are turning to ICT solutions to respond to these changing dynamics. Many attempts to implement ICT solutions meet with failure for several different reasons. Extant literature investigating such failures tends to focus on technical factors, technology failures, poor support from top management, and complexity, but little attention has been paid to the role organizational factors play in ICT implementation success or failure. Seeking to fill the gap in literature, this study sought to leverage STS theory, which posits that, for purposes of investigating the implications of organization context in general and OC specifically on perceptions of ICT implementation project success, an organization should be viewed as a work system which consists of a social subsystem and a technical subsystem. By using the OCAI to collect and analyze data, the CVF was leveraged to understand the complexity of an HEI's social subsystem. The OCAI collected survey participants' perceptions of the culture tendencies at the institutional, college/division and department levels of their institutions that might generate differing opinions about the results of an ICT implementation project. Using a

non-experimental quantitative model, the data obtained via the OCAI analysis was used to understand the impact of an HEI's culture on faculty, staff, and administrator perceptions of ICT implementation project success. Three regression models were run, assessing the impact of departmental cultures on ICT implementation project success; the impact of college/division cultures on ICT project implementation success; and lastly, the impact of institutional culture on the perception of ICT project implementation success. The regression models uncovered two significant findings: a relationship between the Market (Competitive) culture at the college/division level ($\beta = .95$, $p < .05$) and ICT implementation success; and a relationship between the Hierarchical (Control) culture at the college/division level ($\beta = .70$, $p < .10$) and implementation success. No significant relationships were found between department or institutional culture and ICT implementation success.

The remainder of this chapter discusses the findings, the limitations of the study, the use of the findings, and the implications of the findings for both practice and future studies.

Discussion of Findings

Dill (2012) posited that the typical HEI has at least three levels of culture and possibly more, if one considers the various disciplines represented on the typical campus. As such, to understand the findings of this study, it is more useful to unpack the results starting at the lowest organizational level analyzed and move to the highest organizational level analyzed. In organizational research, the department level is accepted as the base organizational level. No instances of a quantitative study providing insight into three levels of OC were found in the literature review for this study. However, based upon the siloed nature of HEIs and the responses

received, this study was able to distinguish between three different levels of each HEI represented in the sample.

Each of the respondents provided their perception of their department, college/division, and institutional cultures. In very few instances across the data set (Figures 7, 11, 13-15, and 20) was there found a respondent assessment of two or more culture levels being identical or very close; and in most cases where it occurred it involved a single department mapped against a college/division. This absence of identical assessment of culture across different levels is particularly noteworthy, given that the 39 respondents indicated membership in 35 departments across the three institutions. Table 9 lists the dominant departmental culture types across the three institutions; it is noteworthy that the most commonly dominant was the Clan culture. Per CVF theory, Clan cultures prefer to operate in environments that exercise flexibility and discretion, as do Adhocracies. On the other hand, Hierarchical and Market cultures are strongly represented, cultures that prefer stability and control and which present opportunity for both synergy and conflict when interacting with departments that have a dominant Clan culture. The dominance of an internal focus (both Clan and Hierarchical) would moderate most interactions. between departments with dominant Clan culture and dominant Hierarchical cultures. However, it is worth noting that institutions A and J contain departments (Figures 9, 10, 16, 17, 18) that have opposite culture types which could lead to conflict and differing opinions about outcomes should the departments work together. For example, the Clan and Market cultures are opposites, hence there exists potential for some conflict in interactions between those departments in Institution A. Likewise, Adhocracy and Hierarchical cultures are opposites, and there exists a

chance of disagreement and conflict when the department with a dominant Adhocracy culture and those with dominant Hierarchical cultures in Institution J work together.

Table 9

Dominant Department Cultures across Institutions

Culture Type	Institution A	Institution D	Institution J
Clan (Collaborative)	5	1	12
Adhocracy (Creative)	0	0	1
Market (Competing)	3	0.5	2
Hierarchical (Controlling)	4	1.5	5
Total	12	3	20

The dominant culture types found across the departments in this study aligned with dominant culture types found across several studies that used the CVF to focus on the institutional OC of HEIs (Kwan & Walker, 2004; Ramachandran et al., 2011; Sanderson, 2006). Similar to the current results, one study by Kleijnen et al. (2009) also found a preference for the Clan culture type at the department level. In the current study it is notable that, despite the diversity of cultures at the department level, the relationship between departmental culture and project success was not statistically significant. Further research is needed to understand why this result was obtained.

Notwithstanding the diversity of culture types at the department level, results obtained at the college/division level based on data supplied by the same respondents showed a statistically significant relationship between college/division Market culture and ICT implementation success. Table 10 documents the dominant college/division cultures across the three institutions. Despite the diverse culture types reported across the departments, culture types at the division level show a significant amount of convergence. The Hierarchical culture type emerges as the

most common dominant culture type across colleges/divisions, with Market in second place, and Clan placing third. As with the departmental OC findings, these findings are consistent with prior literature. Similar to departments, some divisions have opposite culture types. This suggests that tension could arise between these divisions when working together. Given this potential tension and the dominance of the Hierarchical culture across the institution, the Market culture's statistically significant relationship with project success suggests that respondents who identified their college/division as having a dominant culture Market recorded strong responses regarding project success, the reason for which bears further investigation via a subsequent study. Given that most colleges/divisions reported Hierarchical culture, further research is needed to analyze why its relationship with project success was only weakly significant, less so than the same relationship for college/division market Culture.

Table 10

Dominant College/Division Cultures across Institutions

Culture Type	**Institution A**	**Institution D**	**Institution J**
Clan (Collaborative)	0	1	1
Adhocracy (Creative)	0	0	0
Market (Competing)	1	1	1
Hierarchical (Controlling)	5	1	2
Total	6	3	4

The institutional level of analysis showed two institutions with dominant Hierarchical cultures and one institution with a dominant Market Culture, demonstrating consistency with the frequencies of different cultures seen at the colleges/divisions OC level. As with the

departmental and colleges/divisions OC findings, these findings are consistent with prior literature. The regression analysis for the institutional OC level approached but did not reach significance (F=2.059, p=.062, R2 adj=.117). This result is interesting given that Cameron and Ettington (1988), in investigating culture at the institutional level of universities, found a statistically significant relationship between all culture types and organizational effectiveness. It is possible this result would have been more significant with a larger sample size.

Though the results seem somewhat mixed, there are indications of a relationship between OC and ICT implementation success that bears further investigation. The results would seem to lend credence to the STS assertion regarding changes to the technical subsystem of a work system, notably that the social and technical subsystems must be kept in equilibrium to successfully implement changes to the technical system.

Limitations to Generalization

Even after calls for participation were distributed via the Educause Chief Information officer listserv and distribution through other IT community networks, only 45 responses received, of which 39 across three institutions were used as input to this study. Though some significant relationships were discovered, there exists the chance that a larger response pool would uncover different findings. As such the results of this study are not generalizable and should be considered only in the context of the current sample until further research is done with a larger sample size that supports the current findings or find different results. Similarly, the small sample size impacted the ability to gain insights at the department level, although interesting data regarding the diversity of dominant cultures at the departmental levels of institutions was uncovered. Though respondents provided insight on over 30 departments and 13

colleges/divisions across the three institutions, a larger volume of data would have perhaps resulted in significant findings at this level as well.

Additionally, the demographics of the data around roles indicated 56% of respondents identified as staff and 20% as administrators, suggesting a skewness in the population that may not have fully represented the perspective of faculty, who made up less than 24% of the population. Similarly, the ages of the participants were skewed towards older respondents, which may have influenced their culture type perspective, given that HEIs have long been considered the "ivory tower" (Tierney, 2006).

Implications for Practice

Several implications for practice can be taken from this study, even given the small sample size. A direct implication for HEIs is how they approach managing large digital transformation and ICT implementation projects. The OCAI could be used both in advance of and during implementation to provide the project leadership team insight into what OC challenges might impede digital transformation projects as a result of differing institutional, college/division and departmental cultures. When married with the three perspectives on culture as theorized by Jackson (2011), the holistic approach of using the OCAI to diagnose multiple levels of OC can help leadership understand the degree to which their campus cultures evidence an integrated (organization-wide unified), differentiated (multiple subgroups that might indicate conflict) or fragmented (no clear institutional culture with unclear subculture boundaries) culture. Precision in understanding the potential impact of institutional cultures could help administrative leaders determine the appropriate time to initiate a project to allow for changes in OCs that would be more conducive to success. For example, literature regarding the success of digital

transformation projects indicates the need for a "digital culture", a culture that is externally (not internally) focused, seeks delegation over control, encourages calculated risk taking, emphasizes speed and agile iteration, and is heavily collaborative--in other words, a culture that leans more towards the flexible and external scale of the CVF (Hemerling et al., 2018). The data in Tables 9 and 10 show that the cultures of the three institutions in this study are grounded in cultures that seek stability and control, hence the OCAI tool could help organizations take appropriate actions and avoid expensive failures due to OC related challenges in pursuit of digital transformation.

From an ICT leadership perspective, these findings offer a tool that will help IT organizations assist their institutions in selecting ICT initiatives with an acceptable risk profile with regards to the social side of the sociotechnical equation of adopting new technologies. As articulated above, IT leaders can leverage the OCAI technique used in this study to understand the existing culture dynamics and work with senior leadership to construct and execute an appropriate change management strategy that manages inherent risk.

Implications for Future Study

Even considering the small sample size, this study yielded insights about how competing OCs within an organization interact to influence ICT implementation project success. If this study is successfully replicated at a large university, perhaps in a case study in which the interactions of the various cultures can be cataloged and studied, it may offer clues as to the benefits or drawbacks of integrated or differentiated cultures within HEIs. Additionally, a case study approach in partnership with a large HEI may offer an opportunity to engage more faculty participation and further enrich literature on this topic.

Furthermore, this model has implications in other industries in which the need for rapid

technology implementation is necessary to maintain and grow market share.

Chapter Summary

The findings from this study contribute to literature regarding ICT project implementation success at HEIs. The ability to deploy a survey tool and gain concrete data regarding institutional, college/division, and departmental OC that is useful in planning and executing digital transformation efforts could be a game changer and reduce the number of projects that do not realize the intended gains. Additionally, findings with respect to the relationship between OC and ICT project implementation success at the college/division OC level, viewed through the lens of STS, supports the premise that the social and technical subsystems are equally important when planning and executing ICT initiatives.

While the results of the study have limitations, further research in a case study setting will provide additional insights that could be meaningful and useful to higher education leaders, as well as leaders in other industries.

REFERENCES

Abbasi, H., Sajjadi, S. N., & Kazemnejad, A. (2013). Validation of Organizational Culture Assessment Tool (OCAI) based on Competitive Value Framework Model (CVF) in Iran's sports organizations (Federations). *Research in Sport Management and Motor Behavior, 3(5), 85-97.*

Ahmad, T. (2015). Preparing for the future of higher education. *On the Horizon*, *23*(4), 323-330. https://doi.org/10.1108/OTH-06-2015-0029

Ahmadi, S. A. A., Salamzadeh, Y., Daraei, M., & Akbari, J. (2012). Relationship between organizational culture and strategy implementation: Typologies and dimensions. *Global Business and Management Research*, *4*(3/4), 286-299.

Al-Ahmad, W., Al-Fagih, K., Khanfar, K., Alsamara, K., Abuleil, S., & Abu-Salem, H. (2009). A taxonomy of an IT project failure: root causes. *International Management Review*, *5*(1), 93-104.

Al-Hajj, A., & Zraunig, M. (2018). The impact of project management implementation on the successful completion of projects in construction. *International Journal of Innovation, Management and Technology*, *9*(1), 21-27.

Ali Taha, V., Sirkova, M., & Ferencova, M. (2016). The impact of organizational culture on creativity and innovation. *Polish Journal of Management Studies*, *14*(1), 7-17..

Allen, K. A., Ryan, T., Gray, D. L., McInerney, D. M., & Waters, L. (2014). Social media use and social connectedness in adolescents: The positives and the potential pitfalls. *The Educational and Developmental Psychologist*, *31*(1), 18-31.

Allen, M. P. (1997). The problem of multicollinearity. Ch 37 in *Understanding regression analysis*. Springer. https://doi.org/10.1007/978-0-585-25657-3_37

Amin, S. (2013). An effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience: ICT as a change agent for education. *India: Department of Education, University of Kashmir*, *1*, 13. *Scholarly Journal of Education 2*(4), 38-45.

Andreou, P. C., Harris, T., Philip, D., & Zhang, W. (2020). The OCAI textual measure of organizational culture: construct validation documentation. *SSRN Electronic Journal*. https://dx.doi.org/10.2139/ssrn.3625894

Baccarini, D. (1999). The logical framework method for defining project success. *Project Management Journal*, *30*(4), 25-32.

Baker, J. (2012). The technology–organization–environment framework. Ch. 12 in *Information systems theory*. University of Hamburg.

Baldwin, J. R., Faulkner, S. L., Hecht, M. L., & Lindsley, S. L. (Eds.). (2006). *Redefining culture: Perspectives across the disciplines*. Routledge.

Belassi, W., Kondra, A. Z., & Tukel, O. I. (2007). New product development projects: The effects of organizational culture. *Project Management Journal*, *38*(4), 12-24.

Bergquist, W. H. (1992). *The four cultures of the academy*. Jossey-Bass.

Borkovich, D. J., Breese-Vitelli, J., & Skovira, R. J (2015). New technology adoption: Embracing cultural influences. *Issues in Information Systems*, *16*(III), 138-147. https://doi.org/10.48009/3_iis_2015_138-147

Bostrom, R. P., and Heinen, J. S. 1977a. MIS problems and failures: A socio-technical perspective. Part I: The cause. *MIS Quarterly* 1(3), 17-32.

Bostrom, R. P., and Heinen, J. S. 1977b. MIS problems and failures: A socio-technical perspective. Part II: The application of socio-technical theory," *MIS Quarterly 1*(4), 11-28.

Burnes, B., & James, H. (1995). Culture, cognitive dissonance and the management of change. *International Journal of Operations & Production Management 15*(8), 14-33. https://doi.org/10.1108/01443579510094062

Cameron, K. (2008). A process for changing organizational culture. In T. G. Cummings (Ed.), *Handbook of organizational development*, (pp. 429-445). SAGE.

Cameron, K. S., & Ettington, D. (1988). The conceptual foundation of organizational culture. Working paper #544. https://deepblue.lib.umich.edu/bitstream/handle/2027.42/35462/b1410477.0001.001.pdf?sequence=2&isAllowed=y

Cameron, K. S., & Quinn, R. E. (2011). *Diagnosing and changing organizational culture: Based on the competing values framework*. John Wiley & Sons.

Chanchani, S., & Theivananthampillai, P. (2009). Typologies of culture. *SSRN Electronic Journal*. https://dx.doi.org/10.2139/ssrn.1441609

Chatman, J. A., & O'Reilly, C. A. (2016). Paradigm lost: Reinvigorating the study of organizational culture. *Research in Organizational Behavior, 36,* 199-224.

Chen, L., & Nath, R. (2008). A socio-technical perspective of mobile work. *Information Knowledge Systems Management, 7*(1-2), 41-60.

Cherns, A. (1990). Principles of socio-technical design. *The social engagement of social science*, *2*, 314-323.

Choi, Y. S., Seo, M., Scott, D., & Martin, J. (2010). Validation of the organizational culture assessment instrument: An application of the Korean version. *Journal of Sport Management, 24*(2), 169-189.

Cicmil, S., & Hodgson, D. (2006). New possibilities for project management theory: A critical engagement. *Project Management Journal*, *37*(3), 111-122.

Cooper, R. B. (1994). The inertial impact of culture on IT implementation. *Information Management*, *27*(1), 17-31.

Cuellar, M. (2010). Assessing project success: Moving beyond the triple constraint. *eProceedings of the 5th International Research Workshop on Information Technology Project Management (IRWITPM)*, 19-32. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1001&context=irwitpm2010

Damodaran, L. (1996). User involvement in the systems design process: A practical guide for users. *Behaviour & Information Technology*, *15*(6), 363-377.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Delobbe, N., Haccoun, R. R., & Vandenberghe, C. (2002). Measuring core dimensions of organizational culture: A review of research and development of a new instrument. *IAG-LSM Working Papers 02/53.* http://hdl.handle.net/2078/18238

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60-95.

Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization Science, 6*(2), 204-223.

Denison, D. R., & Spreitzer, G. M. (1991). Organizational culture and organizational development: A competing values approach. *Research in Organizational Change and Development, 5*(1), 1-21.

Dennehy, E. (2015). Hofstede and learning in higher level education: An empirical study. *International Journal of Management in Education, 9*(3), 323-339.

Dill, D. D. (2012). The management of academic culture revisited: Integrating universities in an entrepreneurial age. In *Managing reform in universities* (pp. 222-237). Palgrave Macmillan.

Doherty, N. F., & King, M. (1998). The importance of organisational issues in systems development. *Information technology & people, 11*(2), 104-123.

Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and Perspectives, 38*(1), 105-123.

Dvir, D., Raz, T., & Shenhar, A. J. (2003). An empirical analysis of the relationship between project planning and project success. *International Journal of Project Management, 21*(2), 89-95.

Dwivedi, Y. K., Wastell, D., Laumer, S., Henriksen, H. Z., Myers, M. D., Bunker, D., & Srivastava, S. C. (2015). Research on information systems failures and successes: Status update and future directions. *Information Systems Frontiers, 17*(1), 143-157.

Emery, M. (2000). The current version of Emery's open systems theory. *Systemic Practice and Action Research, 13*(5), 623-643.

Ernst, S. J., Janson, A., Söllner, M., & Leimeister, J. M. (2016). It's about understanding each other's culture–Improving the outcomes of mobile learning by avoiding culture conflicts. *SSRN Electronic Journal*. http://dx.doi.org/10.2139/ssrn.3159159

Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research. *Philosophy and Rhetoric*, *10*(2), 130-132.

Fralinger, B., & Olson, V. (2007). Organizational culture at the university level: A study using the OCAI instrument. *Journal of College Teaching & Learning*, *4*(11), 85-98.

Gaddis, P. O. (1959). *The project manager*. Harvard University.

Gallivan, M., & Srite, M. (2005). Information technology and culture: Identifying fragmentary and holistic perspectives of culture. *Information and Organization*, *15*(4), 295-338.

Glass, R. L. (2006). The Standish report: Does it really describe a software crisis?. *Communications of the ACM*, *49*(8), 15-16.

Goffee, R., & Jones, G. (1996). What holds the modern company together? *Harvard Business Review, November-December,*133-148.

Goulielmos, M. (2003). Outlining organizational failure in information systems development. *Disaster Prevention and Management: An International Journal*, *12*(4), 319-327.

Govender, N. M., & Pretorius, M. (2015). A critical analysis of information and communications technology adoption: The strategy-as-practice perspective. *Acta Commercii*, *15*(1), 1-13.

Gregory, B. T., Harris, S. G., Armenakis, A. A., & Shook, C. L. (2009). Organizational culture and effectiveness: A study of values, attitudes, and organizational outcomes. *Journal of Business Research*, *62*(7), 673-679.

Hall, N.G. (2012). Project management: Recent developments and research opportunities. *J. Syst. Sci. Syst. Eng. 21*, 129–143. https://doi.org/10.1007/s11518-012-5190-5

Hameed, M. A., Counsell, S. & Swift, S. (2012). A conceptual model for the process of IT innovation adoption in organizations. *Journal of Engineering & Technology Management*, *29*(3), 358-390.

Handy, C. B. (1976). So you want to change your organisation? Then first identify its culture. *Management Education and Development*, *7*(2), 67-84.

Hastie, S., & Wojewoda, S. (2015, October 4). Standish Group 2015 Chaos Report - Q&A with Jennifer Lynch. https://www.infoq.com/articles/standish-chaos-2015/

Heeks, R. (1999). Information and communication technologies, poverty and development. Development Informatics Working Paper 5. *SSRN Electronic Journal*. https://dx.doi.org/10.2139/ssrn.3477770

Heritage, B., Pollock, C., & Roberts, L. (2014). Validation of the organizational culture assessment instrument. *PloS One*, *9*(3), e92879. https://doi.org/10.1371/journal.pone.0092879

Hemerling, J., Kilmann, J., Danoesastro, M., Stutts, L., & Ahern, C. (2018, April 13). It's not a digital transformation without a digital culture. *Boston Consulting Group*. https://www.bcg.com/publications/2018/not-digital-transformation-without-digital-culture

Hinton, P., McMurray, I., & Brownlow, C. (2014). *SPSS explained*. Routledge.

Hofstede, G. (1998a). Identifying organizational subcultures: An empirical approach. *Journal of Management Studies*, *35*(1), 1-12.

Hofstede, G. (1998b). Attitudes, values and organizational culture: Disentangling the concepts. *Organization Studies*, *19*(3), 477-493.

Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, *2*(1), 2307-0919.

Hofstede, G., Hofstede, G. J., & Minkov, M. (2005). *Cultures and organizations: Software of the mind* (Vol. 2). McGraw-Hill.

Hornstein, H. A. (2015). The integration of project management and organizational change management is now a necessity. *International Journal of Project Management*, *33*(2), 291-298.

Howell, G., Macomber, H., Koskela, L., & Draper, J. (2004, August). Leadership and project management: time for a shift from Fayol to Flores. In *Proceedings of the 12th Annual Conference of the International Group for Lean Construction (IGLC-12)* (pp. 22-29).

Hughes, D. L., Dwivedi, Y. K., Simintiras, A. C., & Rana, N. P. (2016). Project failure and its contributing factors. In *Success and failure of IS/IT projects* (pp. 3-25). Springer.

Ika, L. A. (2009). Project success as a topic in project management journals. *Project Management Journal*, *40*(4), 6-19.

Imran, M. K., Rehman, C. A., Aslam, U., & Bilal, A. R. (2016). What's organization knowledge management strategy for successful change implementation? *Journal of Organizational Change Management*, *29(*7), 1097-1117. https://doi.org/10.1108/JOCM-07-2015-0130

Ives, B., & Olson, M. H. (1984). User involvement and MIS success: A review of research. *Management Science*, *30*(5), 586-603.

Jackson, S. (2011). Organizational culture and information systems adoption: A three-

perspective approach. *Information and Organization*, *21*(2), 57-83.

Jahoda, G. (2012). Critical reflections on some recent definitions of "culture". *Culture & Psychology*, *18*(3), 289-303.

Jørgensen, M., & Moløkken-Østvold, K. (2006). How large are software cost overruns? A review of the 1994 CHAOS report. *Information and Software Technology*, *48*(4), 297-301.

Jugdev, K., & Müller, R. (2005). A retrospective look at our evolving understanding of project success. *Project Management Journal*, *36*(4), 19-31.

Kerzner, H. (2013). *Project management: A systems approach to planning, scheduling, and controlling*. John Wiley & Sons.

Kimberly, J. R., & Quinn, R. E. (1984). *Managing organizational transitions*. McGraw-Hill/Irwin.

King, G., & Sen, M. (2013). The troubled future of colleges and universities. *PS:Political Science & Politics*, *46*(1), 83-89. https://doi.org/10.1017/S1049096512001606

Kleijnen, J., Dolmans, D., Muijtjens, A., Willems, J., & Van Hout, H. (2009). Organisational values in higher education: Perceptions and preferences of staff. *Quality in Higher Education*, *15*(3), 233-249.

Kroeber, A. L., & Kluckhohn, C. (1952). Culture: A critical review of concepts and definitions. *Peabody Museum of Archaeology and Ethnology at Harvard University*, *47*(1), viii, 223. https://www.peabody.harvard.edu/node/304

Kwak, Y. H. (2005). Brief history of project management. In E. G. Carayannis, Y. H. Kwak, & F. Anbari (Eds.), *The story of managing projects* (pp. 1-9). Greenwood.

Kwan, P., & Walker, A. (2004). Validating the competing values model as a representation of organizational culture through inter-institutional comparisons. *Organizational Analysis 12*(1), 21-37. http://dx.doi.org/10.1108/eb028984

Kyakulumbye, S., Nabacwa, M., Opio, P., Kabanda, M., Kyasanku, G., Olweny, M., Sebowa, E., Aryamanya, A. & Ahumuza, V. (2018). *Project planning and management management: Tools, techniques and strategies of managing projects*. Kindle.

Land, F. (2000). Evaluation in a socio-technical context. In R. Baskerville, J. Stage, J. I. DeGross, J.I. (Eds.), *Organizational and social perspectives on information technology* (pp. 115-126). IFIP—The International Federation for Information Processing, vol. 41. Springer.

Larsen, T. J. (2001, April). The phenomenon of diffusion. In M. A. Ardis & B. L. Marcolin, (Eds.). *Diffusing software product and process innovations* (pp. 35-50). TDIT 2001. IFIP—The International Federation for Information Processing, vol 59. Springer. https://doi.org/10.1007/978-0-387-35404-0_4

Lech, P. (2013). Time, budget, and functionality? IT project success criteria revised. *Information Systems Management*, *30*(3), 263-275.

Leidner, D. E., & Kayworth, T. (2006). Review: A review of culture in information systems research: Toward a theory of information technology culture conflict. *MIS Quarterly*, *30*(2), 357-399.

Liu, Z., Min, Q., & Ji, S. (2008, October). A comprehensive review of research in IT adoption. In *2008 4th International Conference on Wireless Communications, Networking and Mobile Computing* (pp. 1-5). IEEE.

Lucas, H. (2014). Disrupting and transforming the university. *Communications of The ACM*, *57*(10), 32-35. https://doi.org/10.1145/2661055

Lyytinen, K., & Hirschheim, R. (1988). Information systems failures—a survey and classification of the empirical literature. In P. Zorkoczy (Ed.), *Oxford surveys in information technology* (pp. 257-309). Oxford University Press.

Mahmud, K., & Gope, K. (2009). Challenges of implementing e-learning for higher education in least developed countries: A case study on Bangladesh. *2009 International Conference on Information and Multimedia Technology*, pp. 155-159. https://doi.org/10.1109/ICIMT.2009.27

Markus, M. L. (2004). Technochange management: Using IT to drive organizational change. *Journal of Information Technology*, *19*(1), 4-20.

McLeod, L., & MacDonell, S. G. (2011). Factors that affect software systems development project outcomes: A survey of research. *ACM Computing Surveys (CSUR)*, *43*(4), 24.

Minkov, M., & Hofstede, G. (2011). The evolution of Hofstede's doctrine. *Cross cultural management: An international journal*, *18*(1), 10-20.

Mirvis, P. H., Sales, A. L., & Hackett, E. J. (1991). The implementation and adoption of new technology in organizations: The impact on work, people, and culture. *Human Resource Management*, *30*(1), 113-139.

Morris, P.W.G., & Pinto, J. K. (eds) (2004). *The Wiley guide to managing projects.* John Wiley & Sons.

Müller, R., & Jugdev, K. (2012). Critical success factors in projects: Pinto, Slevin, and Prescott-

the elucidation of project success. *International Journal of Managing Projects in Business*, *5*(4), 757-775.

Mumford, E. (2000). A socio-technical approach to systems design. *Requirements Engineering*, *5*(2), 125-133.

Mumford, E. (2006). The story of socio-technical design: Reflections on its successes, failures and potential. *Information Systems Journal*, *16*(4), 317-342.

Naor, M., Goldstein, S. M., Linderman, K. W., & Schroeder, R. G. (2008). The role of culture as driver of quality management and performance: infrastructure versus core quality practices. *Decision Sciences*, *39*(4), 671-702.

Naidoo, V. (2002). Organizational culture and subculture influences on the implementation and outcomes of aspects on internal quality assurance initiates. In *International Conference of the Higher Education Research and Development Society of Australasia (HERDSA), Perth, Western Australia*.

Naqshbandi, M. M., Kaur, S., & Ma, P. (2015). What organizational culture types enable and retard open innovation? *Quality & Quantity*, *49*(5), 2123-2144.

Naranjo-Valencia, J. C. N., Valle, R. S., & Jiménez-Jiménez, D. J. (2010). Organizational culture as determinant of product innovation. *European Journal of Innovation Management, 13*(4), 466-480.

Nguyen, T. H., Newby, M., & Macaulay, M. J. (2015). Information technology adoption in small business: Confirmation of a proposed framework. *Journal of Small Business Management, 53*(1), 207-227.

Odor, H. O. (2018). Organisational culture and dynamics. *Global Journal of Management and Business Research*, *18*(A1), 23–29. https://journalofbusiness.org/index.php/GJMBR/article/view/2406

Ogbonna, E., & Harris, L. C. (2000). Leadership style, organizational culture and performance: empirical evidence from UK companies. *International Journal of Human Resource Management*, *11*(4), 766-788.

Ovseiko, P. V., & Buchan, A. M. (2012). Organizational culture in an academic health center: An exploratory study using a Competing Values Framework. *Academic Medicine*, *87*(6), 709-718.

Owusu-Ansah, S. (2013). Application of information and communication technology (ICT): A comparative analysis of male and female academics in Africa. *Library Philosophy and Practice (ejournal)*. 1087. http://digitalcommons.unl.edu/libphilprac/1087

Padalkar, M., & Gopinath, S. (2016). Six decades of project management research: Thematic trends and future opportunities. *International Journal of Project Management*, *34*(7), 1305-321.

Pasmore, W. A. (1988). *Designing effective organizations: The sociotechnical systems perspective*. John Wiley & Sons.

Pasmore, W. A. (1995). Social science transformed: the socio-technical perspective. *Human Relations*, *48*(1), 1-21.

Peansupap, V., & Walker, D. H. (2006). Innovation diffusion at the implementation stage of a construction project: A case study of information communication technology. *Construction Management and Economics*, *24*(3), 321-332.

Peruski, L., Mishra, P., & Rosaen, C. (2006, March). Technology diffusion in the culture of higher education. In *Society for Information Technology & Teacher Education International Conference* (Vol. 2006, No. 1, pp. 1731-1736).

Petter, S., DeLone, W., & McLean, E. R. (2013). Information systems success: The quest for the independent variables. *Journal of Management Information Systems*, *29*(4), 7-62.

Pinto, J. K., & Slevin, D. P. (1988). Project success: Definitions and measurement techniques. *Project Management Journal, XIX*(1), 67-72.

Pollack, J., Helm, J., & Adler, D. (2018). What is the Iron Triangle, and how has it changed? *International Journal of Managing Projects in Business, 11*. https://doi.org/10.1108/IJMPB-09-2017-0107

Prabhakar, G. P. (2008). What is project success: A literature review. *International Journal of Business and Management, 3*(9), 3-10.

Prajogo, D. I., & McDermott, C. M. (2005). The relationship between total quality management practices and organizational culture. *International Journal of Operations & Production Management*. *25*(11), 1101-1122. https://doi.org/10.1108/01443570510626916

Project Management Institute (2013). *A guide to the project management body of knowledge (PMBOK® Guide)—Fifth Edition*. https://repository.dinus.ac.id/docs/ajar/PMBOKGuide_5th_Ed.pdf

Quinn, R. E., & Rohrbaugh, J. (1981). A competing values approach to organizational effectiveness. *Public Productivity Review 5*(2), 122-140. https://doi.org/10.2307/3380029

Rahn, M. (2018, January 4). *Factor analysis: A short introduction, part 5-Dropping unimportant*

variables from your analysis. The Analysis *Factor*. https://www.theanalysisfactor.com/factor-analysis-5/

Ramachandran, S. D., Chong, S. C., & Ismail, H. (2011). Organisational culture: An exploratory study comparing faculties' perspectives within public and private universities in Malaysia. *International Journal of Educational Management, 25*(6), 615-634.

Rashid, Z. A., Sambasivan, M., & Rahman, A. A. (2004). The influence of organizational culture on attitudes toward organizational change. *Leadership & Organization Development Journal*, *25*(2), 161-179.

Robey, D., Smith, L. A., & Vijayasarathy, L. R. (1993). Perceptions of conflict and success in information systems development projects. *Journal of Management Information Systems*, *10*(1), 123-140.

Rogers, E.M. (2003) *Diffusion of innovations*. Free Press.

Rose, A., & Kadvekar, S. (2015). ICT (information and communication technologies) adoption model for educational institutions. *Journal of Commerce and Management Thought, 6*(3), 558-570.

Rouse, M., 2019. *What is ICT (Information and Communications Technology)?* SearchCIO. https://searchcio.techtarget.com/definition/ICT-information-and-communications-technology-or-technologies

Sanderson, D. M. (2006). *Using a competing values framework to examine university culture.* (Master's thesis, Queensland University of Technology). https://eprints.qut.edu.au/16464/3/Don_Sanderson_Thesis.pdf

Sarker, S., Chatterjee, S., Xiao, X., & Elbanna, A. (2019). The sociotechnical axis of cohesion

for the IS discipline: Its historical legacy and its continued relevance. *MIS Quarterly*, *43*(3), 695-720.

Schein, E. H. (1990). Organizational culture. *American Psychologist, 45*(2), 109–119. https://doi.org/10.1037/0003-066X.45.2.109.

Schwalbe, K. (2015). *Information technology project management*. Cengage Learning.

Selwyn, N. (2008). An investigation of differences in undergraduates' academic use of the internet. *Active Learning in Higher Education*, *9*(1), 11-22.

Seymour, T., & Hussein, S. (2014). The history of project management. *International Journal of Management & Information Systems (IJMIS)*, *18*(4), 233-240.

Shokri-Ghasabeh, M., & Kavoousi-Chabok, K. (2009). Generic project success and project management success criteria and factors: Literature review and survey. WSEAS Transactions on Business and Economics, 8(6), 456-468. http://www.wseas.us/e-library/transactions/economics/2009/32-503.pdf

Skoumpopoulou, D., & Nguyen-Newby, T. (2015). The organizational impact of implementing information systems in higher education institutions: A case study from a UK university. *Strategic Change*, *24*(5), 463-482. https://doi.org/10.1002/jsc.2022

Smart, J. C., & St. John, E. P. (1996). Organizational culture and effectiveness in higher education: A test of the “culture type” and “strong culture” hypotheses. *Educational Evaluation and Policy Analysis*, *18*(3), 219-241.

Smith P., Bond M. (2018) Cultural dimensions theory. In V. Zeigler-Hill & T. Shackelford (Eds.), *Encyclopedia of personality and individual differences*. Springer. https://doi.org/10.1007/978-3-319-28099-8_2093-1

Stretton, A. (2007). A short history of modern project management. *PM World Today, 9*(10), 1-18.

Taherdoost, H. (2016). Validity and reliability of the research instrument: How to test the validation of a questionnaire/survey in a research. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.3205040

Tams, S. (2013). Moving cultural information systems research toward maturity. *Information Technology & People, 26*,(4), 383-400.

Taras, V., Rowney, J., & Steel, P. (2009). Half a century of measuring culture: Review of approaches, challenges, and limitations based on the analysis of 121 instruments for quantifying culture. *Journal of International Management, 15*(4), 357-373.

The Standish Group. (1995). Chaos. https://www.csus.edu/indiv/r/rengstorffj/obe152-spring02/articles/standishchaos.pdf

Then, K. A., & Amaria, P. (2013). Factors related to the adoption of IT emerging technologies by research and non-research based higher education institutions. *Research in Higher Education Journal, 19*. https://files.eric.ed.gov/fulltext/EJ1064640.pdf

Tierney, W. G. (1988). Organizational culture in higher education: Defining the essentials. *The Journal of Higher Education, 59*(1), 2-21.

Tierney, W. G. (2006). The changing nature of organizational leadership and culture in academic work. *Journal of Research on Leadership Education, 1*(1), 1-3.

Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). *Processes of technological innovation*. Lexington Books.

Van Huy, N., Thu, N.T.H., Anh, N.L.T., Au, N.T.H., Phuong, N.T., Cham, N.T., & Minh, P.D. (2020). The validation of organisational culture assessment instrument in healthcare setting: Results from a cross-sectional study in Vietnam. *BMC Public Health*, 20, Article 316. https://doi.org/10.1186/s12889-020-8372-y

Vesisenaho, M., & Dillon, P. (2013). Localising and contextualising information and communication technology in education: a cultural ecological framework. *Pedagogy, Culture & Society*, *21*(2), 239-259.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Victor, A., A., & Bolanle, R. R. (2017). Extent of information and communication technology (ICT) utilization for students' learning in tertiary institutions in Ondo State, Nigeria. *International Journal of Advance Research and Innovative Ideas In Education, 3*, 2369-2376.

Vom Brocke, J., & Sinnl, T. (2011). Culture in business process management: A literature review. *Business Process Management Journal, 17*(2):357-378. https://doi.org/10.1108/14637151111122383

Walsh, I., & Kefi, H. (2008). The role of IT culture in IT management: Searching for individual archetypal IT cultural profiles. *AMCIS 2008 Proceedings*, 185. https://aisel.aisnet.org/amcis2008/185

Warren, J., & Myungsin, C. (2007). Culture, organizational dynamics and workflow implementation: the case of a failed implementation. *Journal of Information Technology Case and Application Research, 9*(1), 20-37.

Wateridge, J. (1998). How can IS/IT projects be measured for success? *International Journal of Project Management, 16*(1), 59-63.

Westerveld, E. (2003). The Project Excellence Model®: Linking success criteria and critical success factors. *International Journal of Project Management, 21*(6), 411-418.

Whetton, S., & Georgiou, A. (2010). Conceptual challenges for advancing the socio-technical underpinnings of health informatics. *The Open Medical Informatics Journal, 4,* 221-224. https://doi.org/10.2174%2F1874431101004010221

Whittaker, B. (1999). What went wrong? Unsuccessful information technology projects. *Information Management & Computer Security, 7(1), 23-30.*

Woodhouse, K. (2015, September 28). Closures to triple. *Inside Higher Ed.* https://www.insidehighered.com/news/2015/09/28/moodys-predicts-college-closures-triple-2017

Yamazaki, Y. (2005). Learning styles and typologies of cultural differences: A theoretical and empirical comparison. *International Journal of Intercultural Relations, 29*(5), 521-548.

Yu, T., & Wu, N. (2009). A review of study on the competing values framework. *International Journal of Business and Management, 4*(7), 37-42.

Zhu, C. (2015). Organisational culture and technology-enhanced innovation in higher education. *Technology, Pedagogy and Education, 24*(1), 65-79.

APPENDICES

Appendix A: IRB Approval

UNF
UNIVERSITY of NORTH FLORIDA.

Office of Research and Sponsored Programs
1 UNF Drive
Jacksonville, FL 32224-2665
904-620-2455 FAX 904-620-2457
Equal Opportunity/Equal Access/Affirmative Action Institution

MEMORANDUM

DATE: July 11, 2022

UNF IRB Number: 1927924-2
Approval Date: 07-11-2022
Processed on behalf of UNF's IRB _aj___

TO: Mr. Reginald Brinson

VIA: Dr. Amanda Pascale
Leadership, School Counseling & Sport Management

FROM: Dr. Jennifer Wesely, Chairperson
On behalf of the UNF Institutional Review Board

RE: Review of New Project by the UNF Institutional Review Board
IRB#1927924-2 "The Effect of Organizational Culture on Higher Education Information Communication Technology Implementation Outcomes"

This is to advise you that your above-refenced study underwent "Expedited" review on behalf of the UNF Institutional Review Board and has been approved under category 7.

This approval applies to your study in the form and content as submitted to the IRB for review. Any modifications to the approved procedures or documents must be submitted to the IRB for review prior to implementation, including personnel changes. To submit an amendment to your approved protocol, please complete an **Amendment Request Document** and upload it along with any updated materials affected by the changes via a new package in IRBNet. For additional guidance on submitting an amendment, please contact an IRB administrator.

Please be advised that any subject complaints, unanticipated problems, or adverse events that occur are to be reported to the IRB as soon as practicable, but no later than 3 business days following the occurrence. Please use the **Event Report Form** to submit information about such events.

Upon completion of this study, please submit a **Closure Report Form** within a new package in IRBNet. Please maintain copies of all research-related materials for a minimum of 3 years

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following study closure. These records include the IRB-approved protocol, approval memo, questionnaires, survey instruments, consent forms, and all IRB correspondence.

Should you have questions regarding this determination, please contact the Research Integrity unit of the Office of Research and Sponsored Programs by emailing IRB@unf.edu or calling (904) 620-2455.

UNF IRB Number: 1927924-2
Approval Date: 07-11-2022
Processed on behalf of UNF's IRB _aj___

Appendix B: Email Solicitation

Brinson, Reggie

From: EDUCAUSE Connect <DoNotReply@ConnectedCommunity.org>
Sent: Monday, July 25, 2022 12:15 AM
To: Brinson, Reggie
Subject: CIO Digest for Sunday July 24, 2022

CAUTION! This email came from outside of Morehouse School of Medicine. Exercise extra caution clicking links and opening attachments from any and all senders.

CIO

Post New Topic

Jul 24, 2022

Discussions

started 8 hours ago, Reggie Brinson (0 replies)

Research Project: The Effect of Organizational Culture on Higher Education Information Communication Technology Implementation Outcomes

1. Good day colleagues. I am writing to ask your... Reggie Brinson

1. Research Project: The Effect of Organizational Culture on Higher Education Information Communication Technology Implementation Outcomes

Jul 24, 2022 2:07 PM | view attached
Reggie Brinson

Good day colleagues.

I am writing to ask your assistance with a research project, the focus of which has been my life's work. I am seeking data to assess the impact of an institution's organizational culture on the outcomes of Information Communications Technology projects which are critical components of an organizational change or digital transformation effort. Literature asserts 70% of such projects do not deliver the expected benefit and the Harvard Business Review (2019 article) suggests the organization and not technology may be the driver for such failures. The project seeks to analyze

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data at the organizational level and as such will generate the best results with participation across an institutions community.

Please see the attached recruitment letter for more information. You will note I am a student at the University of North Florida, but currently serve as Chief Information Officer at the Morehouse School of Medicine (rwbrinson@msm.edu).

I would be more than happy to share the research results with any interested party.

Thank you in advance for your consideration.

Reggie Brinson
Chief Information Officer
Morehouse School of Medicine

Reply to Group **Reply to Sender Online** **Post New Topic**

By using this service, you are accepting the EDUCAUSE Connect Terms and Conditions. You are subscribed to "CIO" as Rwbrinson@msm.edu. To change your subscriptions, go to My Subscriptions. To unsubscribe from this community discussion, go to Unsubscribe.

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Appendix C: Recruitment Letter

Dear Potential Participant:

We are writing to ask if you are willing to participate in a new research study being conducted at the University of North Florida? This research is important to gaining a better understanding of the impact of a higher education institution's organizational culture on transformative Information Communications Technology (ICT) initiatives. Information Communications Technology is a term popularized in the early 2000s to connote a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information typically through communications across the internet.

In higher education, ICT covers a range of technology tools like Canvas, D2L, Starfish, AcademicWorks, Clockworks, Student Club portal, StarRez, Watermark, Campus Labs (Anthology), Class (Blackboard Collaborate), You at College, Workday, Banner 9 Self-Service portal, WebAdMIT, CollegeNET, Ellucian Elevate, Zoom, Microsoft Teams, Degree Works, iDonate, GivePulse, SignUpGenius, Medicat , Point-and-Click or any custom software designed to facilitate teaching, learning, research and administrative functions. Many higher education institutions implemented new ICT solutions or used existing ICT solutions in more innovative ways as a means of maintaining operations during the COVID pandemic. Successful adoption of ICT is now critical to the academic and administrative functioning of higher education institutions. However, cross-industry research indicates 70% of transformative ICT initiatives, including those enabling organizational change and digital transformation efforts fail to deliver the planned benefit and have major financial implications for organizations. In a 2019 article, the Harvard Business Review argues these failures are not about ICT, but the organization.

The following information summarizes the study and what it involves:

The Effect of Organizational Culture on Higher Education Information Communication Technology Implementation Outcomes

Study Purpose: *This study will investigate whether differences in a higher education institution's departmental, divisional, and institutional cultures influence the level of cooperation and conflict experienced by you or others during the implementation of transformative ICT initiatives and how such experiences influence project success or failure.*

Participation Requirements: *Participants in this study will be asked to complete a 15 to 20 minute survey to share their perceptions of a recent transformative ICT initiative at their institution.*

Contact Information:

For questions about this study, contact Reggie Brinson at N00082384@unf.edu.

Participation is voluntary and there are no penalties for deciding not to participate.

To participate in this research project, please follow the link below:
https://unf.co1.qualtrics.com/jfe/form/SV_a5EQbGunD9P1ZEG

Sincerely,

Reggie Brinson

Appendix D: Informed Consent Document

Informed Consent Document*

My name is Reggie Brinson, and I am a doctoral student, at the University of North Florida (UNF). We are conducting a research study on Information Communication Technology (ICT) implementation to understand the impact of a Higher Education Institution's culture on the perception of ICT implementation outcomes.

The study seeks the perception of higher education institution employees who have been involved or impacted by an academic or administrative information communications technology (ICT) implementation in the last two years. Employees under the age of 18 will not be included. If you meet these criteria and agree to take part in my project, you will be asked to complete an online survey to share your perceptions of the organizational culture at the departmental, division and institutional levels of your institution and how they influenced cooperation and/or conflict that led to the success or failure of the ICT project. We expect that participation in this study will take 15 to 20 minutes of your time. Your responses will be confidential. Only the principal investigator of the research will have access to your responses.

Although there are no direct benefits to you or compensation for taking part in this study, others may benefit from the information we learn from the results of this study. Great care will be taken to protect your information; however, there is a risk the combination of the institution name, department name and the demographics data collected could lead to indirect identification of a participant if exposed. To minimize this risk and maintain confidentiality, the researcher will take steps to: (1) ensure the IP Address of the device used to respond to the survey is not collected, (2) employ the security protocol (TLS) used to protect online financial transactions and health data to protect your responses in transit, (3) ensure the data collected is stored in an encrypted database in the Qualtrics data center, (4) replace your institution and department names with research codes (e.g., Institution A, Department Gamma) so that your response may not be traced back to your institution, department or you and (5) . maintain and store a master list of research codes in an encrypted file on a UNF server. The collected data will be aggregated by institution and departments within the institution (e.g., Institution A, Department Gamma, Department Omega, etc.) for analysis with no direct reference to individual participants. Your responses will be disclosed only with your permission or as required by law. You may choose not to participate in this research without negatively impacting your relationship with the researcher or the University of North Florida.

If you have any questions or concerns about this project, please contact me at N00082384@unf.edu. You may print a copy of this form to keep for your records.

If you have questions about your rights as a research participant or if you would like to contact someone about a research-related injury, please contact the chair of the UNF Institutional Review board by calling (904) 620-2498 or emailing irb@unf.edu.

Thank you for your consideration.

Respectfully,

Reggie Brinson
Phone: 404-374-2415
Email: N00082384@unf.edu

Dr. Amanda Blakewood Pascale
Phone: 904-620-5530
Email: Amanda.Pascale@unf.edu

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I _____(print name) attest that I am at least 18 years of age and agree to take part in this research study.

Signature: _____ Date: _____

Appendix E: Permission to Use OCAI, ©Kim Cameron

Re: Permission to Use the Organization Culture Assessment Instrument (OCAI) for Dissertation Research

Meredith Smith <meredithbusiness@gmail.com>
Tue 12/7/2021 11:21 AM
To: Brinson, Reginald <n00082384@unf.edu>

Dear Reginald,

Thank you for your inquiry regarding the Organizational Culture Assessment Instrument (OCAI). Kim Cameron copyrighted the OCAI in the 1980s, but because it is published in the Diagnosing and Changing Organizational Culture book, it is also copyrighted by Jossey Bass.

The instrument may be used free of charge for research or student purposes, but a licensing fee is charged when the instrument is used by a company or by consulting firms to generate revenues. As a graduate student you may use it free of charge. Please be sure all surveys and your dissertation include the appropriate copyright information (© Kim Cameron). Professor Cameron appreciates you sharing your results with him when you finish your study.

We do have a local company (BDS, Behavioral Data Services, 734-663-2990, Sherry.Slade@b-d-s.com) which can distribute the instrument on-line, tabulate scores, and produce feedback reports for a fee. These reports include comparison data from approximately 10,000 organizations--representing many industries and sectors, five continents, and approximately 100,000 individuals.

I hope this explanation is helpful. Congratulations on your program, and I wish you well on your project.

Best wishes,

Meredith Smith

Assistant to Kim Cameron