ALIGNING FACILITY MANAGEMENT WITH AN ORGANIZATION'S CORE BUSINESS

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Abstract

Facility management is a profession in which facility managers are employed to manage a diverse set of services, personnel, and built environments to accomplish organizational goals. Four research questions were used to examine the maturity level of facility management in a university environment. How does strategic alignment compare facility management services with an organization's core business? How are facility management services considered essential to an organization's core business? How do facility management services provide value to an organization's core business? How does facility management's reputation play a role in the alignment of facility management services with an organization's core business? Chapter 1 introduces the study's problem, the purpose of the study, and the contributions this study makes to the field of organizational and facility management. Chapter 2 discusses the competing values model, which represents the theoretical framework of the study. Chapter 3 provides a discussion of the research design used in the study. Eight hypotheses are used in Chapter 4 to test the research questions. Chapter 5 provides a discussion of the results and recommendations for further research. The study findings showed limited support for the maturity relationship asked by the research questions. For example, the study findings showed significant support for the maturity relationship between facility management reputation and an organization's core business. In contrast, the study findings showed little support for the maturity relationship between facility services, facility essential services, and the value of facility services. Future research should employ quantitative designs to examine further the theoretical framework of facility management.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

Facility management coordinates the interaction of employees with an organization's physical environment (Yiu, 2008). Facility management has an established role in organizations. However, facility management has been slow to gain recognition as a strategic contributor to an organization's core business (Kaya, Heywood, Arge, Brawn, & Alexander, 2004). Organizational misperceptions and the inability of facility management to translate intangible services into organizational outcomes contribute to facility management's slow recognition (Kaya et al., 2004). Price (2002) and Yiu (2008) attribute facility management's failure to integrate into an organization's core business as an identity crisis. In addition, Carder (1995), Shiem-Shin Then (1999), and Coenen, von Felten, and Schmid (2010) cite relationship issues, such as facility managers focusing too much on their technical role rather than on delivering quality services and enhancing the reputation of facility management.

On a much broader scale, researchers point to reputational issues of facility management (Coenen et al., 2010). Senior management's expectation is for facility management to ensure that the environment in which employees operate is clean and well maintained. However, senior management has difficulty understanding how a clean and well-maintained facility affects the organization's core business. Facility management

provides a diverse array of tangible and intangible services, such as real estate management and pest control management (Chotipanich, 2004; Yiu, 2008). Aligning these diverse services into an organization's core business presents a significant challenge because the services provided by facility management do not fit strategically with an organization's core business (Price, 2002).

Facility management's reputation also contributes to how facility management is perceived. Facility management has few opportunities to establish a reputation with university students, staff, and faculty and even fewer opportunities with those outside of the organization (Coenen et al., 2010). Because of facility management's poor reputation, inability to translate intangibles, and focusing too much on the technical aspect of the field, facility management is often misunderstood. Due to these issues, strategically aligning facility management with an organization's core business is a challenge.

Background of the Study

Facility management has not achieved the status and recognition of other management disciplines, such as leadership management, organizational management, or financial management. Lack of empirical research, lack of publications in peer reviewed and scholarly management journals, and lack of interest by leading management scholars to conduct research in facility management have contributed to the current state of scholarly research in facility management (Anker Jensen et al., 2012; Ventovuori, Lehtonen, Salonen, & Nenonen, 2007; Yiu, 2008). Another factor that has contributed to the current state of scholarly research in facility management is the absence of facility

management educational programs at major research universities (Anker Jensen et al., 2012; Ventovuori et al., 2007; Yiu, 2008).

A goal of this study was to bring facility management to the attention of leading management scholars. This research study expands the research in facility management by establishing an overall research design approach for studying facility management. This research study is one of the first to examine quantitatively the construct of facility management alignment with an organization's core business strategy using a research design approach that is causal comparative. For example, case study appears to be the chosen research methodology of previous research in facility management (Ventovuori et al., 2007). This research study contributes to organizational management by introducing facility management to organizational theorists, industrial psychologists, and other academics that have an interested in studying organizations.

Statement of the Problem

The Management Problem

Due to misperceptions (Kaya et al., 2004), reputational issues (Coenen et al., 2010), and the lack of a knowledge base and research (Alexander, 1992; Nutt, 1999), aligning facility management with an organization's core business poses a challenge. A literature review and a survey of facility managers were used to study the root causes of the issues facing facility managers.

A level of misunderstanding of facility management, rather than a field in crisis, may be the cause of the misunderstanding. Dettwiler, Waheed, and Fernie (2009) recognized that facility management was misunderstood but suggested that

misunderstanding should not disqualify facility management's strategic importance. Dettwiler et al. (2009) argued that facility management is a strategic and important function by suggesting that facility management fits within Porter's value chain framework.

Reputational issues may be countered by arguing that facility management adds value to an organization. Uline and Tschannen-Moran (2008) surveyed 80 middle-school teachers and found that the quality of a facility had an effect on student performance. Uline, Earthman, and Lemasters (2009) found that teacher attitudes were different in schools in good condition than in schools in bad condition.

The study used the Strategic Alignment Maturity survey instrument to measure the level of maturity alignment between facility management and an organization's core business. The survey instrument was used to measure the level of alignment on the following factors: (a) facility services, (b) essentialness of facility services, (c) value of facility services, and (d) reputation of facility management.

Although reputation, lack of knowledge, research, and misperceptions present significant problems for the facility management field, the literature suggests that facility management can overcome these issues by clearly defining facility management's role within an organization.

Purpose of the Study

The purpose of this study was to compare the alignment between facility management services and an organization's core business from the perspective of strategic alignment. Facility management services are defined as the services provided

by facility management (Kok, Mobach, & Omta, 2011). Strategic alignment is defined as successful outcomes of the alignment between organizational functional units and the strategic alignment of core business strategy (Martinez-Olvera, 2010).

Rationale

Four research questions and eight hypotheses were used to compare the relationship between facility management and an organization's core business. A quantitative non-experimental, comparative, cross-sectional survey research design was also used to investigate the relationship between facility management and an organization's core business. The rationale for selecting these approaches was fourfold. First, the research questions sought to compare the relationship between facility management alignment and an organization's core business. Second, the hypotheses were used to test the comparisons between facility management and an organization's core business. Third, a non-experimental, comparative design may be used to identify the differences between variables without implying a causal relationship (Schenker & Rumrill, 2004). Fourth, a non-experimental, comparative design is correct for data collected from study participants. The specific data collected by this study was based on the relationships that exist between facility management and an organization's core business. A survey instrument was used to collect primary source data from the study's participants. Comparative research attempts to show the magnitude of differences that exist between variables (Schenker & Rumrill, 2004).

Contributions to the Field of Study

Contributions were made to the field of facility management and organizational management in the following manner. A quantitative, non-experimental, comparative, cross-sectional, survey research design was used to compare the differences between facility management and an organization's core business. Research was expanded by establishing an overall research design approach for studying facility management.

Contributions were made to organizational management by introducing facility management to organizational theorists, industrial psychologists, and other academics that have an interest in studying organizations. The findings of Duyar (2010) study illustrate that facility management plays an important role in educational instruction. In addition, constructing, operating, and maintaining buildings represent a significant financial expenditure for universities (Bromilow & Pawsey, 1987).

Research Questions

Four research questions were used to state the comparison of facility management to an organization's core business. Each research question was tested by using a null and alternative hypothesis in which the mean of the random sample met one of the following conditions: (a) the mean of sample is equal to the population mean or (b) the mean of the sample is less than or equal or greater than the mean index of the population.

Research Question 1: How does strategic alignment compare facility management services with an organization's core business?

Research Question 2: How are facility management services considered essential to an organization's core business?

Research Question 3: How do facility management services provide value to an organization's core business?

Research Question 4: How does facility management's reputation play a role in the alignment of facility management services with an organization's core business?

Significance of the Study

The intended audience was facility managers in higher education and academic scholars. The significance of this study was to extend the research on how facility management services strategically align with the core business of higher education institutions. Second, the study examined the maturity level of the essentialness of facility management services within an organization. Third, the study measured the maturity level of the value of facility management services. Fourth, the study measured the maturity level of the reputation of facility management services within an organization's core business. Facility management is a relatively new area of research in the field of organization and management. Therefore, this study added to the existing body of knowledge of facility management in the scholarly literature.

Definition of Terms and Variables

The modified Strategic Alignment Maturity survey instrument was used to measure the facility management constructs of (a) facility management services, (b) facility management organizational core, (c) essential facility management services, (d) value of facility management services, and (e) the reputation of facility management services. Definitions of key terms and operational definitions of the dependent variables are presented in this section.

Definition of Terms

Alignment. Alignment is the degree of fit between organizational components to achieve maximum output (Semler, 1997).

Facility management. Facility management is the alignment of the physical environment of the organization with people, task, and structure to achieve organizational objectives (Yiu, 2008).

Fit. Fit is the state of agreement or congruence that exists between organizational components and the goals and objectives of an organization (Nadler & Tushman, 1980).

Organization. Organization is a form that brings people, technology, and structure to achieve an output (Selznick, 1948).

Strategic alignment. Strategic alignment refers to the state in which the organization has achieved a high maturity level of understanding, communication, sharing knowledge and, planning between organizational functions (Nadler & Tushman, 1980).

Structure. Structure is the relationship that exists between people and tasks within an organization (Friedlander, 1971).

Technology. Technology is the means used to convert organizational input to organizational output (Perrow, 1967; Thompson & Bates, 1957).

Definition of Variables

The following facility management dependent variables are used to measure strategic alignment maturity levels: (a) *Facility Management Services Index*, (b) *Facility Management Organizational Core Index*, (c) *Essential Facility Management Services Index*, (d) *Value of Facility Management Services Index*, and (e) *Reputation of Facility*

Management Services Index. The variables were measured using a modified version of the Strategic Alignment Maturity survey instrument. Following are the operational definitions for facility management variables.

***Facility Management Services Index* (*FMService* in SPSS).** This variable refers to a management framework that accommodates a diverse list of services delivered by facility management (McLennan, 2004). The *Facility Management Services Index* was computed as the arithmetic mean of questions 7, 10, 16, 20, 28 of the Strategic Alignment Maturity survey instrument.

***Facility Management Organizational Core Index* (*OrgCore* in SPSS).** This variable refers to those organizational functional units, competencies, and strategies that directly affect organization output. The *Organizational Core Index* was computed as the arithmetic mean of questions 5, 6, 8, 11, 12, 19, 25, and 26 of the Strategic Alignment Maturity survey instrument.

***Essential Facility Management Services Index* (*EssentialFMS* in SPSS).** These are tailored specifically to meet the strategic mission of an organization (Chotipanich, 2004). The *Essential Facility Management Services Index* was computed as the arithmetic mean of questions 9, 13, 15, 17, and 27 of the Strategic Alignment Maturity survey instrument.

***Value of Facility Management Services Index* (*ValueFMS* in SPSS).** This variable refers to the perception by the customer that facility services have contributed to the organization based on the cost and risk associated with that service (Kok et al., 2011). The *Value of Facility Management Services Index* was computed as the arithmetic mean of questions 14, 21, 24, and 30 of the Strategic Alignment Maturity survey instrument.

***Reputation of Facility Management Services Index* (*ReputationFMS* in SPSS).** This variable refers to public awareness of the positive benefits of facility management services (Coenen et al., 2010). The *Reputation of Facility Management Services Index* was computed as the arithmetic mean of questions 18, 22, 23, and 29 of the Strategic Alignment Maturity survey instrument.

Assumptions

Theoretical, topical, and methodological assumptions were made for this research study.

Theoretical Assumptions

Strategic alignment theory serves as the fundamental model for this study. Nadler and Tushman (1980) put forth the basic elements of the strategic alignment theory. According to Quiros (2009), strategic alignment theory explains how cultural, structure and functional components of an organization fit together in an efficient and coherent manner. The overarching assumption of the strategic alignment theory is that each component within the organization must be oriented in the same direction and have similar structural characteristics (Quiros, 2009). The theoretical assumptions are discussed in detail in Chapter 2.

Topical Assumptions

The topical assumption is that if facility management aligned strategically with the goals and objectives of the organization, the organization would operate efficiently. Strategic alignment assumes this for any organizational function, including facility

management (Quiros, 2009). The topical assumption was tested using four research questions discussed previously.

Methodological Assumptions

Paired samples and one-sample *t* tests were used to test the hypotheses of the research questions. Before the hypotheses and research questions can be tested, the assumptions for paired samples and one-sample *t* tests had to be met. The assumptions for the paired samples *t* test are discussed in detail in Chapter 3. The assumptions for the one-sample *t* test are also presented in Chapter 3.

Limitations

This research study has several limitations. This research study is one of a few and perhaps the only study that used a non-experimental, comparative approach to study facility management. Case study has been the accepted approach (Ventovuori et al., 2007). The Strategic Alignment Maturity survey instrument may not be able to determine the level of strategic alignment. No attempt was made to provide solutions regarding lack of alignment between facility management and organization's core business.

Organization of the Remainder of the Study

This research study examines the alignment relationship between facility management and an organization's core business. Chapter 2 provided a literature review of the major organizational topics discussed: organizational alignment, organizational culture, facility management, organizational structure, and technology. Chapter 3

presented the research methodology. Chapter 4 presented the study results. Chapter 5 presented the study's findings and implication for future research.

CHAPTER 2. LITERATURE REVIEW

Introduction

Facility management is an evolving management discipline, but the concept of organization alignment is a well-established area of inquiry within organizational management. The concept of alignment must be clearly understood from the perspective of organizational structure because alignment theory serves as the theoretical foundation for the competing values model. The competing values model provided the framework used in this study for the placement of facility management within an organizational structure. To place alignment, organizational structure, and facility management in the proper relational context, this literature review examined alignment theory, the competing values model, organizational structure, technology, culture, and facility management.

A literature review was performed on the foundational theories used in this study. The review of the theory starts with an overview of the alignment theory focusing on the various terms used to define how structures must fit together to achieve alignment. Second, a review of technology, organizational structure, and facility management was provided. Considerable time is dedicated to explaining technology and various types of organizational structures because the most basic component of any subunit within an organization are the means by which work is performed (technology) and the context of that work (structure; Perrow, 1967). A major purpose of this research study was

explaining the process of how facility management performs work and the context of that work. Finally, a review of organizational culture is provided because culture played a key role in interpreting the competing values model (Quiros, 2009).

Organizational Alignment Theory

The modern interpretation of strategic alignment theory proposed by Nadler and Tushman (1980) is the alignment theory put forth by Semler (1997). The overarching premise of strategic alignment theory is that an organization's success is dependent on how effectively each of the components fit together (Quiros, 2009). Strategic alignment theory assumes agreement between the vertical and horizontal perspectives of an organization, rather than disagreement (Semler, 1997). Semler (1997) denoted agreement occurs at the structural, cultural, performance, and environmental levels of an organization.

Organizational alignment may be discussed based on the following perspectives. First, one of the purposes of organizational alignment is to establish agreement between organizational components. Second, organizational alignment attempts to inform on the conditions between organizational components. Third, those components are strategy, structure, and culture. Fourth, organizational alignment attempts to fit strategy, structure, and culture together to achieve organizational goals through the strategy adopted by the organization. Finally, organizational alignment represents the relationships that exist among strategy, structure, and culture (Semler, 1997). Agreement among these features is essential to achieve organizational alignment or fit. Fit is the more common term used

to describe the condition that exists between organizational components (Nadler & Tushman, 1980).

Strategic Alignment Theory

Strategic alignment theory may be discussed from two perspectives: (a) vertical and (b) horizontal. Each perspective has its own set of characteristics. Strategy is the defining characteristics of vertical alignment. Culture and structure are the defining characteristics of horizontal alignment (Quiros, 2009). As indicated earlier, vertical alignment is the strategy of an organization.

The concept of vertically aligned strategy supports the notion that organizations with managers that have management characteristics that align with organizational strategy perform better than organizations that have managers with management characteristics that do not align (Kathuria & Porth, 2003). For example, Thomas, Litschert, and Ramaswamy (1991) tested several variables, such as level of education, age, and tenure. Managers with higher education were more willing to implement change than those with less education. From the perspective of age, older managers resisted change while younger managers embraced change. Companies managed by tenured managers tend to be less aggressive in the market place than those organizations with less tenured managers. Andrews, Boyne, Meier, O'Toole, and Walker (2012) applied the vertical component of strategic alignment theory to confirm management performance. In Andrews et al. (2012), senior management, and middle management were tested for agreement based on prospecting and defending strategies.

Structure and Fit

The notion of alignment permeates through the field of strategic management (Venkatraman & Camillus, 1984). When drafting strategy policy, ensuring that the internal structures and external environments are aligned are essential factors in countering threats. Alignment also plays a role in creating and implementing strategies. The process for implementing strategy includes manipulating organizational structures and the decision-making processes (Kaplan & Norton, 2004). Similar to alignment, fit has also played a key role in strategy. For example, Nissen (2014) suggested that fit plays an important role in strategy. Miles and Snow (1984) referred to two types of fit. Internal fit refers to the fit between organizational components and strategy. External fit refers to the fit between internal structures and the external environment.

According to Miller (1996), fit can add to an organizations competitive advantage. Fit may add to an organizations competitive advantage based on how organizational processes achieve a high degree of fit by being properly configured. A high degree of fit may be described in the following manner. First, a high degree of fit may be achieved through synergy, which is when organizational components are congruent (Nadler & Tushman, 1980). Second, a high degree of fit may be achieved when the individual is in harmony with organizational tasks. Third, a high degree of fit may be achieved when organizational processes are tightly configured (Powell, 1992). Fourth, a high degree of fit can occur through specialization (Geroski, 2001). Fifth, a high degree of fit may be generated through being strongly committed to the resources that the organization is using. Sixth, a high degree of fit may be illustrated through the

ability to adapt quickly (Barnett & Sorenson, 2002). Finally, simply working together may achieve high fit between organizational components (Nadler & Tushman, 1980).

The possibility exists that too much alignment may cause an organization's internal structure to become structurally inert. The concept of inertia is a central topic in organizational ecology, where concepts of alignment and fit are also very prominent. Structural inertia occurs when organizational structures lack the ability to adapt (Geroski, 2001). Geroski points to several causes of structural inertia. First, politicizing the allocation of resources may cause internal structures to become stagnant. Second, the lack of creativity among management leaders could cause internal structures to become entrenched. Third, internal structures may become stagnant due to the unwillingness to challenge the status quo. Fourth, at the other end of the spectrum, management could become accustomed to success, which may result in complacency (Geroski, 2001).

Vertical and Horizontal Alignment

Vertical alignment is the alignment of organizational levels beginning at the top of the corporate pyramid down to lower-level subunits (Kathuria, Joshi, & Porth, 2007). Three levels of vertical alignment are corporate, business, and functional. The fourth level of vertical alignment is the decision-making process. Each level within vertical alignment may be designated as a number: cooperate is Level 1; business is Level 2, functional is Level 3, and decision-making is Level 4. The role vertical alignment plays in the development of strategy may be explained as follows: First, strategy is normally created at the corporate level. Second, strategy is spread throughout Levels 1, 2, 3, and 4. Third, strategy is normally implemented at Level 3, the functional level.

Through the process of horizontal alignment, allocation of effort is spread throughout the entire organization, mainly at Levels 3 and 4. Two classifications of horizontal alignment may be described as extending over and between functional units. Horizontal alignment implications extending over functional units have the following effects. First, horizontal alignment spreads uniform decisions throughout Level 3 functions promoting balance and support. Second, horizontal alignment spreads decisions between Level 4 units to achieve teamwork. In order to carry out the decision-making process at the Level 4 function, the decision-making process needs to have spanned the strategic objective from the corporate level down to the functional units. At the same time, the decision-making process should have been spreading across the Level-4 functions. A key characteristic of horizontal decision-making is teamwork.

Congruence Theory

Friedlander (1971) provided a very thorough definition of congruence from the perspective of the internal organizational structure. Previously, an exhaustive definition of organization was provided, but as a brief reminder, an organization consists of people, structure, and tasks with the desire to accomplish an objective (Perrow, 1967). In organizations, people convey their wants, worth, and talents. Tasks are the activities used to achieve the objectives of the organization (Pennings, 1975). The relationship-forming link between people and task is structure.

According to Friedlander (1971), the relationship between, people, tasks, and structure must have a level of congruence to accomplish the objectives of the organization. The implication is that the relationship between people tasks and structure

is at a high level or, as Friedlander explains, the output between people, tasks, and structure are at maximum output. In contrast, if the relationship between the three components is low, then the output is not being maximized or the task is not being accomplished. Friedlander referred to the state between the three organizational components as being incongruent.

Congruence Model of Organizational Behavior

Nadler and Tushman (1980) suggest a congruence model of organization designed to view organizations as an open system but detailed enough to analyze organizations at the functional level (Nadler & Tushman, 1980). The model was designed to analyze the major components of an organization: (a) inputs, (b) outputs, and (c) transformational processes. Analyzing and interpreting transformational processes are the main objectives of the model. The congruence model reinforces Friedlander's ideas that organizations are made up of components, such as people, tasks, and structures (Friedlander, 1971).

Similar to Friedlander, Nadler and Tushman (1980) proposed that the components are normally in agreement with the other components. The concept commonly used to describe the agreement between the input, output, and transformational process is fit. Although the ideal state for the relationships between organizational components is to agree or fit, the components may also be in disagreement. In order for the model to be effective, congruence must be present among the components.

Inputs into the Congruence Model

The four inputs considered by the congruence model are as follows: (a) environment, (b) resources, (c) history, and (d) strategy. Organizational inputs may be described as the (a) perception of ideals, (b) materials, and (c) equipment provided to

produce an output (Nadler & Tushman, 1980). Schminke, Ambrose, and Cropanzano (2000) described input as an idealized perception of fairness. Conversely, at the far end of the spectrum for the definition of inputs, inputs were described as material resources (Chakravarthy, 1982). An input is a consideration that may occur at any time that an organization may need to face. The four types of inputs are (a) the environment, (b) resources, (c) history, and (d) strategy (Nadler & Tushman, 1980).

Environment and resources. The environment may be described as any consideration that is not within the organization that could affect organizational performance. In order to analyze the environment, several issues must be considered. First, what are the potential demands that may come from the environment? For example, competition and innovation from new arrivals may influence the organization (Geroski, 2001). Second, environmental constraints in the form of government regulatory policies may limit what an organization can do, such as federal emission polices (Russo & Harrison, 2005). Third, the environment can also provide opportunities. For example, the failure of a competitor creates an opportunity for a competing organization (Barnet & Sorenson, 2002).

A resource is any input that contributes to an organization's ability to produce an output (Barney, 1991). A resource can be property or knowledge (Miller & Shamsie, 1996). Resources may come in the form of intangibles, such as how people feel about the organization or tangible resources, such as technology (Nadler & Tushman, 1980). In order to analyze resources from the perspective of congruence, the resources should have the following characteristics. First, the resource should be of high caliber. Second, the resource should be worth the investment effort to be considered an input. Third, the

resource must be able to be manipulated into a usable material. Fourth, the resource should have a sustainability quality. Fifth, the resource in some instances should be rare (Barney, 1991).

History and strategy. Organizational history may be defined as the study of an organization's past for the intended purpose of creating strategy for current and future organizational success (van Baalen, Bogenrieder, & Brunninge, 2009). According to van Baalen et al. (2009), business historians have been more about telling the history of organizations rather than interpreting the history of an organization to be used as a business strategy. Further, the history of organizations is treated as events that occurred in the past and has no value to current affairs in an organization (Ericson, 2006). On the other hand, research interest in strategy has sought to use history as a means of learning about strategy (Kimberly & Bouchikhi, 1995).

Strategy encompasses features of the environment, resources, and history used to achieve congruence between internal organizational structures (Nadler & Tushman, 1980). In order to analyze strategy from a congruence perspective, the following issues must be considered. First, has the organization created a mission statement? Does that mission statement explain the role of the organization in their environment? Has the organization developed plans to implement the mission of the organization? How will the organization measure organizational success once the plans are implemented? The next area of discussion regarding the congruency theory is as an analytical tool.

Organizational Outputs

Outputs are the goods and services resulting from the transformation of inputs. To determine the effectiveness of the outputs, the following issues need to be considered.

First, a system needs to be in place to determine organizational effectiveness. Second, the organization needs to determine the efficient use of the resources that the organization has on hand. Third, the organization needs to avoid allowing internal structures to become entrenched. The organization must be flexible to respond to changes in the environment. Fourth, the organization should work towards developing a work force that is satisfied with the organization (Nadler & Tushman, 1980).

Organizational Transformation

The key components of an organization are tasks, individuals, formal structures, and informal structures (Nadler & Tushman, 1980).

Tasks and individuals. In the congruence model, tasks are the basic element of analysis. Perrow (1967) described task functions in detail. Perrow described tasks as the routine and non-routine activities required to complete a job. According to Perrow, the task structure may be broken down into two main categories: control and coordination. The control aspect involves the level of supervision and power needed to perform a task. Parameters are set on some tasks, such as how much freedom an individual or group have in performing a task with supervision or without supervision. In other words, some tasks may not require approval to alter resources and time spent, but other tasks may require approval to alter resources and time spent.

The coordination of tasks may also be broken down into two processes: planning and feedback (Perrow, 1967). The planning of tasks are procedures that describe the resources, tools, and methods necessary to process a task. Processing a task based on feedback involves consulting with others before the routine activities of a task are changed.

Individuals may be described from a dimensional or interactive perspective in organizations (Rice & Mitchell, 1973). The basic function of the individual within an organization is task performance (Nadler & Tushman, 1980), but the role of the individual in organizations goes far beyond simply performing task. The dimensional aspect mainly concerns location, but the interactive aspect of the individual focuses on when, where, and how the individual interacts with others (Rice & Mitchell, 1973).

Formal and informal structure. Organizations are formal structures that imply a sense of order and design in the process of completing a planned task or goal (Selznick, 1948). When analyzing organizations from the perspective of formal structures, several factors must be considered. First, organizational design involves placing the job into the proper subunit and structure and ensuring proper alignment of the task, subunit, and structure. Second, the job must be properly designed to fit the structure. Third, the work environment should be properly designed to align with task, structure, and organization.

Informal structures are present in all organizations. The function of the informal structure may vary, but informal structures exist because the formal structure may not be meeting needs of the group or work force. Informal structures meet those needs in the following contexts. First, informal structures may serve to keep behavior in check. Second, informal structures may allow workers to express their opinions (Selznick, 1943).

Analytical Tool

Now that an overview of organizational components has been provided, the next several paragraphs discuss how congruence theory might be used to analyze the relationship between the internal structure of the organization, the organization, and the

environment. The ultimate goal of an organization is to achieve the objectives set forth by the organization (Nadler & Tushman, 1980). The congruence model proposes that, if the components of an organization fit, the organization may function in an acceptable manner. If the components do not fit, the organization may not function in an acceptable manner (Fry & Smith, 1987). The concept of acceptable fit must occur throughout all organizational components at the task, individual, group, and organizational levels (Nadler & Tushman, 1980). The same can be assumed if the organization has an acceptable fit with the external environment. The concepts of fit may be described in the following manner.

Individual and organizational fit. Individual fit is concerned with how the individual fits within the organization. To ensure that an acceptable fit exists between the individual and the organization, the following questions need to be asked. Are structures and processes designed in such a manner to meet the needs of the individual? How does the individual feel about the work within the organization? Do the goals of the individual compliment the goals of the organization (Nadler & Tushman, 1980)? Are tasks designed in a manner to fulfill the needs of the individual? What is the level of task demands on the individual and are those demands achievable (Nadler & Tushman, 1980)? What role does the informal organization play in the work processes of the individual? Are individual resources available for use beyond the formal organizational structures (Nadler & Tushman, 1980)?

Task and organizational fit. To ensure that task and organizational fit are congruent the following questions need to be asked. Are task demands achievable based on existing organizational structures? Does task demand equate to adequate

organizational support (Nadler & Tushman, 1980)? Is there a process in place to support task demands outside of the formal organizational structure (Nadler & Tushman, 1980)? Is there a process within the formal organization to support goals generated through the informal organizational structure?

The Theoretical Problem

The framework of this research study is to provide a basis in which facility management aligns with an organization's core business. The theoretical framework used to explain how facility management fits into an organization's overall strategy is the competing values model (Quiros, 2009). The competing values model is an alignment framework that allows the analysis of organizations against extreme organizational forms with the aim of finding the most compatible organizational forms (Quiros, 2009). The competing values model essentially combines vertical, horizontal, and the competing values model to form a model capable of accepting any type of organizational structure (Quiros, 2009). The foundational theories of the competing values model framework are the contingency, congruence, and the strategic alignment theory.

The organizational alignment theory is a strategic alignment theory proposed by Semler (1997). The competing values model is a strategic alignment theory proposed by Quinn and Rohrbaugh (1981). The competing values model essentially combines vertical, horizontal, and the competing values model to form a model capable of accepting any type of organizational structure (Quiros, 2009).

The concept of accepting many competing dimensions or values is central to understanding the competing values model. Technology, environment, culture, and structure are the competing dimensions depicted in the competing values model. In most

organizations, these dimensions do not fit together smoothly (Buenger, Daft, Conlon, & Austin, 1996). The competing values model accepts the contradictory nature of these dimensions (Belasen & Frank, 2008). The competing values model proposes that, through contradiction, organizational effectiveness can be achieved by properly aligning the different dimensions within organizations. Figure 1 graphically depicts the competing values model and Figure 2 is referred to as the linking variable model. The linking variable model was used to depict the location of the study variables, hypotheses, and survey instrument questions.

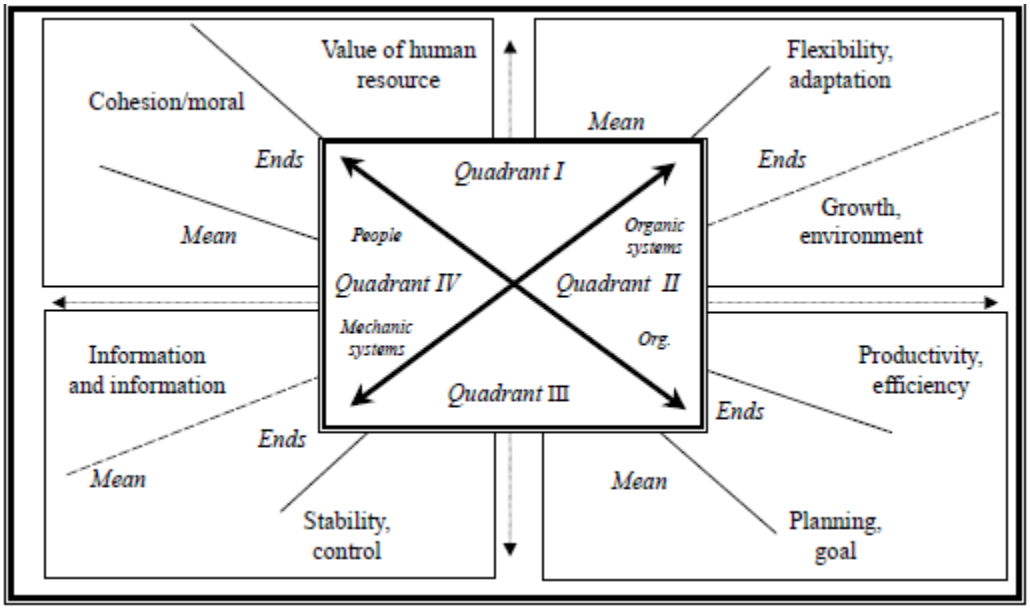


Figure 1. Theoretical framework of competing values model. Adapted from "Organizational alignment: A model to explain the relationships between organizational relevant variables," by I. Quiros, 2009, *International Journal of Organizational Analysis, 17(4), 285 –305.* Copyright 2009 by the Emerald Group Publishing Limited. Reprinted with permission.

Theoretical/Conceptual Framework

Alignment theories provide a framework for explaining how an organizational culture, structure, and strategy fit efficiently with an organization's core business (Nadler & Tushman, 1980). The three most prominent alignment theories are the congruence theory (Nadler & Tushman, 1980), organizational alignment theory (Semler, 1997), and the competing values model (Quinn & Rohrbaugh, 1981). Nadler and Tushman (1980) developed the congruence theory as a means to implement strategy (Quiros, 2009).

The organizational alignment theory proposed by Semler (1997) is similar to the congruence theory, but Semler adds culture as a means to support leadership and strategy. Although Semler's theory includes culture, according to Quiros (2009), neither theory goes far enough in explaining the role culture plays in organizational alignment and the complexities of modern organizations. Therefore, neither congruence theory nor organizational alignment theory fully explains alignment or strategic fit. Quiros proposes a new alignment theory, the competing values model, developed by Quinn and Rohrbaugh (1981).

The competing values model provides a framework in which both vertical and horizontal organizational alignment viewpoints are discussed. For example, alignment is analyzed from a cultural perspective across various levels, such as individual, group, or organizational level. Alignment is discussed from the perspective of various organizational types, such as organic or mechanical perspective. In addition, the model supports the basic elements of vertical and horizontal alignment. In the framework of the competing values model, constructs are spread over quadrants.

The competing values model uses quadrants to organize and group concepts. Each quadrant contains several constructs. Flexibility, growth, and the environment overlap quadrants one and two. Product and efficiency overlap quadrants two and three. Stability, control, and information overlap quadrants three and four. Cohesion, moral, and value of human resources overlap quadrant four and one. Because of the numerous potential constructs, the competing values model provides the theoretical basis and defines the constructs for this research study.

The constructs show how alignment between facility management and an organizations core business strategy fit within the quadrants of the competing values model. For example, consider the construct value of facility management services. A key characteristic of value is customer perception. Customer perception depends a great deal on the role culture plays in an individual's life. Quadrants 1 and 4 of the competing values model accommodate this characteristic because the competing values model allows for a certain level of culture to coexist in an organic-to-mechanistic structural form.

Quinn and Rohrbaugh (1983) characterized the four quadrants in the competing values model framework based on several themes, which Quinn and Rohrbaugh refer to as models. Quadrant 1 is characterized as a human relation models. Quadrant 2 is characterized as an open model. Quadrant 3 is characterized as an internal process model. Quadrant 4 is characterized as a rational process model. According to Quiros (2009), the congruence of each of these quadrants may be analyzed from the perspective of culture and structure.

Competing Values Models Quadrants

Human relations (Quadrant 1) is a relationship that exists between culture, people, and organic, structural forms. The main characteristic is flexibility and internal focus.

Open systems (Quadrant 2) increases adaptation of organizational forms, with cultural and structural forms leading to greater effectiveness. The main characteristic is adaptability and external focus.

Internal processes (Quadrant 3) is characterized as control and internal focus.

Rational processes (Quadrant 4) is characterized as control and external focus.

The hypotheses and survey instrument questions are depicted within the proposed linking variable model quadrants appearing in Figure 2.

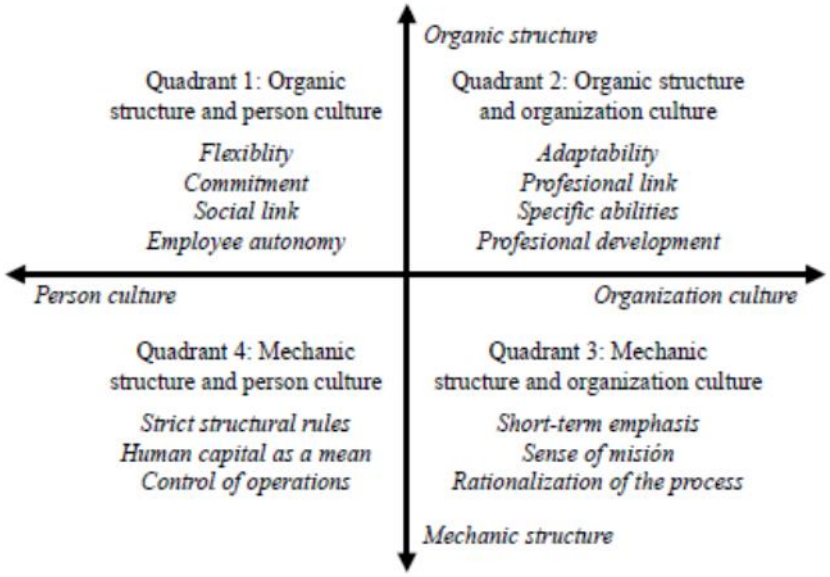
Linking Variables to the Competing Values Model

In this section, survey instrument questions, variables, and hypotheses were linked to the quadrants in the competing values model appearing in Figure 2. The meanings of each quadrant of the competing values model were discussed in the previous section. Each quadrant represents a set of characteristics. The survey instrument questions, variables, and hypotheses were placed in the quadrant with similar attributes, characteristics, and structures. Prior to placing the questions in the appropriate competing values model quadrant, the means of similar study questions were used to create the values of variables. For example, the mean of survey Instrument Questions 14, 21, 24, and 30 was computed to create values for the variable Value of Facility Management Services Index because those questions had common traits, characteristics, and structures. Survey Instrument Questions 14, 21, 24, and, 30, the variable Value of

Facility Management Services Index, and the hypotheses for RQ1 are in the human relations quadrant of the competing values model because the concepts associated with human relations have similar characteristics.

HUMAN RELATIONS
RQ3
ValueFMS
Q14, Q21, Q24, Q30

OPEN SYSTEMS
RQ1
FMService: Q7, Q10, Q16, Q20, Q28,
Organization core: Q5, Q6, Q8, Q11, Q12, Q19, Q25, Q26



INTERNAL PROCESSES
RQ2
EssentialFMS
Q9, Q13, Q15, Q17, Q27

RATIONALE PROCESSES
RQ4
ReputationFMS
Q18, Q22, Q23, Q29

Figure 2. Linking variables. Adapted from "Organizational alignment: A model to explain the relationships between organizational relevant variables," by I. Quiros, 2009, *International Journal of Organizational Analysis, 17(4), 285 –305*. Copyright 2009 by the Emerald Group Publishing Limited. Reprinted with permission.

Human Relations Dimension

The human relations dimension has traits similar to the variable Value of Facility Management Services Index. For example, the human relations dimension is defined by

traits, such as morale and value of human resources (Quinn & Rohrbaugh, 1983). Similarly, facility management value may be defined by traits, such as customer perception (Kok et al., 2011). The hypotheses for RQ3 are in Quadrant 1, the human relations dimension.

Open System Dimension

The open system dimension has features similar to the variables Facility Management Services Index and Organizational Core Index. The open system dimension is defined as organizational, cultural, and structural forms that lead to greater organizational effectiveness. The main characteristic is adaptability and external focus (Quinn & Rohrbaugh, 1983). Similarly, activities, processes, and structure define facility management (Anker Jensen et al., 2012). The open system dimensions have features similar to the variables Facility Management Services Index and Organizational Core Index. The following questions were placed in the open system dimension because these questions have similar features: (a) facility management survey Instrument Questions 7, 10, 16, 20, 28 and (b) organizational core survey Instrument Questions 5, 6, 8, 11, 12, 19, 25, and 26. The hypotheses for RQ 1 are in Quadrant 2, the open systems dimension.

Internal Processes Dimension

The internal processes dimension is defined by control and internal focus. Information management and communications are key features of the internal process dimension. The internal process dimension has similar features to the variable Essential Facility Management Services Index. The following questions were placed in the internal processes dimension: essential services survey Instrument Questions 9, 13, 15, 17, and 27. The hypotheses for RQ2 are in Quadrant 4, the internal processes dimension.

Rational Processes Dimension

The rational processes dimension is defined as external control and external focus. The rational process dimension has similar features to the variable Reputation of Facility Management Services Index. The following questions were placed in the rational processes dimension: reputation survey Instrument Questions 18, 22, 23, and 29. The hypotheses for RQ4 were in Quadrant 3, the rational processes dimension.

Organizational Structure and Facility Management

Facility management is an evolving management discipline, but the concept of organizational alignment is a well-established discipline within the field of organizational management and development. The purpose of this study is to examine the relationship between facility management and an organization's core business from an alignment perspective. For the purpose of this study, core business is defined as the goals and objectives of an organization and the primary functions and competencies used to accomplish those goals and objectives. The concept of alignment must be clearly understood because alignment was used to frame the relationship between facility management and an organization's core business.

To place alignment and facility management in the proper relational context, this literature review took a twofold approach. First, the literature review was used to define alignment concepts, provide examples, and identify arguments for or against the idea that the concept of alignment may be used to explain the relationship between organizational technology and structure. Second, the literature review follows a similar path with facility management, which is to define concepts, provide examples, and identify those

arguments for or against the idea that facility management has issues in aligning with an organizations core business. Both approaches were discussed in the context of the research questions. A review of the literature related to organizational alignment was discussed first, followed by a literature review of facility management. This is a study of organizational alignment from the perspective of facility management.

In the field of organizational management, several terms are used to indicate agreement between an organization's internal environment and external environment, and relationship between an organizational technology and structure. Concepts, such as congruence, fit, and alignment, are used to describe an organization whose technology and structure fit to achieve goals and objectives (Drazin, & Van de Ven, 1985; Miller, 1992; Merron as cited in Semler, 1997). Fit is the state of congruence that exists between organizational components and the goals and objectives of an organization (Friedlander, 1971). The origin of congruence, fit, and alignment may be traced to popular ecology and contingency theories (Venkatraman & Camillus, 1984).

In the mid-20th century, organizational theorists began to question the notion that there was *one-best-way* to design and manage an organization. The one-best-way of designing and managing an organization had been the accepted approach for the first half of the twentieth Century and was based on scientific management the principal proponents of which were Taylor, Follett, and Massie (Woodward, 1980). The scientific approach espouses that organizations should have a formalized design and managing organizations should follow the human relations school of thought.

A counter to the one-best-way argument of scientific management was the contingency theory the principal proponents of which were Woodward, Burns and

Stalker, Thompson, Lawrence, and Lorsch, as well as Perrow (Woodward, 1980). Contingency theory arose out of the belief that there was no one-best-way to design an organization and to confront problems associated with managing a complex organization (Dalton, Todor, Spendolini, Fielding, & Porter, 1980). Woodward (2008), an organizational theorist who studied organizations during the 1950s and 1960s in the factories of England, had two main points of contention with the notion of the one-best-way to design and manage organizations. First, no empirical research was available to support the one-best-way approach. Second, Woodward's experience in working with organizations in the local area suggested that issues between staff and line personnel were more pressing.

Woodward (1980) decided to put the scientific management theories to the test through empirical research. Woodward wanted to understand why organizations have different structures and why some structures appear to be more suitable for success than other organizational structures. In other words, there are contingencies that organizations must address which may require several different types of management styles rather than one-best-way (Woodward, 1980).

The arguments put forth by the contingency theory proponents seem to be the most relevant for this study because their research seems to suggest that an organization's situation dictated which management style is most appropriate. The overriding theme of the contingency theory proponents is that organizations that perform well have structures that fit or align with the situational demands of contingent elements. Those contingent factors may include technology, market position, product diversity, the size of the organization, and the organization's structure (Woodward, 1980).

This research study focused primarily on the relationship between technology and structure because technology and structure may be used to establish facility management as a function of the organization. In addition, contingency theory proponents, such as Woodward, believe that technology played an important role in defining organizational structure and an optimum link between technology and structure had a positive impact in achieving organizational goals (Woodward, 1980).

This study developed the concept of facility management as an organizational function with a structure no different from the structures of the more traditional functions of an organization, such as finance, accounting, and marketing. The premise of contingency theory proponents is that organizational processes, technology, structure, and culture are states that make alignment possible. In this study, the argument was that these elements must be present in facility management. Facility management may be defined based on the concepts of technology, organizational structure, alignment, and culture.

Defining technology and structure from the perspective of fit to achieve organizational success was a central theme of this study. The review of the literature that was used to define technology, structure, and fit spanned many years. For this reason, technology, structure, and fit were defined based upon many interpretations and in such a way as to allow facility management to be aligned with an organizations core business. With the possibility of many interpretations, finding a concise definition for technology was a challenge. Four views of technology were discussed.

Technology

Woodward (1980), Aston Group and Perrow (1967) supported technology viewed from an organizational perspective. Goldthorpe (1959), Lodahl (1964), Burack (1967), and Fullan (1970) put forth technology viewed at the individual level. Woodward and Perrow (Aldrich, 1972) support technology treated as an independent variable. As an independent variable, technology influences the structure of an organization. Hickson, Pugh, and Hinings of the Aston Group, treated technology as a dependent variable and, as a result, the Aston Group believed that technology exerts very little influence on organizational structure (Aldrich, 1972).

Prior to Woodard, the focus of attention by researchers regarding technology was defined at the individual and group level. Terms used to define technology at the individual and group level included process technology and industrial arts (Burack, 1967). Similarly, Fullan (1970) defined technology from the perspective of industrial technology. Fry and Slocum (1984) defined technology from the perspective of the work group.

Technology at the Individual Level

According to Burack (1967), technology at the individual level is concerned with the practical application of technology and transforming materials from a tangible form to a usable form, such as products and services. The concept of process technology implies the transformation of raw material to goods and services employing systematic activities (Burack, 1967). Based on this definition, Burack (1967) suggested a conceptual framework that provides additional clarification to technology at the individual and group levels. Technology may be conceptualized (a) as the degree of mechanization or the state

of that knowledge at a particular point in time, (b) as a degree of time interdependence or the extent to which inputs and outputs of operations depend on each other, (c) as the degree of computerization or process programming, or (d) as the degree of subdivision of labor or the human interaction needed to complete a task. The more that a process is computerized; the less human interaction is needed. Lastly, technology may also be conceptualized as the degree of engineering involved or the expertise used to relate one task to another.

Fullan (1970) elaborates on the concept of technology by identifying and defining the basic types of industrial technology, such as craft systems, mass production, and continuous-process technology. In the craft system, the individual worker is the most skilled but this is not the case in the mass production system. The skill set of the individual worker in the mass production system is diminished because the individual worker in this type of system is very familiar with the task and the work task is broken down into very small steps. Similarly, the skill set of the individual worker is diminished even more in the continuous-process system because the production system is fully automated and controlled from a central location. Every aspect of the production process is automated from basic worker task to material handling. The worker simply monitors the production system.

Technology at the Group Level

Fry and Slocum (1984) described technology from a work-group perspective. Key to defining technology from a work-group perspective is the idea that the flow of work is somehow interrelated or interdependent. In other words, the work performed by one function may influences the outcome of another function. Work-group technology

may be classified into three dimensions: (a) familiar or unfamiliar (b) analyzable or unanalyzable, and (c) interdependent. Technology described as familiar or unfamiliar refers to how familiar the group is with using the technology. Technology that is analyzable or unanalyzable refers to the level of difficulty used to solve technological problems. Technology described as interdependent, refers to how the performance of one function influences the operation of another function (Fry & Slocum, 1984). Chapple and Coon (as cited in Thompson & Bates, 1957) defined technology at the individual and group level. Woodward (1980), Perrow (1967), the Aston Group (Pugh et al., 1963), and Hickson, Pugh, and Pheysey (1969) defined technology at the organizational level.

Technology at the Organizational Level

In their book, *Principles of Anthropology*, published in 1942, Chapple and Coon (as cited in Thompson & Bates, 1957) used an early reference that described technology from a systems perspective. Chapple and Coon saw technology as a transformational process of combined human skills and abilities within an organization. Woodward (1980) applied the concept of technology to analyze the production characteristics of an entire organization. For example, Woodward used technology to describe the production process of an organization into batch processes of various sizes, such as small, large, and mass (Donaldson, 1976).

Joan Woodward's (1965) *Industrial Organization – Theory and Practice* is considered a seminal book in the field of organizational theory (Dawson & Wedderburn, 1980). The Woodward book describes the first empirical study that explored the relationship between technology and an organization (Dawson & Wedderburn, 1980). One hundred organizations participated in the study. In order to understand the

relationship between technology and the organization, Woodward grouped the production systems of those organizations into 11 categories. The higher categories suggested better control and predictability of the manufacturing process. Woodward referred to the scaling of the production process as technical advance (Donaldson, 1976).

Perrow (1967) viewed technology from an organizational perspective and described technology as a dimension of non-routine and routine work. According to Perrow, technology is the single most important characteristic of organizations. In other words, technology defines the organization. From that perspective, Perrow further described organization as a system consisting of people, symbols and things interacting together to convert raw material to goods or services. Perrow's perspective allows technology to be viewed as an independent variable that influences outcome.

Technology as an Independent Variable

Understanding technology as an independent variable played an important role in defining the impact facility management has on an organization's core business. For example, because technology is an independent variable, technology may influence the structure and goals of an organization (Hage & Aiken, 1969; Litwak, 1961; Perrow, 1967; Woodward, 1980). As mentioned in the previous paragraph, Perrow suggested that technology may be broken down into two dimensions, non-routine and routine workflow or processes.

Technology at the level of non-routine and routine workflow influences goals. Non-routine workflow may be characterized as having limited uniformity, unfamiliar, and little understanding. Alternatively, workflow that is familiar, uniform, and understood is characterized as routine (Perrow, 1967). Social structure is but one

characteristic of structure. The other significant characteristic of structure is task structure (Perrow, 1967). For this study, structure refer to both social structure and task structure and is the form people use to interact with each other in an organizational setting to transform raw materials into goods or services (Perrow, 1967). The concept of structure was fully defined similar to the definition of technology. Perrow's definition of technology was later adopted in the 1970s (Alexander & Randolph, 1985).

Dubin's 1959 book, *Working Union-Management Relations* (as cited in Woodward, 1980), broke technology down into two parts. The first part described technology based on the hardware used to perform the work, such as tools, instruments, machines, and technical formulas. The second part of Dubin's definition described technology based on the importance of the task and the reasoning for choosing the methods to complete the task. Dubin's view of technology is that of function. Conversely, researchers, such as Hage and Aiken (1969), believed that technology could be described as having many dimensions. Hickson et al. (1969) and his colleagues, viewed technology as part of operations.

According to Hage and Aiken (1969), technology may be viewed as a social structure or the interaction of people with a task that has many dimensions. Perrow (1967) described technology as a dimension of non-routine and routine work. Litwak (1961) described technology as a dimension of uniform tasks. Hage and Aiken saw flaws in Perrow's explanation of technology because Perrow's concept of technology did not explain all dimensions of technology.

The Aston Group of Pugh, Hickson, Hinings, and Turner (1969) utilized two scales to describe technology, the scale of workflow integration and the production

continuity scale (Donaldson, 1976). Each scale has a distinct purpose. For example, the workflow integration scale measures activities within the manufacturing process, such as the level of automation and sequence of operation. The workflow integration scale is broken down into four smaller scales. The four smaller scales measures level of automation, the rigidity of the workflow, the preciseness of the inspection, and the relationship of the inspection to the internal workflow process. The second major scale proposed by the Aston Group is the production continuity scale.

Woodward, the Aston school, and Perrow viewed technology from an organizational perspective, (Aldrich, 1972). In other words, Woodward (1980) and Perrow (1967) believed that technology influenced organizational structure. On the other hand, the Aston school treated technology as a dependent variable and did not view technology as having a significant impact on organizational structure.

Technology as a Dependent Variable

The Aston Group, represented by Pugh and Hickson (1972), had a different view of technology's influence on organizational structure than the views of leading researchers, such as Woodward, Perrow, Thompson, and Bates, who viewed technology as having an influence on organizational structure and that technology. Instead, the Aston Group viewed technology as a dependent variable (Pugh & Hickson, 1972). The Aston Group used a classification system to group the various meanings of technology into three broad technological categories (Hickson et al., 1969). These broad technological categories may be represented as operations, material, and knowledge.

Technology as Operations

The Aston Group described technology as an operational process containing organizational procedural skills or skill sets used in the workflow process (Hickson et al., 1969). To add clarity to operational technology, operational technology may be broken down into smaller components, such as automation, adaptability of the workflow process, and quality of the workflow process. Operational technology, described as automation, refers to the process in which the equipment takes on human characteristics (Hickson et al., 1969). Adaptability of operational technology allows the objects of technology, such as mechanics, skills, and raw materials, to be used for other products. Quality of operations technology allows workflow process to follow exacting standards (Hickson et al., 1969). Thompson and Bates (1957), Burack (1966), and Burack and Cassell (1967) specifically described technology as being part of the workflow process. For example, Thompson and Bates (1957) described technology as a process in which man works with machines to achieve a desired result in the form of a good or a service.

In groundbreaking research, Perrow (1967) stretched the concept of technology from man as the focal point in operating the machine to describing technology as a broad organizational process. Perrow viewed technology as a transformational process, but at an organizational level in which people work together to transform objects. Perrow placed emphasis on the object and described the object as having many different facets. For example, Perrow described the object as (a) a raw material, (b) a living being, and (c) a symbol. Similarly, Rushing (1968) described technology from the perspective of an object by characterizing the hardness of the object.

Perrow (1967) also developed the concept of technology described as knowledge technology. For example, knowledge technology is simply a renaming or redefining of Perrow's view focused on technology representing a degree of achieved logical analysis. This is in line with the view of partitioning technology using many characteristics, such as raw material and symbols (Perrow, 1967). Thompson and Bates (1957) earlier elaborated on the idea that knowledge is key to the transformation of technology. For example, the knowledge acquired in the process of transforming objects may be adapted to produce other goods and services.

The previous paragraphs explored the definitions of technology from the late 1950s through 1970s; those definitions may be summarized from the following perspective. First, Woodward (1980) proposed the technical complexity of technology. Second, Hickson et al. (1969) proposed operations technology. Third, Thompson (1967) proposed the interdependence of technology. Fourth, Perrow (1967) proposed routine and non-routine technology. Finally, Mohr (1971) proposed the manageability of raw materials.

Defining Technology in the 1970s

A review of the literature, beginning in the late 1970s through the present, showed little change in the definition of technology, but based upon previous research, the meaning of technology was modified and expanded. For example, Overton, Schneck and Hazlett (1977) modified Perrow's definition of technology by characterizing technology as uncertainty, instability, and variability (Perrow, 1967). Uncertainty refers to understanding the complexity of the task. Instability refers to unpredictability of the

techniques used to perform the task. Variability refers to multitasking or the number of tasks performed by workers.

Technology Components Beginning in the 1970s

According to Miller (as cited in Rousseau & Cooke, 1984), technology may be described from a systems component perspective: (a) concrete systems, (b) abstract systems, and (c) activity systems. Miller's characterization (as cited in Rousseau & Cooke, 1984) is very similar to the definitions put forth by Perrow (1967), Thompson (1967), and Woodward (1980). Miller, Glick, and Huber (1991) explained that the definition of technology has changed little since being defined in earlier research. For example, as late as 1991, Miller et al. (1991) described technology as workflow, routine, and production continuation. Technology as workflow integration has characteristic features, such as automation, continuity, and rigidity, initially proposed by the Aston Group (Hickson et al., 1969).

Perrow (1967) previously proposed technology described as routine, followed shortly by Hage and Aiken (1969). As early as 1970, Fullan (1970) had put forth the notion of technology being a continuous production process. Researchers, such as Burns and Stalker (1961), Lawrence and Lorsch (1967), Miller et al. (1991) and Donaldson (1976) continued to redefine and modify the definition of technology.

For the purpose of their study, Miller et al. (1991) used a broad interpretation of technology from the perspective of routineness. As indicated throughout this research study, Perrow (1967) was the leading proponent of defining technology from the perspective of routineness and organizational level, but technology routineness defined

from Perrow's (1967) perspective, although defined at the organizational level, was based on how often a process was attempted.

Miller et al. (1991) expanded the definition of technology routineness to represent centralization. Centralization of technology routineness implies that the authority of the decision making process is at the top of the organization. Second, Miller et al. (1991) conceptualized technology routineness as a means of formalizing rules, characterized as controlling behavior. Finally, technology of routineness may be defined as the specialization of labor. Technology routineness from the specialization of labor implies that tasks are assigned at the individual and the organizational levels.

Technology and Structure

Miller et al. (1991) expanded the definition of technology to understand the development of theoretical models that could better explain the relationship between technology and structure because 31 published research studies had not explained the relationship between technology and structure (Miller et al., 1991). Woodward (1980) conducted the first major research study on the relationship between technology and structure. Woodward proposed that technology influenced structure. Conversely, researchers, such as Hickson et al. (1969) were not able to find any significant relationship between technology and structure. Miller et al. (1991) believed that the definition of technology did not allow a wide variety of variables. By expanding the definition of technology, more variables could be used to create a theoretical model to explain the relationship between technology and structure.

Technology Defined from the Perspective of the Environment

Donaldson (1976) continued the trend of expanding the definition of technology by defining technology from the perspective of the environment. In other words, organizational technology may be defined based on external environmental determinants, such as markets, technological advances, and industry demands. In addition, technology defined from the perspective of the environment seems to be more reliable than technology defined by previous researchers, such as Woodward and the Aston Group, who viewed technology as a process of change (Donaldson, 1976). For example, in a study of 20 manufacturing companies located in England, Burns and Stalker (1961) concluded that quickly changing market demands and technological advances seem to be better accommodated by organizational structures that tend to be more systematic in their approach and more adaptable (Burns & Stalker, 1961).

Other researchers, such as Lawrence and Lorsch (1967), who studied 12 major companies located in the United States, reached the same conclusion, as did Burns and Stalker (1961). In addition, Harvey (1968) defined technology from an environmental perspective and came to a similar conclusion as Donaldson (1976), Burns, and Stalker (1961), and Lawrence and Lorsch (1967). The findings in Harvey's (1968) study of 43 manufacturers concluded that those manufacturers that have small pliable organizational structures achieved greater technological change. In the next several sections, the definition of technology is shown to expand from the perspective of automation and the computerization of technology (Carter, 1984).

Technology Defined as Automation

Technology defined as automation or computerization is not a new concept in the research literature of technology and structure. However, the early automation of technology focused mainly on the impact automation had on workers. Technology defined as automation primarily refers to equipment (Hickson, Hinings, Lee, Schneck, & Pennings, 1971). For example, Bright (1958) suggested that automation might require workers to increase their skill set in order to be able to operate computers. Mann and Williams (1960) suggested that automation could play a role in increasing workers in the decision-making process. The idea that automation would require increased skills was being debated throughout the public arena during the 1950s.

Congressional hearings, sociologists, labor unions, and workers were all debating the issue (Bright, 1958). Bright (1958) concluded at the time that management should not underestimate the impact of automation on skill requirements. From the perspective of technology defined as computerization, Hicks et al. (1969) defined technology at the operational technology level. Within the operational technology level, machines and devices were defined as automated. In addition, the computerization of technology has a much larger meaning that includes automatic equipment and the input and output of information (Carter, 1984).

Technology Defined as Computerization

In a study of 253 government finance offices, Meyer (1968) attempted to define the relationship between computerization of technology and structure. According to Meyer, computerization of technology may have the following characteristics. First, interdependence would be created between the various subunits. Second, a consultant

would be created to coordinate the communications between the various departments. In a study of 110 manufacturing companies, Blau, Falbe, McKinley and Tracy (1976) defined technology based on the substitution of automation equipment for workers, primarily white-collar workers.

Technology Defined as Information Technology

Khandwalla (1977) proposed a much broader definition of computerization of technology. The process of work is broken into three parts, similar to earlier definitions of technology: (a) workflow, (b) operations, and (c) information technology. The most important feature of Khandwalla's definition is that of information technology. According to Khandwalla, information technology relies on the most fundamental definition of technology, which is transformation of input to output. Inserting the computerization of technology into these three features, and especially the information technology feature, raises the level of efficiency across all work levels. Finally, defining the computerization of technology based on the three features proposed, Khandwalla considers the computer as a link across subunits making the computer one of the most important technological advancement in organizations (Khandwalla, 1977). In the preceding paragraphs, technology was defined. In the following paragraphs, structure within the context of organizational alignment will be defined.

Organizational Structure

Introduction

The alignment of facility management with an organization's core business may be understood by defining facility management for the most fundamental processes of an

organization: technology and structure. A review of the literature suggests that when technology and structure are aligned, success in organizational performance is achieved (Dean, Yoon, & Susman, 1992). The literature also suggests that organizational subunits (e.g., accounting, human resources, and facility management) and the alignment of those subunits may be examined from the perspective of technology and structure.

Therefore, to understand technology and structure, an exhaustive review of the definitions of technology and structure is provided. The previous paragraphs provided detailed analysis of the definitions of technology and explained the relationship between technology and structure. Similarly, structure was defined at the most basic level of workflow processes within organizations. The characteristics of technology and structure suggest that a functional unit, such as facility management, might have a positive alignment with an organization's core business.

Max Weber (as cited in Blau, Heydebrand, & Stauffer, 1966) proposed one of the earliest explanations of organizational structure. Hall (1962) suggested that one of the reasons that agreement exists among scholars concerning the functionality of organizations is due to Weber's writings. Weber's seminal work on structure, *From Max Weber: Essays in Sociology*, published in 1949, presented a fundamental model on a theory of formal organization (as cited in Blau et al., 1966). The important features of Weber's formal organizations theory may be characterized in the following manner. First, structure is an important factor in understanding bureaucracies. Second, structure within organizations is interdependent. Third, the interdependence of structure may be explained relative to social processes (as cited in Blau et al., 1966). Weber's writings

only provided descriptions of formal bureaucracy characteristics, which has made empirical research difficult in validating the work of Weber.

Informal Structure

Later descriptions of organizational structure defined structures from the perspective of informal and formal structures (Selznick, 1943, 1948). Formal organizations were the primary focus of this study, but a definition for informal structure served to contextualize formal structure. According to Selznick (1948), informal structure represents group behavior that is a part from and somewhat unknown to the formal structure. Roethlisberger and Dickson (1941), in their book, *Management and the Work*, examined the behavior of informal structure among shop workers. Similarly, Barnard (1968) conducted a theoretical analysis of informal structure from the perspective of executive management. Barnard (1968) described informal structure as having no structure. Within informal structure, control is established through small informal groups and leadership. For example, the actions of the informal group represent group members' unfulfilled wishes not met by the formal organizational structure. Those unfulfilled wishes were not intentionally constructed by members but rather were understood (Selznick, 1948).

As a result, informal structures provided an outlet for group members that were not present in the formal structure. First, informal structures are mechanisms for controlling behavior of members at the group level. Second, group members' use informal structures as a mechanism to somewhat control their existence within the larger environment of the organization. Third, informal structures serve as a vehicle for building personal relationships among group members. Informal structures exist because

group members believe that formal structures do not provide for self-expression. Although informal structures may provide a means of self-expression for some groups within the organization, organizational goals may be impeded (Selznick, 1948).

Formal Structures

Conversely, organizations are formal structures. Formal structures are mechanisms used by organizations to achieve stated goals (Selznick, 1948). Formal structures represent a rational means that organizations use to meet goals. Identifying the definition of formal structures within organizations has been investigated since the beginning of organizational studies. Some of those investigations have been speculative rather than being based on systematic research. Early investigations, such as those performed by Weber (as cited in Blau et al., 1966) on the function of formal structures within organizations, were speculative or were based on case studies rather than a systematic exploration of the relationship between formal structures within organizations (Pugh et al., 1963).

For example, Weber (as cited in Blau et al., 1966) identified 26 characteristics of formal structures (Pugh et al., 1963). Udy (1959) concluded that there was no way to know if any of the characteristics proposed by Weber related because no systematic research had been performed. Stinchcombe (1959) came to the similar conclusion that the characteristics proposed by Weber were conceptual and not variables and that the characteristics had not been systematically studied.

Structural Dimensions

Pugh et al. (1963) proposed six structural variables and classified those variables as dimensions of organizational structure. The proper context for viewing structural

variables is the concept of dimensions using the perspective of a continuum (Hall, 1962). In addition to Hall, researchers such as Gouldner (as cited in Hall, 1962) and Udy (1959) viewed structures as a continuum. Understanding structural variables as continuums allow structures to be used in various organizational forms rather than exclusive to one particular organizational form (Hall, 1962). The structural variables identified by Pugh et al. (1963) include specialization, standardization, formalization, centralization, configuration, and flexibility. A study of the variables identified was published in a later work by Pugh, Hickson, Hinings, and Turner (1968), discussed after definitions of each of the structural variables were provided.

Specialization

Specialization is conceptualized as understanding the separate functions of tasks within organizations (Pugh et al., 1963). The specialization function has several characteristics. First, the number of specializations within an organization indicates the importance of the function. Second, the specialization function may be broken down into broad categories. Third, specialization is more common in big organizations. For example, an organization may have specialists that focus on the external environment, or specialists that focus on seeking out new opportunities for the organization. Fourth, an important characteristic of specialization is the degree of specialization, which is the process of distinguishing between one set of job responsibilities versus another set of job responsibilities at the functional level.

Specifically, the degree of specialization involves pinpointing an exact designation of roles within an organization (Pugh et al., 1963). For example, the facility manager is no longer required to perform a majority of the tasks within an organization.

Other professionals and artisans with specialized skill sets, such as engineers, architects, plumbers, and air conditioning mechanics perform those tasks. According to Friedmann (1961), a specialist is a professional whose knowledge is considered a must-have because the professional is knowledgeable about all aspects of the job. In addition, specialists exemplify a level of status within a functional area. According to Pugh et al. (1963), being able to identify the number of professionals in a function may lead to a better understanding of the overall structure of the function. Another aspect of specialization is division of labor. According to Blau, Heydebrand, and Stauffer (1966), division of labor is important to make a distinction between job titles and the duties and responsibilities associated with the titles.

Standardization

Standardization may be defined from the perspective of procedures and roles (Pugh et al., 1963). Procedures are formal, recurring, and known organizational tasks. Bales (1950) first described grouping procedures in a manner to be productive: Bales' procedures include (a) gather information for decision-making purposes, (b) make decisions, (c) convey information, and (d) implement decisions. Standardization is commonly associated with big organizations. Standardization is a common feature in most workflow activities. For example, standardization is a characteristic of large production operations (Pugh et al., 1969), because the technology in such organizations is characterized by increasing mechanization and standardization.

Because of standardization, especially in large production operations, less emphasis is placed on the individual and more on the overall operation, which may lead to feelings of disassociation by production workers (Pugh, Hickson, & Hinings, 1969).

In addition to disassociation of work, a direct impact of standardization results in the reduction of pay to production workers and the loss of expertise among workers (Fullan, 1970). According to Dalton et al. (1980), standardization may have an overall negative impact on worker performance.

Establishment of role standardization refers to varying levels of job distinction (Pugh et al., 1963). Varying levels of job distinction may be used to (a) describe the role and qualification for a specific function; (b) describe performance measurements; (c) specify offices, symbols, and status; and (d) specify performance rewards. The role characteristics provided focused on the organization as a whole, but roles may also be described from the perspective of groups.

From a group perspective, roles may be task specific or group specific (Benne & Sheats, 1948). Task-specific roles are those tasks chosen by the group that need to be completed. Task-specific roles are used to advance the efforts of the group in the identification, specification, and solution of group problems. Conversely, group specific tasks support group activities.

There are a number of features that characterize group-specific activities. Group-specific tasks may be used to (a) change group dynamics; (b) maintain the status quo of the group; (c) make the group stronger; (d) plan, direct, and manage group activities; and (e) sustain the group (Benne & Sheats, 1948). Similar to standardization in general, standardization of roles may contribute to disassociation of workers (Goldthorpe, 1959).

Formalization

Formalization is a type of structure that explains how communication and procedures relate (Pugh et al., 1963). Formalization may also be described as the degree

procedures are used to plan, direct, and control behavior (Miller et al., 1991). Simply put, formalization involves written procedures. Size is a key factor in determining if the structure of formalization is present in an organization. For example, in a study based on previously collected data from across many countries, Hickson, Hinings, McMillan, and Schwitter (1974) found that size influenced structure formalization.

Similarly, a study conducted by Marsh and Mannari (1981) used a survey instrument to collect data from 50 factories. The Marsh and Mannari study found that size influences formalization. Reimann (1980), in his study of 20 manufacturing plants, found that formalization was associated with size. The manufacturing plants in the Reimann study had parent and subsidiary relationships for which the parent company influenced the formalization of written rules for the subsidiary. The results of these studies (Hickson et al., 1974; Marsh & Mannari, 1981; Reimann, 1980) from research conducted in several different countries support the conclusion that formalization is somewhat dependent on size (measured by number of employees) of the company regardless of where the company is located (Hickson et al., 1974).

Centralization

Centralization is the localization of the decision-making structure of an organization (Pugh et al., 1963). Pugh et al. (1968) described centralization as the concentration of decisions made by those at the top of an organization. Centralization of decision-making may be described as the decision-making process being controlled by a few individuals (Dalton et al., 1980). Key variables that determine the existence of the centralization structure in organizations are professionalization, autonomy and, to a lesser extent, the size of the organization.

Analysis of a study conducted by Blau et al. (1966) in 1958 of 252 personnel agencies across the United States and Canada found that centralization increased as the division of labor increased. Increase in division of labor suggests a large organization. In the Blau et al. (1966) study, size (measured by number of employees) could be said to be a factor in centralization. The Blau et al. (1966) study also suggested that a lack of professionalization leads to an increase in centralization. Division of labor influences both professionalization and centralization, especially in smaller organizations (Blau et al., 1966).

Professionalization and centralization typically do not coexist in small organizations. In other words, for centralization to be present, professionalization must be absent. If professionalization is present, centralization cannot be present (Blau et al., 1966). Division of labor, size (as measured by division of labor), and technology of an organization may be factors that determine the centralization of authority, but configuration explains the shape of the authority within an organization (Pugh et al., 1963).

Configuration

Configuration is the structural shape of the jobs charged with operating an organization in relation to the positions charged with actually performing the work. The physical manifestation of those job positional relationships may be represented in the form of an organizational chart (Pugh et al., 1963). Characteristic features that point to the existence of configurations within an organization are vertical and lateral span of control, segmentation, number of positions (jobs), and status of the position (Pugh et al., 1963).

In an investigative study, Pugh, Hickson, Hinings, and Turner (1968) collected data on 46 organizations in an attempt to measure structural dimensions, including the dimension of configuration. The data collected was analyzed and the results of the analysis showed that characteristics of structure of configuration were present in the organizations that participated in the study. Pugh et al. (1963, 1968) concluded that the view of configuration was that one of several dimension formed an organization structure. Miller (1982) and Mintzberg (1980) advanced a much broader view of configuration. Mintzberg described configuration as a collection of unique parameters that defined an organization's structure. Miller described configuration as representing the entire organization rather than as one of many dimensions within an organization. Similarly, flexibility may also be defined from a much broader perspective.

Flexibility Structure

As with the previous definitions, Pugh et al. (1963) provides a concise meaning of flexibility structure. According to Pugh et al., flexibility is the change that may occur in an organizational structure. The flexibility structure may be characterized based on the amount, speed, and acceleration of change, and more importantly, through interpersonal relationships (Pugh et al., 1963). Unlike the dimensions of specialization, standardization, formulation, centralization, and configuration, Pugh et al. (1968) provided empirical evidence regarding the existence of these dimensions. However, Pugh et al. (1968) was unable to investigate the presence of flexibility in the 1968 study because of the lack of time required to study the change in organization structure.

Miller and Friesen (1982) provided a much broader understanding of flexibility by referring to flexibility as structural change and describing structural change from the

perspective of internal structural elements and the external environment. Miller and Friesen believed that what occurs in the environment influences the rate of structural change. Miller and Friesen characterized how organizations should respond to environmental dynamics by describing rate of structural change as either occurring immediately and simultaneously or occurring at different times (Miller & Friesen, 1982). For example, the Miller and Friesen study investigated how organization should respond to environmental influence on organizational structure.

The Miller and Friesen (1982) study was a longitudinal, collecting data from published sources and from questionnaires. The study covered 7 years to allow enough time to investigate structural change within organizations. The study concluded that structural changes that were immediate and simultaneous were associated with successful organizations in contrast with structural changes in organizations that occurred at different times (Miller, 1982). The organizational dimensions discussed in the preceding paragraphs provide valuable insight into explaining how facility management aligns with an organization's core business. The next section in this literature review defines the concept of culture.

Organizational Culture

One of the major assumptions put forth in this research study is that alignment theory can explain the relationship between an organization's functional unit and core business. Facility management is the functional unit that is being investigated. The relationship between an organization's functional unit and an organization's core business may be understood as a function of technology, structure, and the culture of an

organization fit. This study uses alignment theory to explain the relationship between technology, structure, and culture. Technology and structure were discussed in previous paragraphs. The next several sections focus on culture.

Definition of Culture

Baligh (1994) defines culture as components that may be fitted to organizational structure. This study is focused on narratives that link culture and structure together. Two broad narratives were used to explain the relationship between organizational culture and structure. One narrative defines culture as a product of organizational structure (Hall & Saias, 1980). The second narrative defines structure as a product of organizational culture (Janićijević, 2013; Pettigrew, 1979).

For example, Hall and Saias (1980) supported the first narrative by defining organizational culture as a product of organizational structure, stating that organizational culture exists between organizational structures and connect structures to each other. According to Hall and Saias (1980), organizational culture may be described as organizational member feelings manifested through their ideals, beliefs, and values. Structure may produce or generate culture from two possible sources. First, people that make up an organization are dissimilar. They may come from different cultures and have different beliefs and values. For example, in a study of 136 graduate students from different ethnic backgrounds, Cox, Label, and McLeod (1991) postulated that certain ethnic groups would be more willing to work together than other ethnic groups. The Cox et al. (1991) study confirmed this hypothesis.

The second source for generating organizational culture is the idea that an organization is a structure within a structure. This assumption is that cultures generate

structures within structures (Hall & Saias, 1980). For example, Rowlinson's (1995) case study of Cadbury, a British chocolate manufacturer, illustrates how structures within a larger structure can generate their own cultures. The overall or corporate structure at Cadbury was believed to be more associated with the founder's Quaker heritage. Conversely, the four labor institutions designed by Cadbury had their own cultures distinct from the corporate culture that reflected norms and belief systems circa 1960, which was the period reviewed in this case study.

Culture as a Product of Structure

Janićijević (2013) provides support for the second narrative by describing structure as a product of organizational culture. Janićijević described organizational culture similar to Hall and Saias (1980) but added key terms, such as norms, attitudes, and symbolisms that influence the way organizational members think about and perceive the world around them. Assuming that culture influences the way organizational members view their environment, the suggestion that organizational culture could influence workflow processes is reasonable.

Meyer and Rowan (1977) put forth the idea that institutional rules may take on myth-like and ceremonial characteristics that influence organizational structure. Myths and ceremonies are cultural characteristics (Pettigrew, 1979). Because these institutional rules can become powerful through the creation of myths and ceremonies, institutional rules tend to lead to a disconnect between organizational structure and actual work processes (Meyer & Rowan, 1977). For example, in the 1980s, high consideration and high initiation structural leadership style, known as *hi-hi leadership*, was thought to be an effective leadership structure (Schriesheim, 1982). According to Schriesheim, employees

in hi-hi leadership structures perceived the leader as compassionate and the relationship between the leader and subordinate were defined by the leader. Two separate studies questioned the effectiveness of hi-hi leadership style structures.

The study conducted by Larson, Hunt, and Osborn (1976) was one of the first studies to question the cultural myths of hi-hi leadership style structures. Larson et al. used a questionnaire to survey over 2400 participants from multiple types of organizations. The results of the survey showed little support for hi-hi leadership structure, which challenged the cultural myths of hi-hi leadership structure. Similarly, a study conducted by Schriesheim (1982) seems to support the conclusion of the Larson et al. study.

The Schriesheim (1982) study used questionnaires to survey over 700 participants. The results of the Schriesheim study support the Larson et al. (1976) study. The Larson et al. and Schriesheim studies support the idea advanced by Meyer and Rowan (1977) that institutional rules that rise to the level of myths and ceremonies create a disconnect between structure and actual work activities. The transformation of institutional rules to myths and ceremonies falls in line with the idea advanced by Hall and Sais (1980) that culture (myths and ceremonies) is a product of structure.

Facility Management

Facility Management Origin

Although the term *facility management* has been in use for less than 30 years, the many functions of managing buildings have been practiced by individuals with various titles since the early 20th century (APPA: Leadership in Educational Facilities, n.d.;

Lavy, 2008). For example, in the early 20th century, buildings and grounds were managed by individuals referred to as *building and grounds superintendents*. Midway through the 20th century, plant administrators managed buildings and grounds. Late in the 20th century, the term *facility management* was used by various trade publications, and company recruiters began to refer to building and ground superintendents and plant administrators as facility managers (Cotts & Lee, 1999).

Facility Management Misunderstanding

Facility management is responsible for delivering many different types of services (Chotipanich, 2004). Being a catchall for many organizational services has led to a misunderstanding and significant arguments have developed among practitioners and building professionals regarding the role of facility management (Yiu, 2008). Because facility management has responsibility for many functions, providing a clear and concise definition for facility management has been difficult, which has resulted in confusion regarding the role of facility management.

Difficulty in defining facility management has led to an apparent identity crisis (Bell, 1992; Carder, 1995; Dettwiler et al., 2009; Lehtonen, 2006; Nutt, 2004; Price, 2002; Price, Matzdorf, Smith, & Agahi, 2003; Yiu, 2008). The issue of an unclear definition of facility management is compounded by the lack of research in the field (Alexander, 1994; Chotipanich & Lertariyanun, 2011; Featherstone & Baldry, 2000; Nutt, 1999; Price et al., 2003).

Bell (1992) considers the fact that facility management has assumed numerous tasks and built a strong strategic position within organizations as positive rather than a weakness. Although Bell viewed the many definitions as a source of robust functionality,

others saw the issue as problematic and exposed facility management to being defined in a very limited perspective. For example, Alexander (1992) described facility management as simply a provider of services to organizations. Similarly, Kaiser (1989) described facility management as the process of optimizing the resources of an organization. In contrast, facility management may be described from a much broader multi-functional approach.

Cotts and Lee (1999) described facility management as the alignment between the physical environment, people, and other building professions, such as engineering and architecture. Because facility management can accommodate such a diverse set of meanings, the role of facility management has been called into question. Dettwiler et al. (2009) acknowledged the abundance of functions contained within facility management causes difficulty in distinguishing where the responsibilities of facility management end and other disciplines begin. Practitioners and those in traditional engineering fields have debated the status of facility management (Bell, 1992).

Some of the debate includes the following questions. What is the role of facility management? Is facility management an engineering or management discipline? Practitioners and leaders within facility management believe the debate surrounding the status of facility management is not justified (Bell, 1992). Facility management has no interest in gaining influence over the traditional engineering or management functions. Facility management ultimate goal is to bring diverse functions together to accomplish the objectives of an organization (Bell, 1992). Another factor affecting the status of facility management is that facility management is viewed primarily as a technical and operational function, rather than as strategic function (Chotipanich & Nutt, 2008;

Dettwiler et al., 2009; Grimshaw, 1999; Price et al., 2003; Ventovuori et al., 2007; Yiu, 2008).

Facility management professionals prefer to be viewed as part of the strategic planning process within organizations, but the major duties of facility management are operational (Grimshaw, 1999). According to Grimshaw, this shows that the role of facility management is unclear. For some time, there was a concern that, if this view of facility management did not change, facility management would be relegated to just being a maintenance function (Price et al., 2003). The fact that facility management is just a maintenance function seems rooted in the definition of facility management and that view has not changed over time (Dettwiler et al., 2009). For example, Alexander (1992) expressed concern that the focus of facility management on operations and service prevented the field from gaining professional status.

A qualitative case study conducted by Kaya et al. (2004) supported the claim that the focus of facility management was at the operational level. The purpose of the Kaya et al. study was to identify organizations with excellent facility management departments. One reason the study was conducted was to develop a program to change the attitudes of chief executive officers of study organizations regarding the role and position of facility management. The chief executive officer of one of the organizations studied viewed facility management as just a maintenance function. Although the chief executive did not change his views regarding the role of facility management, the results of the case study found that participation was important to raising the profile of facility management.

Facility Management Lack of Research

Despite having identity and status issues, businesses recognized the need for a sound facility management function. A common theme in the literature for resolving some of the stature and role issues affecting facility management was to (a) provide a solid theoretical foundation for facility research and (b) dramatically increase research in the facility management. One conclusion from the published literature is that empirical research in facility management needs to be expanded (Alexander, 1992; Grimm, 1992; Nutt, 1999).

The lack of research in the field of facility management should not be a surprise because in the early days of facility management, the need for research was recognized, but, as is evident by examining the published literature, a relatively modest amount of research has been conducted and published. For example, Grimm (1992) suggested that research should be conducted to (a) determine the content of educational material, (b) create a knowledge base, and (c) teach facility management. Grimm continued by suggesting that research is essential to ensure that the knowledge base is benchmarked. Alexander (1992) recommended establishing a research agenda. One of the agendas proposed by Alexander sounds very similar to the title of this study, which is research in facility management to investigate the relationship between facility services and organizational effectiveness.

Facility Management and Organizational Effectiveness

Several studies have attempted to explore the relationship between facility management and organizational effectiveness. For example, Rees (1997) investigated the relationship between health care institutions and facility management. One purpose of

the Rees study was to determine if size (based on annual budget) influenced hierarchical location of the facility manager's position. Rees (1998) investigated the relationship between health care institutions and facility management. Shiem-Shin Then (1996) performed a literature review to investigate if facility management could be framed from the perspective of integrated resources that would encourage organizations to include facility management in strategic decisions.

Facility Management Growth

Nutt (1999) begin to write about the lack of research in facility management early in the development of the field. By the mid-1990s, facility management had experienced substantial growth and recognition. The market for facility management services was being driven by suppliers, businesses seeking advice from consulting services, and contractors. Colleges were beginning to offer courses in facility management and college graduates recognized opportunities in the field. Empirical research did not expand with the growth in facility management (Alexander, 1994; Chotipanich & Lertariyanun, 2011; Price et al., 2003; Ventovuori et al., 2007; Yiu, 2008).

Because of the lack of research, facility management has borrowed from other disciplines, which is one reason why facility management suffers from status and identity issues (Nutt, 1999). Lack of research may have contributed to misinformed perceptions about facility management and may explain why facility management is mostly an operational discipline (Nutt, 1999). Nutt (1999) summarizes the issues that may be directly attributed to a lack of empirical research. First, the tasks and duties assign to facility management continue to expand. Second, facility management has a weak methodological foundation. Third, facility management lacks a knowledge base. Fourth,

facility management has not added any new information to the field of management that can be distinctively attributed to facility management. Fifth, facility management has no theoretical model as a foundation.

Facility Management Knowledge Base

Lack of research is a root cause to many of the issues affecting facility management. For example, in his article on facility management strategy, Alexander (1994) proposed that the future of facility management includes the following research objectives:

- Research should be conducted to understand the field of facility management, which implies that the research should not be conducted for the sole purpose of defining the field.
- Research should be conducted to build a knowledge base of facility management.
- Research should be conducted to identify best practices in facility management.
- Research should be shared among practitioners and professionals, but this research should be generalizable across the various functions of facility management.

Yiu (2008) seemed to be in agreement with Nutt (1999) when he (a) called for a knowledge base distinct to facility management, (b) proposed a framework to move facility management from an operational function to a strategic management function, and (c) suggested constructing a knowledge base for facility management. Yiu proposed to build a facility management knowledge base framework based on what Yiu referred to

as a market and firm agency theory. Yiu suggested that the framework is based on several established management theories, such as classical management theory, economic theory, and project management theory. Although Yiu proposed this framework in 2008, neither Yiu nor any other researchers have attempted to validate the framework through empirical study.

Facility Management Research Analysis

According to Ventovuori et al. (2007), facility management continues to struggle with the contradiction of how to define itself beyond the operational level. Ventovuori et al. suggested the only way facility management can realize the potential of becoming more strategically oriented is to develop a sound approach to analyzing and thinking about the major issues concerning facility management. Ventovuori et al. believe that this rethinking concerning facility management must begin with a thorough review of the relevant literature.

In a qualitative research study, Ventovuori et al. (2007) performed a literature review and a research study of the academic papers published in facility-management-related journals. The objective of the literature review in Ventovuori et al. was to review, evaluate, and classify academic research in the field of facility management. More importantly, Ventovuori and his team wanted to learn how this research was linked to the practice of facility management.

The literature review performed by Ventovuori et al. (2007) covered the years between 1996 and 2005. The review included published work in journals, which the Ventovuori team referred to as quality journals. Trade journals were not included. The term *quality journals,* in the opinion of this researcher, do not rise to the quality level of

academic peer-reviewed or scholarly journals. Based on this researcher's literature review, very few if any facility management articles have been published in peer-reviewed management journals. The two most commonly used journals identified by Ventovuori and his team was *Facility* and the *Journal of Facility Management*. Of all the published works reviewed by the Ventovuori team, more than half of the articles were published in the journal *Facility*. According to Ventovuori et al., *Facility* is the leading published journal in the facility management field.

The Ventovuori et al. (2007) team grouped the published articles into six categories: (a) technical, (b) performance, (c) procurement, (d) workplace, (e) sustainability, and (f) general trends. Ventovuori et al. also classified the published articles into empirical research categories. The two categories were case studies and generic. According to Nutt (1999), the case study focuses on one specific organization and, typically, the research is practice based. Conversely, a generic study is a general study mainly focusing on theory. This researcher's main interest is in empirical research. The summary of the Ventovuori et al. literature review shows (a) 197 papers were case-specific case studies or other qualitative studies and (b) 111 papers involved hypothesis testing, theory, or had quantitative designs. Based on a literature review of facility management, qualitative case study is the primary research methodology (Ventovuori et al., 2007).

Summary

The literature on the following topics was discussed in Chapter 2. First, a discussion was provided on the literature associated with alignment theory. The literature

on the following topics related to alignment theory, such as organizational alignment, strategic alignment, and congruence, were discussed. These topics served as a means for understanding the competing values model. The competing values model provided a means for depicting the research questions and survey items within the quadrants of the competing values model framework. The next topic discussed in the literature review was the components of organizations, such as technology, organizational structure, and culture. An analysis was performed on each organizational component. The final topic discussed in the literature review was facility management. Facility management was discussed from the perspective of origin, definition, arguments for and against, and the major challenges facing facility management.

CHAPTER 3. METHODOLOGY

Purpose of the Study

The purpose of Chapter 3 is to discuss the research design and methodology used in this study. This chapter provides a logical explanation of the factors used in selecting the research design used in this study. The chapter also provides a detailed discussion of the philosophical underpinnings associated with this study. The chapter discusses the methodological model, research questions and hypotheses, instrument measures and scales, data collection, pilot data, and data analysis procedures.

Research Questions

This research study had four research questions associated with comparing the alignment of facility management and an organization's core business. An hypothesis was created for each of the four research questions to test a sample of the population responses to the research questions. The four research questions for this research study were as follows:

RQ1: How does strategic alignment explain the difference between facility management services and an organization's core business?

RQ2: How are facility management services considered essential to an organization's core business?

RQ3: How do facility management services provide value to an organization's core business?

RQ4: How does facility management reputation play a role in the alignment of facility management services and an organization's core business?

Hypotheses

The hypotheses for the research questions may be expressed in the following manner.

Hypotheses for RQ1

H_0: $\mu_A = \mu_B$, where μ_A is the mean of the index values of survey instrument questions that measure facility management services and μ_B is the mean of the index values of survey instrument questions that measure the strategic alignment of an organization's core business.

H_0: There is not a statistically significant difference between facility management services and the strategic alignment of an organization's core business.

H_A: $\mu_A \neq \mu_B$, where μ_A is the mean of the index values of survey instrument questions that measure facility management services and μ_B is the mean of the means of the index values of survey instrument questions that measure the strategic alignment of an organization's core business.

H_A: There is a statistically significant difference between facility management services and the strategic alignment of an organization's core business.

Hypotheses for RQ2

H_0: $\mu \leq 3$, where μ is the mean of the index values of survey instrument questions that measure how essential facility management services are to an organization's core business.

H_0: Facility management services are not statistically significantly essential to an organization's core business.

H_A: $\mu > 3$, where μ is the mean of the index values of survey instrument questions that measure how essential facility management services are to an organization's core business.

H_A: Facility management services are statistically significantly essential to an organization's core business.

Hypotheses for RQ3

H_0: $\mu \leq 3$, where μ is the mean of the index values of survey instrument questions that measure the degree to which facility management services add value to an organization's core business.

H_0: Facility management services do not add a statistically significant value to an organization's core business.

H_A: $\mu > 3$, where μ is the mean of the index values of survey instrument questions that measure the degree to which facility management services add value to an organization's core business.

H_A: Facility management services add a statistically significant value to an organization's core business.

Hypotheses for RQ4

H_0: $\mu \leq 3$, where μ is the mean of the index values of survey instrument questions that measure the role of facility management reputation in the alignment of facility management services to an organization's core business.

H_0: Facility management reputation does not have a statistically significant role in the alignment of facility management services to an organization's core business.

H_A: $\mu > 3$, where μ is the mean of the index values of survey instrument questions that measure the role of facility management reputation in the alignment of facility management services to an organization's core business.

H_A: Facility management reputation has a statistically significant role in the alignment of facility management services to an organization's core business.

Research Design

This study used a quantitative, non-experimental, comparative, cross-sectional, survey research design. Comparative research design is consistent with the research problem and question because this research study attempts to compare the differences between groups, such as facility services, organizational core, essential facility services, value, and reputation of facility management.

Quantitative Approach

The quantitative method was discussed from the following perspectives: origin, definition, arguments for and against, and relevance to this research study. Philosophical underpinnings, such as positivism and functionalism, were discussed

Positivism. The positivist philosophy is most commonly associated with quantitative research (Mkansi & Acheampong, 2012). The terms *positive science* and *philosophy* have been around for hundreds of years (Crotty, 1998). Sir Francis Bacon is credited with using the terms *positive science* and *positive philosophy* as early as the 15th century, but those terms were replaced by *positivism*, which became popular through the work of Auguste Comte in the 18th century (Crotty, 1998). Sir Francis Bacon's work, *Novum Organum or True Directions Concerning the Interpretation of Nature*, attempted to address the untruths or false idols that impeded knowledge (Kessler, 2001).

Comte, who is seen as the father of sociology, (Ekelund & Olson, 1973) believed society could benefit from understanding natural law. Comte sought to integrate the tenets of natural law into the seeking of knowledge through positive science and philosophy later to be known as positivism (Crotty, 1998). Since Comte, the meaning of positivism has changed throughout the centuries transitioning from positivism, to logical positivism, contemporary positivism to post-positivism.

The major writings of Comte are *Cours de Philosophie Positive*, which was written between 1830 through 1842 and *System of Positive Polity*, which was written between 1851 and 1877 (Ekelund & Olsen, 1973). In his writings, Comte's suggest positivism is the pursuit of knowledge which follows a model similar to natural law (Crotty, 1998), but not the kind of natural law that relies on survival of the fittest (Donaldson, 2005). To Comte, the philosophy of natural law means all living things are in agreement with the environment and cannot be separated (Ekelund & Olsen, 1973), but through adaptation and intelligence, life may coexist with the environment Donaldson (2005). Human adaptive process relies on the ability to observe the environment and

through inductive or empirical observation. Intelligent life can live in harmony with the environment. The empirical observation process implied by Comte seeks to understand the environment through objective observation of which can be seen through a scientific process and not simply relying on speculation (Crotty, 1998).

Logical positivism. Logical positivism originated in Vienna in the early 19th century. The central tenet of logical positivism proposes the only way to true knowledge is by investigating only observable facts, which was not the position of Comte's positivism (Crotty, 1998). The proponents of logical positivism believed that every statement must be verified through empirical investigation (Godfrey & Hill, 1995). In the pursuit of knowledge through empirical investigation, the logical positivists, also referred to as logical empiricists, are only interested in the facts that can be observed.

The logical empiricists are not interested in the value attached to observable, nor or the logical empiricists interested in that which cannot be observed (Godfrey & Hill, 1995). For that reason, the logical empiricists were closely aligned to the science of physics (Crotty, 1998). Logical positivism has been the dominant research philosophy in management for many years as illustrated by the abundant use of quantitative research methodology in management research (Godfrey & Hill, 1995; Karami, Rowley, & Analoui, 2006). Although the philosophy of logical positivism is still a dominant research philosophy, post-positivism represents a return back to the positivism of Comte (Crotty, 1998).

Post-positivism. Early signs of the return of the post-positivist movement may be seen in the softening of the logical positivist regarding unobservable facts (Godfrey & Hill, 1995), and positive functionalism (Donaldson, 2005). As indicated earlier, logical

positivism is closely aligned with the science of physics, but a relative new theory in the field of physics, quantum theory, calls into question the central tenant of logical positivism, which is that logical positivism only interested in the facts that can be observed and not interested in the unobservable (Crotty, 1998). Basically, quantum theory proposes there are some characteristics of the atom that is unobservable, but successful predictions about the atom has been made based on unobservable characteristics of the atom, which is contradictory to the logical positivist position (Godfrey & Hill, 1995).

As a result, the logical positivists changed their position on unobservable data but still hold to the position that not much can be learned from non-observable facts. The postpositive views, which represent a move from logical positivism to post-positivism, are instrumental and functional. Instrumental positivism allows for the use of unobservable in theory development although the logical positivist would still argue against the use of unobservable in theory because the ultimate truth is still not revealed (Godfrey & Hill, 1995). The instrumental positivist counters by arguing that the complete truth of phenomena is rarely revealed, but if the unobservable used in theory development can provide adequate approximation to the truth of a phenomena, then the use of the unobservable in theoretical construct is justified.

Functionalism. Another example, which represents a more moderate positivist view, is the concept of functionalism. Functionalism proposes that the optimum structure of an organization was selected because the decision makers of organization are compelled to make the correct decision due to situational factors, and not solely on the ideals of the decision-maker (Donaldson, 2005). Stated differently, to achieve the most

successful outcome, the structure and situational influences must align. The structure and situational influence represents the observable, while the feelings and ideals of the decision maker represent the unobservable.

Positivism supports the notion of functionalism because the decision maker relies on the outcome of the organization structure to make the decision to keep the existing structure or change to a new structure. The reliance on theory development and situational influences are two of the primary reasons why positivism has played a dominant role in the study of organization theory, which aptly describes why quantitative research is the chosen methodology for this study. Quantitative research is ideally suited for using parametric and nonparametric measures, random sampling, and analytical surveys.

Non-Experimental Research Design

The research design for the study is non-experimental. According to Gelo, Braakman, and Benetka (2008), the primary focus of non-experimental design is to explain the relationship between two or more variables. When there are large numbers of variables, which cannot be controlled in a true experiment, a non-experimental design may be a better choice (Swanson & Holton, 2005). Characteristics, such as non-manipulation of variables and lacking random assignment are other ways of describing non-experimental designs (Rumrill, 2004). Some researchers argue that the non-experimental design approach is weaker than an experimental research design because non-experiment design cannot show causal relations between variables (Turner, Balmer, & Coverdale, 2013). Alternatively, Johnson (2001) argued that non-experimental research is important for the very reason Turner et al. suggested non-experimental

research is weaker. Further, Johnson argues that non-experimental design is important because they may provide additional evidence to support experimental research.

There are three types of non-experimental research designs: causal-comparative or comparative, correlational, and descriptive. A brief definition of correlation design and descriptive research were provided and a detailed discussion of causal-comparative research was discussed because this research study is causal-comparative. Descriptive research designs do not manipulate the independent variable but use surveys to collect data according to Holton and Burnett (as cited in Swanson & Holton, 2005). The purpose of descriptive research is to provide detailed features of a representative portion of a population (Turner et al., 2013). Correlational research helps find the relationships that exist between several variables. Second, correlational research design does not infer causation. Third, correlational research uses hypotheses to test the study's research questions according to Holton and Burnett (as cited in Swanson & Holton, 2005).

Causal-comparative research is a non-experimental design that does not allow for the manipulation of variables, seeks to contrast the difference between variables, but does not attempt to prove an independent variable caused a change in an outcome or dependent variable (Lenell & Boissoneau, 1996). Causal-comparative studies are commonly associated with comparing large data groups (Rumrill, 2004). For example, this research study seeks to determine the differences between facility management and core business groups in a university setting. This study does not seek to prove a causal relationship between the groups but to determine the level of maturity based on a measurement scale and to determine if there are significant differences between the groups (Lenell & Boissoneau, 1996).

The principal characteristics of causal-comparative research may be described in the following manner. First, the principal statistical methods used to analyze data in a causal-comparative study are the *t* test, analysis of variance, analysis of covariance, or nonparametric statistics (Lenell & Boissoneau, 1996). Second, the groups in a causal-comparative study are already intact, unlike in a true experiment where a control group may be created to conduct the experiment (Schenker & Rumrill, 2004). Third, causal-comparative research infers that a relationship exists between variables but cannot prove that a cause and effect relationship exist between the variables (Turner et al., 2013). Fourth, a causal-comparative research design uses a quantitative approach to conduct research.

Research Methodology

The relationship between the variables was analyzed using statistical analysis relevant to non-experimental comparative studies. Parametric, nonparametric, and descriptive statistics were used in this study. The parametric statistics used in the study are (a) the paired samples *t* test and (b) the one-sample *t* test. A paired-samples *t* test is used to compare the means from two related samples. The one-sample *t* test is used to compare the means of one sample with a mean that is unknown (Laerd Statistics, 2015). Parametric and nonparametric statistical methods have a set of characteristics and assumptions that are appropriate for use with specific types of data. For example, parametric statistical procedures are suitable only for analyzing data measured on interval or ratio scales. On the other hand, nonparametric statistical procedures are suitable for analyzing data measured on nominal or ordinal scales (Cooper & Schindler, 2011).

In some instances, parametric statistical models may be used to analyze ordinal data that has been transformed into interval or ratio scale values using such transformations as arithmetic means. The parametric statistical models used to analyze data in this study are the paired-samples and one-sample *t* test. Use of parametric techniques, such as the paired-samples and one-sample *t* test to analyze ordinal data is possible only when sample arithmetic means are used to test the hypotheses (Knapp, 1990).

The principal assumptions guiding parametric measures are to determine the level of relationship between quantitative variables (Cooper & Schindler, 2011). Descriptive statistics, such as arithmetic mean and standard deviations, were used in this study.

Population and Sample

Population and Sampling Frame

The population for this research study was all higher education facility professionals recruited from the sampled organization. Facility management professionals are individuals involved in the day-to-day management of university physical-plant facilities that are composed of one or more buildings. Facility management professionals have a variety of job titles within the higher education industry, such as (a) vice president of administrative services, (b) director of facilities, (c) facility manager of a specific area or building, or (d) building supervisor.

The sampling frame for this research study was all higher education facility professionals recruited from the sampled organization. When this study was conducted, the organization through which participants were recruited had 1,104 members.

Minimum Sample Sizes

The minimum sample size was determined using G*Power 3.1.9.2 software (Mayr, Erdfielder, Buchner, & Faul, 2007). Research Question 1 required the comparison of the arithmetic means of two different populations, which requires a paired-samples *t* test.

A two-tail test was used in this research study to test Research Question 1 because the alternative hypothesis is H_A: $\mu_A \neq \mu_B$. The effect size is a measure of the difference between what the sample reveals and what was expected in the population (Vacha-Haase & Thompson, 2004). The sample size is important in determining the effect size. Cohen (1992) uses measures, such as small (0.20), medium (0.5), and large (0.8) to describe effect-size levels for paired-samples *t* tests. A small-to-medium effect size value of 0.3 was used as a factor to determine minimum sample size for this study. The third factor used to determine the sample size was the desired alpha error (α) or probability of committing a Type I error (rejecting a true null hypothesis). A commonly used value for the probability of committing a Type I error is .05, which means there is a one in 20 chance that the null hypothesis was rejected when the null hypothesis was true (McCrum-Gardner, 2010). The fourth factor used to determine sample size was the power factor. Power is one minus the probability of committing a Type II error (accepting a false null hypothesis), which is represented by the symbol β. The power value used for this study was 0.87, which is above the commonly acceptable lower threshold for power analysis of 0.80 (McCrum-Gardner, 2010).

A priori analysis was used to compute the minimum sample size, which was determined to be 108 with a statistical power of 0.87, effect size 0.3, and significance

level 0.05 (see Table 1). Central and non-central distributions for the paired-samples *t* test appear in Figure 3.

Table 1. G*Power 3.1.9.2 Output for Paired-Samples *t* test

Phase	Description	Result
Input:	Tail(s)	= Two
	Effect size dz	= 0.3
	α err prob	= 0.05
	Power (1-β err prob)	= 0.87
Output:	Noncentrality parameter δ	= 3.1176915
	Critical t	= 1.9823834
	Df	= 107
	Total sample size	= 108
	Actual power	= 0.8706833

Note. *t* tests - means: difference between two dependent means (matched pairs); analysis was a priori, computing required sample size.

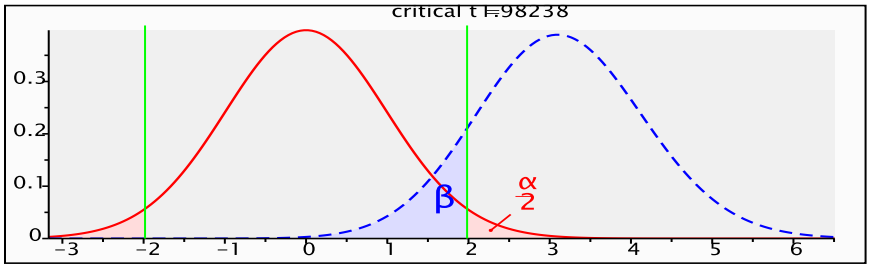


Figure 3. Central and non-central distributions for the paired-samples *t* test.

The minimum sample size for RQ2, RQ3, and RQ4 was calculated for a one-tail test because the alternate hypotheses for the three research questions were H_A: $\mu > 3$. Again, a small-to-medium effect size value of 0.3 was used as a factor to determine minimum sample size for this study. Again, the commonly used value for the probability of committing a Type I error of .05 was used to compute the minimum sample size. The power statistic used for RQ2, RQ3, and RQ4 was 0.93, which again is above the commonly acceptable lower threshold for power analysis of 0.80 (McCrum-Gardner, 2010).

Table 2. G*Power 3.1.9.2 Output for One-Sample *t* test

Phase	Description	Result
Input:	Tail(s)	= One
	Effect size d	= 0.3
	α err prob	= 0.05
	Power (1-β err prob)	= 0.93
Output:	Noncentrality parameter δ	= 3.1464265
	Critical t	= 1.6589535
	Df	= 109
	Total sample size	= 110
	Actual power	= 0.9308233

Note. *t* tests - means: difference from constant (one sample case); analysis was a priori, computing required sample size.

The minimum sample size was determined to be 110 with a statistical power of 0.93, effect size of 0.3, and significance level of 0.05 (see Table 2). A graph of the central and non-central distributions for the one-sample *t* test appears in Figure 4.

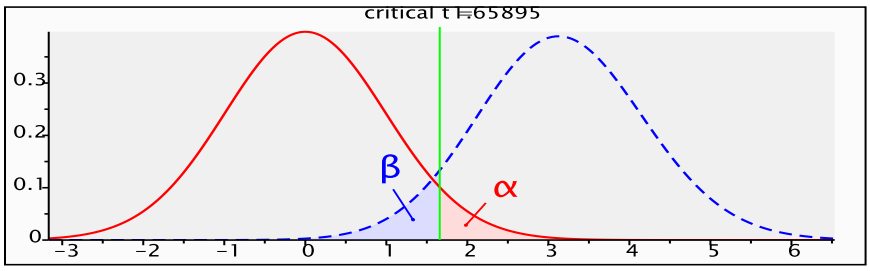


Figure 4. Central and con-central distributions for the one-sample *t* test.

Sampling Plan

A simple random sample was used to select the participants included in the sample for this study. Recruiting, selecting, and assigning were the sampling procedures used to obtain participants. The participants for the current sample were randomly selected from the organization through which participants were recruited. The recruitment process began with an e-mail that was sent to the director of the organization through which participants were recruited. The director sent instructions on how to request permission to survey the organization through which participants were recruited. An application was completed and submitted to the organization through which participants were recruited. Next, the director of the organization assigned a research project number through which participants were recruited. Then the organization through which participants were recruited assigned an advisory council mentor. Finally, the

organization designated the researcher for this study through which participants were recruited.

The sampling process involved using simple random sampling to select participants to participate in this study (Cooper & Schindler, 2011). The simple random sampling technique used for this study utilized the Excel random sample function. The sampling frame provided by the organization through which participants were recruited contained e-mail addresses for 1,104 higher education facility managers.

Instrumentation/Measures

Survey Instrument

The data for this study were collected using a modified version of the Strategic Alignment Maturity survey instrument. Sledgianowski, Luftman, and Reilly (2006) developed the original Strategic Alignment Maturity survey instrument. The Strategic Alignment Maturity survey instrument questions used an ordinal scale.

This research study's four research questions served as the foundation for selecting the measurement questions and instrument and proved to be a valuable guide for selecting the method for delivering the questions to the participants. Based on the research questions, the Strategic Alignment Maturity questionnaire was modified to collect responses from facility management professionals.

A modified version of the Strategic Alignment Maturity survey instrument originally developed by Dr. Jerry Luftman was used for this study (Luftman, 2004). The original survey instrument was developed from the framework proposed by Dr. Luftman and validated by Sledgianowski et al. (2006). The modifications made to the original

survey instrument for use in this study were made using Dr. Luftman's framework. Permission to use the strategic alignment instrument was provided in writing by Dr. Luftman (2004).

The original Strategic Alignment Maturity survey instrument was designed as a general tool that could be used to assess strategic maturity of both information technology functions and other organizational functions (Luftman, 2004). The modified survey instrument was completed by the participants for this study using Survey Monkey, a provider of web-based survey instrument services. The modifications made to the original version of the Strategic Alignment Maturity survey instrument are described later in this chapter.

Luftman (2004) also developed the framework for the Strategic Alignment Maturity survey instrument. The framework of the Strategic Alignment Maturity survey instrument is constructed based on five strategic alignment maturity levels: (a) initial process, (b) committed process, (c) established focused process, (d) improved managed process, and (e) optimized process (Sledgianowski et al., 2006).

Instrument Scale

The original Strategic Alignment Maturity survey instrument used a multiple-choice single-response survey format based on the components and maturity levels described in the preceding paragraphs. The survey instrument items consisted of four categories. Under each category, several statements were provided to explore issues pertaining to that category. The statements used a scale made up of six multiple-choice questions to determine the level of maturity. Multiple-choice Question 1 indicated the lowest level of maturity and Question 5 indicated the highest level of maturity. The sixth

question was used to provide the participant an alternative when they did not know or understand the questions regarding maturity level (Sledgianowski et al., 2006). The maturity levels for the instrument scale are provided in Appendix B.

Validity and Reliability

Sledgianowski et al. (2006) validated the original Strategic Alignment Maturity survey instrument for internal consistency. Reliability of the original Strategic Alignment Maturity survey instrument was tested using Cronbach's coefficient alpha, which measures the similarities in instrument items and variables (Cooper & Schindler, 2011). The Cronbach's alpha values for the original Strategic Alignment Maturity survey instrument factors were as follows: (a) communication 0.71, (b) governance 0.73, (c) partnership 0.74, and (d) skills 0.79 (Sledgianowski et al., 2006).

Field Test and Pilot Study

The Strategic Alignment Maturity survey instrument was designed to measure the maturity level of information technology professionals. However, Luftman (2004) stated that the Strategic Alignment Maturity survey instrument could be adapted to measure the maturity level of other organizational functions, such as (a) accounting, (b) human resources, and (c) facility management. The modifications made to the original Strategic Alignment Maturity survey instrument for this study were minor:

- The words *facility management* were substituted for the words *information technology*.
- The word *university* was substituted for the word *organization*.

No changes were made to the scale or item format structure. The original Strategic Alignment Maturity survey instrument used a single-item statement format followed by five questions. The modified survey instrument used an identical statement format and structure. Both field and pilot tests were conducted for the modified instrument.

Field Test

Facility managers have diverse training and educational levels, including education and training as architects, engineers, and business. Yiu (2008) defined facility management as the practice of coordinating the built environment with people through the integration of business administration, architecture, behavior, and engineering disciplines. Ellerthorpe (2001) discussed the additional business opportunities facility management affords architects. Architectural firms view facility management as a value to their client portfolio (Castellanos Moreno, Martin, & Eduardo, 2013).

A field test was performed on the modified instrument. For the field test, eight letters were sent to facility management professionals requesting that they serve as expert reviewers of the modified Strategic Alignment Maturity survey instrument. An introductory letter, the modified Strategic Alignment Maturity survey instrument, and this research study's research questions were sent to the facility management professionals who indicated that they would participate in the field test.

Three of the expert reviewers responded to the request to review the modified Strategic Alignment Maturity survey instrument. The qualifications of the expert reviewers who responded included the following: (a) a businessperson holding a Harvard University MBA, (b) an architect, and (c) an engineer, all of whom were active in facility management. The three reviewers' responses indicated that the modified Strategic

Alignment Maturity survey instrument would be appropriate to answer the research questions associated with this research study.

Pilot Study

The pilot study was sent to 16 randomly selected participants. Although this pilot study used a small sample size (16 participants), Edgell (1984) performed *t* tests and Pearson *r* tests on sample sizes as small as five and both tests performed well. The pilot survey instrument was analyzed to ensure the reliability of the modified version of the Strategic Alignment Maturity survey instrument.

Organizational core. Organizational core refers to those organizational functional units, competencies, or strategies that directly affect the client. The data for organizational core was collected using the following eight questions from the modified Strategic Alignment Maturity survey instrument: 5, 6, 8, 11, 12, 19, 25, and 26.

Facility service. Facility service is service management. Facility service is a management framework that can accommodate a diverse list of services delivered by facility management (McLennan, 2004). The data for facility services were collected using the following five questions from the modified Strategic Alignment Maturity survey instrument: 7, 10, 16, 20, and 28.

Essential facility management service. Essential facility management service is tailored specifically to meet the strategic mission of an organization (Chotipanich, 2004). The data for essential facility management services were collected using the following five questions from the modified Strategic Alignment Maturity survey instrument: 9, 13, 15, 17, and 27.

Value of facility management service. Value of facility management service is the perception by the customer that facility services have contributed to the organization based on the cost and risk associated with that service (Kok et al., 2011). The data for the value of facility management services were collected using the following four questions from the modified Strategic Alignment Maturity survey instrument: 14, 21, 24, and 30.

Reputation of facility management service. Reputation of facility management service is the public awareness of the positive benefits of facility management services (Coenen et al., 2010). The data for the reputation of facility management services were collected using the following four questions from the modified Strategic Alignment Maturity survey instrument: 18, 22, 23, and 29.

Data Collection

Survey Monkey

A web-based survey instrument was used to collect data for this study. Survey Monkey is one of the leading web-based survey instrument companies that help researchers solve survey instrument problems by offering membership to their service for a fee (Survey Monkey, 2016). Tools provided by Survey Monkey were used to create and deliver the survey instrument used in this study. The following was the process for data collection.

Initial Phase

1. An e-mail was sent to the director of the organization through which participants were recruited as a letter of introduction. The e-mail contained the introductory information, the purpose of the research, and permission to

conduct a survey instrument of facility professionals who subscribe to the organization through which participants were recruited.

2. The director of the organization through which participants were recruited was contacted by the researcher. The organization through which participants were recruited had previously hosted a seminar at the researcher's campus; therefore, there was an existing relationship with the organization through which participants was recruited.

Participant Phase

1. After permission was granted to survey the organization through which participants were recruited, an e-mail was sent to each randomly selected participant.
2. The randomly selected participants were informed that the survey instrument would be administered through Survey Monkey and the participants were instructed to access the survey instrument at a web link provided to them.
3. Informed consent was sent to each participant. A data confidentiality form was included with the informed consent form. Respondents were given the option to withdraw from the survey.
4. Survey Monkey recorded the time each survey instrument was completed.
5. The results of the survey were collected by Survey Monkey and transmitted to the researcher.

Ending Phase

1. A follow up e-mail was sent to all selected participants thanking those who participated in the survey (the identities of those who participated was not known to the researcher).
2. The elected participants were informed that the results of the survey instrument would be made available upon request.

Testing Statistical Model Assumptions

The hypotheses for this study were tested using a paired-samples *t* test and a one-sample *t* test. Both of these statistical models were developed using certain specific assumptions. Before these statistical tests can be used to test the hypotheses for this study, the assumptions for both the paired-samples *t* test and one-sample *t* test must be tested using data from the sample to verify that the model assumptions have been satisfied.

Testing Assumptions for the Paired-Samples *t* test

The assumptions for the paired-samples *t* test were tested as follows (Laerd Statistics, 2015):

1. The data were obtained using random sampling. This assumption was tested by examining the sampling plan (Laerd Statistics, 2015).
2. The data for the dependent variables is measured on a continuous scale. This assumption was tested by examining the measurement scale for the dependent variables (Laerd Statistics, 2015).

3. The independent variable is categorical with two related groups. This assumption was tested by examining the definition and measurement scale for the independent variable (Laerd Statistics, 2015).
4. No significant outliers exist within the differences in the paired means for the two dependent variables. For this study, outliers were defined to be difference values that are more than ±3 standard deviations from the overall mean of the differences. This assumption was tested using box-and-whisker plots (Laerd Statistics, 2015).
5. The differences in the paired means for the two dependent variables should be approximately normally distributed. This assumption was tested using: (a) the Kolmogorov-Smirnov test of normality and (b) histograms with a superimposed normal curve (Laerd Statistics, 2015).

Testing Assumptions for the One-Sample *t* test

The assumptions for the one-sample *t* test were tested as follows (Laerd Statistics, 2015):

1. The data were obtained using random sampling. This assumption was tested by examining the sampling plan (Laerd Statistics, 2015).
2. The data for the dependent variable is measured on a continuous scale. This assumption was tested by examining the measurement scale for the dependent variable (Laerd Statistics, 2015).
3. No significant outliers exist for the dependent variable. For this study, outliers were defined to be values of the dependent that are more than ±3

standard deviations from the overall mean of the dependent variable. This assumption was tested using box-and-whisker plots (Laerd Statistics, 2015).

4. The means for the dependent variable should be approximately normally distributed. This assumption was tested using (a) the Kolmogorov-Smirnov test of normality and (b) histograms with a superimposed normal curve (Laerd Statistics, 2015).

Testing Hypotheses for the Research Questions

The hypotheses for each research question were tested using the following procedures.

Testing the Hypotheses for RQ1

The null and alternative hypotheses for RQ1 are as follows:

H_0: $\mu_A = \mu_B$, where μ_A is the mean of the index values of survey instrument questions that measure facility management services and μ_B is the mean of the index values of survey instrument questions that measure the strategic alignment of an organization's core business.

H_A: $\mu_A \neq \mu_B$, where μ_A is the mean of the index values of survey instrument questions that measure facility management services and μ_B is the mean of the index values of survey instrument questions that measure the strategic alignment of an organization's core business.

The hypotheses for RQ1 were tested using a paired-samples *t* test. The purpose of the paired-samples *t* test is to infer whether, or not the means of the two groups are from the same or different populations (Laerd Statistics, 2015). The level of significance used

to conduct the test was $\alpha = .05$. That is, the probability of committing a Type I error (not supporting a true null hypothesis) is equal to .05. The paired-samples *t* test was conducted as a two-tailed test because $H_A: \mu_A \neq \mu_B$.

Testing the Hypotheses for RQ2, RQ3, and RQ4

The null and alternative hypotheses for RQ2 are as follows:

$H_0: \mu \leq 3$, where μ is the mean of the index values of survey instrument questions that measure how essential facility management services are to an organization's core business.

$H_A: \mu > 3$, where μ is the mean of the index values of survey instrument questions that measure how essential facility management services are to an organization's core business.

The null and alternative hypotheses for RQ3 are as follows:

$H_0: \mu \leq 3$, where μ is the mean of the index values of survey instrument questions that measure the degree to which facility management services add value to an organization's core business.

$H_A: \mu > 3$, where μ is the mean of the index values of survey instrument questions that measure the degree to which facility management services add value to an organization's core business.

The null and alternative hypotheses for RQ4 are as follows:

$H_0: \mu \leq 3$, where μ is the mean of the index values of survey instrument questions that measure the role of facility management reputation in the alignment of facility management services and an organization's core business.

H_A: $\mu > 3$, where μ is the mean of the index values of survey instrument questions that measure the role of facility management reputation in the alignment of facility management services and an organization's core business.

The hypotheses for RQ2, RQ3, and RQ4 were tested using a one-sample *t* test. The purpose of the one-sample *t* test is to infer whether or not the mean of the dependent variable is from a population with a hypothesized mean value (Statistics, 2015), which for RQ2, RQ3, and RQ4 is $\mu \leq 3$. The level of significance used to conduct the test was $\alpha = .05$. That is, the probability of committing a Type I error (not supporting a true null hypothesis) is equal to .05. The one-sample *t* tests for RQ2, RQ3, and RQ4 were conducted as one-tailed tests because H_A: $\mu > 3$.

Ethical Considerations

Ensuring ethical considerations and procedures for sampling participants in an online research study were paramount. The research questionnaire for this online study was delivered using participants' e-mails. To address any ethical considerations regarding sampling procedures and the e-mail delivery of the Strategic Alignment Survey, ethical concerns, such as informed consent, the right to withdraw, security of delivery method, confidentiality and anonymity, and avoiding harm were provided to participants (Barchard & Williams, 2008).

The following steps were performed to address above ethical concerns. First, two opportunities were provided to the participants regarding informed consent. An abbreviated version of the informed consent and the entire version of informed consent form were provided to the participants. A main consideration was ensuring that the

informed consent form was easily understood. Second, no deception of any kind was used in this study to collect information from participants. Third, participants had the right to withdraw from the study at any time. Fourth, the data collection was performed in a secure manner. Fifth, the data collection was confidential and anonymous. Finally, the study did not cause any harm to the participants (Barchard & Williams, 2008).

Summary

In summary, a non-experimental, comparative research design was used in this study. The approach for this study was quantitative. A thorough discussion was provided on the research design and quantitative approach. Population descriptions and sampling frames were defined and minimum sample sizes were determined using G*Power software 3.1. A simple random sample was the sampling plan that was used. The type of statistical tests and their assumptions were discussed.

CHAPTER 4. RESULTS

The purpose of this study is to compare the alignment between facility management and an organization's core business. In Chapter 4 (a) the pilot data are analyzed, (b) the study's sample is described, (c) demographics of the data are presented, (d) the assumptions of the study's statistical model are tested, (e) research questions are reviewed, and (f) hypotheses associated with the research questions are tested.

Description of the Sample

Responses

Invitations to participate in an Internet-based survey were e-mailed to 581 facility professionals that were randomly selected from the sample frame of 1,104 members on the organization's information list through which participants were recruited. Completed surveys were submitted by 111 participants, which represented a response rate of 19.1% of those who were randomly invited to participate.

Post-Hoc Power Analysis

A post-hoc power analysis was performed using G*Power 3.1.9.2, which generated the power analysis for the paired-samples *t* test for RQ1 shown in Table 3 and the graph of the central and non-central distributions appearing in Figure 5. The achieved power for the paired sample *t* test was .932, which means that a false null hypothesis was

rejected correctly in 93.2% of all cases. A power of .932 is greater than the .800 recommended for Type II errors (Cooper & Schindler, 2011).

Table 3. Post-Hoc Power Analysis for Paired-Samples *t* test (RQ1)

Phase	Description	Results
Input:	Tail(s)	= One
	Effect size dz	= 0.3
	α err prob	= 0.05
	Total sample size	= 111
Output:	Noncentrality parameter δ	= 3.1606961
	Critical t	= 1.6588242
	Df	= 110
	Power (1-β err prob)	= 0.9327137

Note. *t* tests - means: difference between two dependent means (matched pairs); analysis was post hoc, computing achieved power.

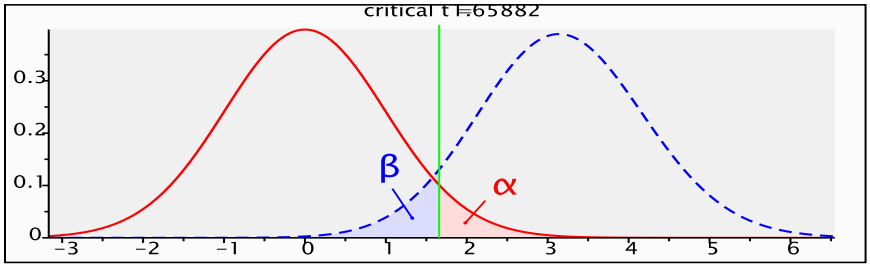


Figure 5. Post-hoc central and non-central distributions for paired-sample *t* test.

A post-hoc power analysis was performed for the one-sample *t* test used for RQ2, RQ3, and RQ4. The results appear in Table 4 and the graph of the central and non-central distributions appears in Figure 6. The power analysis for the one-sample *t* test also was .932, which means that a false null hypothesis was rejected correctly in 93.2% of all cases. Again, a power of .932 is greater than the .800 recommended for Type II errors (Cooper & Schindler, 2011).

Table 4. Post-Hoc Power Analysis for One-Sample *t* test (RQ2, RQ3, and RQ4)

Phase	Description	Results
Input:	Tail(s)	= One
	Effect size d	= 0.3
	α err prob	= 0.05
	Total sample size	= 111
Output:	Noncentrality parameter δ	= 3.1606961
	Critical t	= 1.6588242
	Df	= 110
	Power (1-β err prob)	= 0.9327137

Note. t tests - means: difference from constant (one sample case); analysis was post hoc, computing achieved power.

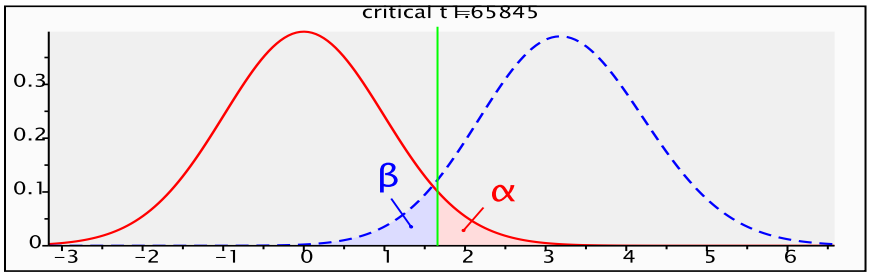


Figure 6. Post-hoc central and non-central distributions for one-sample *t* test.

Demographics

The gender distribution of facility professionals who participated in this study was 95% male and 5% female (see Table 5). The distribution for reporting of facility professionals who participated in this study was (a) 18.0% of facility professionals report to the president of their university, (b) 66.7% of facility professionals report to the Provost, and (c) 37% of facility professionals report to the vice president of facilities (see Table 6). The organizational structure of facility management in this sample is: (a) 69.4% centralized, (b) 6.3% decentralized, and (c) 27% hybrid (see Table 7).

Table 5. Gender

	Frequency	Percent
Male	105	94.6
Female	6	5.4
Total	111	100.0

Table 6. Facility Management Report to Officers

	Frequency	Percent
President	20	18.0
Provost	54	48.6
VP of Facilities	37	33.3
Total	111	100.0

Table 7. Facility management Organizational Type

	Frequency	Percent
Centralized	77	69.4
Decentralized	7	6.3
Hybrid	27	24.3
Total	111	100.0

Survey Instrument Validity and Reliability

The data analysis results for this study yielded a Cronbach's alpha of .893 (see Table 8). No items needed to be deleted to improve on the internal consistency of the Strategic Alignment Maturity instrument because the items in the *Corrected Item-Total Correlation* column are all above .3 and the values in the *Cronbach's Alpha if Item Deleted* column are greater than .7 (see Table 9; Laerd Statistics, 2015)

Table 8. Reliability Statistics Strategic Alignment Maturity (SAM) Instrument

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
.899	.902	26

Table 9. Item-Total Statistics Strategic Alignment Maturity (SAM) Instrument

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
OrgCore5	71.72	223.604	.416	.460	.897
OrgCore6	72.78	221.066	.571	.515	.895
FMService7	72.70	214.207	.627	.613	.893
OrgCore8	71.43	225.179	.260	.262	.899
EssentialFMS9	72.57	211.980	.543	.599	.894
FMService10	72.92	215.373	.340	.436	.900
OrgCore11	72.16	214.991	.556	.600	.894
OrgCore12	72.37	211.365	.588	.627	.893
EssentialFMS13	72.92	227.836	.229	.375	.899
ValueFMS14	72.40	221.427	.297	.351	.899
EssentialFMS15	73.09	210.921	.575	.547	.893
FMService16	71.88	210.517	.571	.466	.893
EssentialFMS17	71.36	218.656	.547	.611	.894
ReputationFMS18	72.51	208.613	.607	.646	.892
OrgCore19	72.34	213.624	.478	.631	.895
FMService20	72.57	210.374	.556	.503	.894
ValueFMS21	72.51	213.658	.569	.489	.893
ReputationFMS22	71.88	215.575	.529	.612	.894
ReputationFMS23	72.01	213.687	.450	.465	.896
ValueFMS24	72.34	214.376	.564	.536	.894
OrgCore25	72.67	221.506	.344	.439	.898
OrgCore26	72.85	214.615	.480	.430	.895
EssentialFMS27	73.48	222.817	.418	.382	.897
FMService28	73.16	215.331	.588	.648	.893
ReputationFMS29	71.84	219.339	.528	.623	.895
ValueFMS30	72.96	221.573	.392	.452	.897

Table 10. Reliability Statistics OrgCore

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
.702	.718	8

Table 11. Item-Total Statistics OrgCore

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
OrgCore5	20.76	19.331	.433	.304	.672
OrgCore6	21.82	19.152	.503	.357	.663
OrgCore8	20.47	19.965	.223	.073	.706
OrgCore11	21.19	17.354	.479	.370	.654
OrgCore12	21.41	15.693	.584	.453	.624
OrgCore19	21.37	17.762	.299	.164	.702
OrgCore25	21.71	18.741	.314	.205	.691
OrgCore26	21.89	16.944	.421	.217	.668

Table 12. Reliability Statistics FMService

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
.645	.675	5

Table 13. Item-Total Statistics FMService

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FMService7	10.82	11.717	.490	.264	.563
FMService10	11.05	10.807	.272	.083	.676
FMService16	10.00	10.796	.426	.206	.578
FMService20	10.69	10.753	.409	.220	.587
FMService28	11.28	11.717	.490	.287	.562

Table 14. Reliability Statistics EssentialFMS

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
.584	.555	5

Table 15. Item-Total Statistics EssentialFMS

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
EssentialFMS9	10.49	5.279	.451	.272	.459
EssentialFMS13	10.84	8.680	.057	.019	.640
EssentialFMS15	11.02	4.974	.522	.311	.403
EssentialFMS17	9.28	7.119	.344	.134	.530
EssentialFMS27	11.40	7.321	.347	.165	.531

Table 16. Reliability Statistics ValueFMS

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
.518	.524	4

Table 17. Item-Total Statistics ValueFMS

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ValueFMS14	8.20	5.107	.212	.085	.539
ValueFMS21	8.30	4.444	.424	.180	.334
ValueFMS24	8.13	5.005	.309	.142	.445
ValueFMS30	8.76	5.450	.306	.124	.451

Table 18. Reliability Statistics ReputationFMS

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	*N* of Items
.688	.712	4

Table 19. Item-Total Statistics ReputationFMS

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ReputationFMS18	10.28	6.132	.519	.277	.593
ReputationFMS22	9.66	7.006	.542	.390	.583
ReputationFMS23	9.78	6.776	.371	.145	.704
ReputationFMS29	9.61	7.980	.527	.353	.615

Testing Statistical Model Assumptions

Testing Assumptions for the Paired-Samples *t* test

The results of testing the assumptions for the paired-samples *t* test were as follows.

The data were obtained using random sampling. This assumption was tested by examining the sampling plan, which stated that the data was collected using simple random sampling. Therefore, this assumption was satisfied.

The data for the dependent variables is measured on a continuous scale. This assumption was satisfied because the values of both of the dependent variables are arithmetic means computed from the responses to groups of individual questions.

The independent variable is categorical with two related groups. This assumption was satisfied because the independent variable is categorical with two possible values.

No significant outliers exist within the differences in the paired means for the two dependent variables. For this study, outliers were defined to be difference values that are more than ±3 standard deviations from the overall mean of the differences. This assumption was tested using box-and-whisker plots (see Figure 7). The results reveal seven outliers were identified in the data, as assessed by inspection of a box-plot. The outliers were kept in the data, because the paired-samples *t* test was run with outliers (see Table 22), and without outliers (see Table 24) and there was no observable difference in the results.

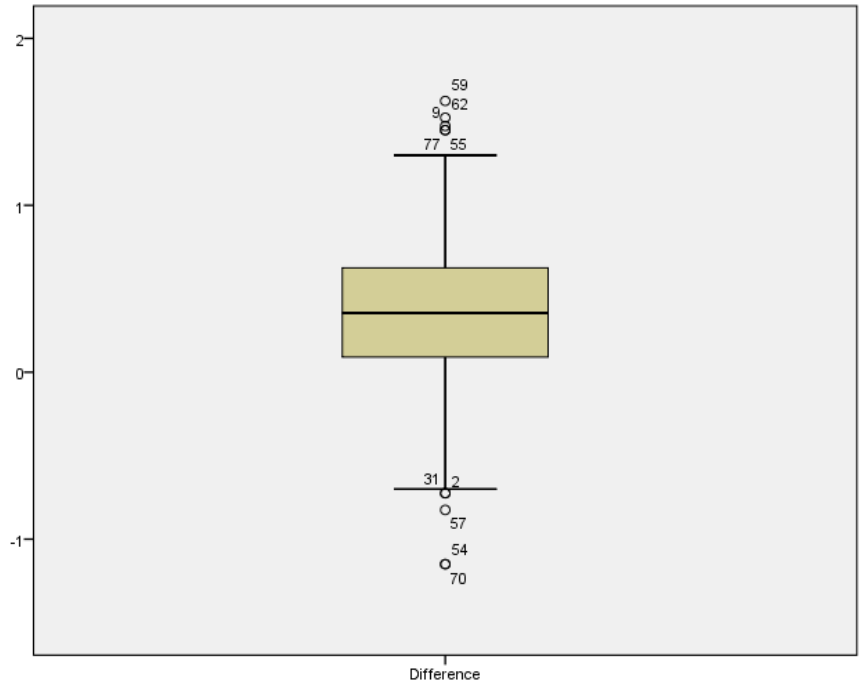


Figure 7. Box-and-whisker plot of the differences between the means.

The differences in the paired means for the two dependent variables should be approximately normally distributed. This assumption was tested using: (a) the Kolmogorov-Smirnov test of normality and (b) histograms with a superimposed normal curve. Examining the results for the Kolmogorov-Smirnov test of normality (see Table 20), the null hypothesis that the differences between matched-pair means was normally distributed was not supported because $p = .001 < \alpha = .05$. The histogram and superimposed curve for the differences of the means in Figure 8 appears to support the null hypothesis that the distribution of the differences is normal. Even though the test for normality was somewhat inconclusive, the paired-samples *t* test was run because the paired-samples *t* test is sufficiently robust for larger sample sizes so the estimators generated by the test should not be biased (Laerd Statistics, 2015).

Table 20. Tests of Normality Difference variable

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	.119	111	.001	.972	111	.021

Note. a. Lilliefors Significance Correction

Table 21. Paired Samples Statistics with Outliers

		Mean	*N*	Std. Deviation	Std. Error Mean
Pair 1	OrgCore	3.05	111	.596	.057
	FMService	2.69	111	.800	.076

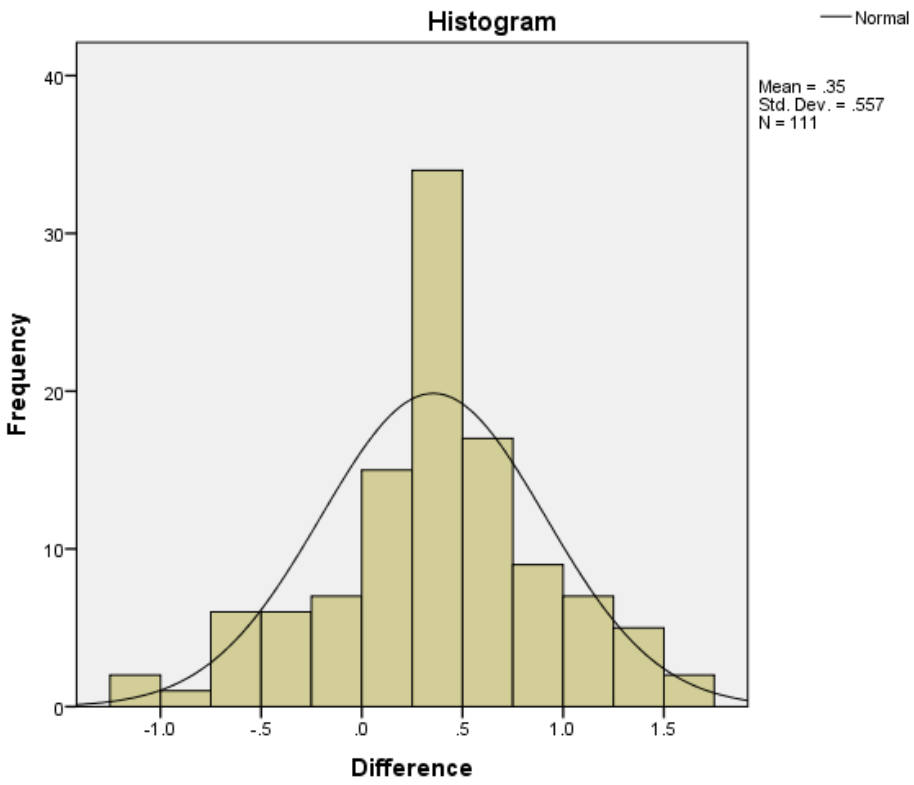


Figure 8. Difference between means histogram and normal curve.

Table 22. Paired Samples Test with Outliers

					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	OrgCore - FMService	.354	.557	.053	.249	.459	6.697	110	.000

Note. Represents paired differences.

Table 23. Paired Samples Statistics without Outliers

		Mean	*N*	Std. Deviation	Std. Error Mean
Pair 1	OrgCore	3.04	88	.666	.071
	FMService	2.69	88	.897	.096

Table 24. Paired Samples Test without Outliers

					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	OrgCore - FMService	.351	.622	.066	.219	.482	5.293	87	.000

Note. Represents paired differences.

Testing Assumptions for the One-Sample *t* test

The results of testing the first two assumptions for the one-sample *t* test for RQ2, RQ3, and RQ4 were as follows:

The data were obtained using random sampling. This assumption was tested by examining the sampling plan, which stated that the data was collected using simple random sampling. Therefore, this assumption was satisfied.

The data for the dependent variable is measured on a continuous scale. This assumption was satisfied because the values of the dependent variable are arithmetic means computed from the responses to groups of individual questions. The results of testing the third and fourth assumptions for the one-sample *t* test for RQ2 were as follows.

No significant outliers exist for the dependent variable. For this study, outliers were defined to be difference values that are more than ±3 standard deviations from the overall mean of the differences. This assumption was tested using box-and-whisker plots. Facility management essential had three outliers in the data. The outliers are depicted in the box-plot, (Figures 9, 11, and 13). The results reveal 12 outliers that were identified in the data, as assessed by inspection of box-plots. The outliers were kept in the data because a one-sample *t* test was run on each variable without outliers (see Tables 26, 31, 36) and with outliers (see Tables 28, 33, 38), and there was no statistically significant difference in the results.

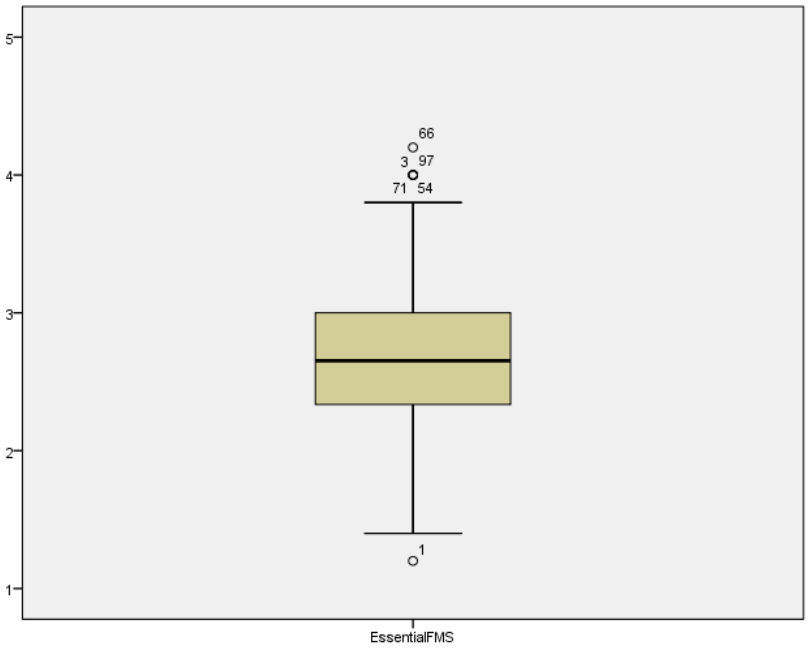


Figure 9. Box-and-whisker plot of EssentialFMS.

Table 25. One-Sample Statistics without Outliers EssentialFMS

	N	Mean	Std. Deviation	Std. Error Mean
EssentialFMS	88	2.64	.685	.073

Table 26. One-Sample Test without Outliers EssentialFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
EssentialFMS	-4.945	87	.000	-.361	-.51	-.22

Note. Test value = 3.

Table 27. One-Sample Statistics with Outliers EssentialFMS

	N	Mean	Std. Deviation	Std. Error Mean
EssentialFMS	111	2.65	.615	.058

Table 28. One-Sample Test with Outliers EssentialFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
EssentialFMS	-5.966	110	.000	-.348	-.46	-.23

Note. Test value = 3.

The data for the dependent variable should be approximately normally distributed. This assumption was tested using: (a) the Kolmogorov-Smirnov test of normality and (b) histograms with a superimposed normal curve (Laerd Statistics, 2015). Kolmogorov-Smirnov test of normality was performed on the variable FMess (see Table

29). The histogram and normal curve for Essential Facility Management Service is depicted in Figure 10. The facility management essential scores were not normally distributed, as assessed by Kolmogorov-Smirnov test because $p = .003 < \alpha = .05$.

Table 29. Tests of Normality EssentialFMS

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	.108	111	.003	.975	111	.036

Note. a. Lilliefors Significance Correction

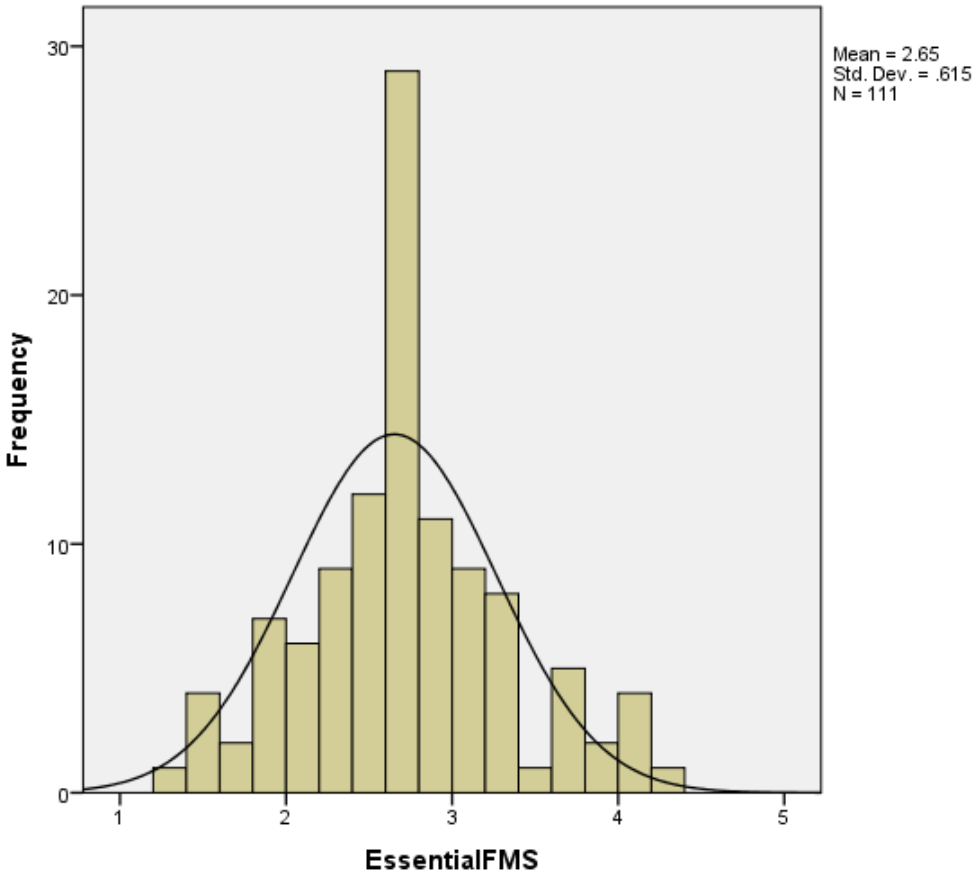


Figure 10. Histogram of EssentialFMS.

The results of testing the third and fourth assumptions for the one-sample *t* test for RQ3 were as follows:

No significant outliers exist for the dependent variable. For this study, outliers were defined to be difference values that are more than ±3 standard deviations from the overall mean of the differences. This assumption was tested using box-and-whisker plots. Facility management value had six outliers in the data. The outliers are depicted in the box-plot shown in Figure 11. The results reveal 12 outliers that were identified in the data, as assessed by inspection of box-plots. The outliers were kept in the data, because a one-sample *t* test was run on each variable without outliers (see Tables 26, 31, 36) and with outliers (see Tables 28, 33, 38), and there was no statistically significant difference in the results.

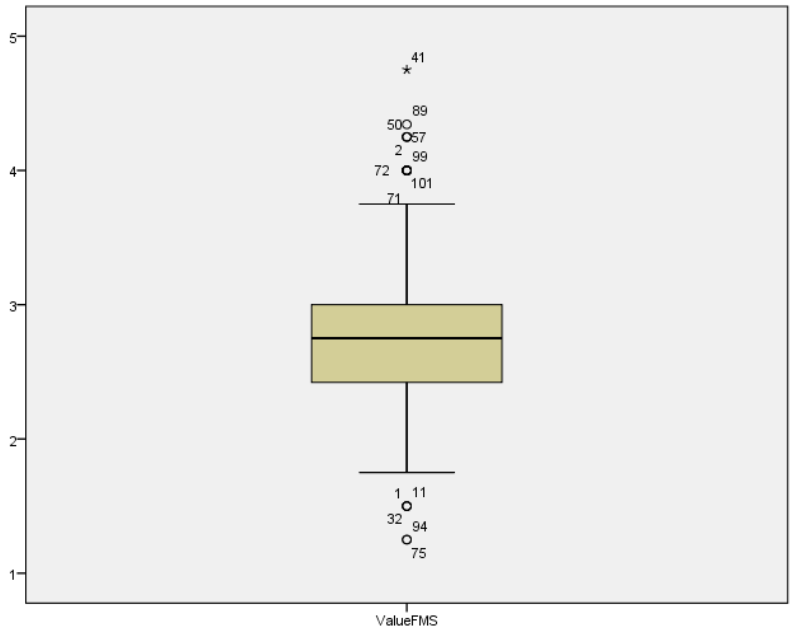


Figure 11. Box-and-whisker plot of ValueFMS.

Table 30. One-Sample Statistics with Outliers ValueFMS

	N	Mean	Std. Deviation	Std. Error Mean
ValueFMS	88	2.78	.778	.083

Table 31. One-Sample Test without Outliers ValueFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
ValueFMS	-2.623	87	.010	-.218	-.38	-.05

Note. Test value = 3.

Table 32. One-Sample Statistics with Outliers ValueFMS

	N	Mean	Std. Deviation	Std. Error Mean
ValueFMS	111	2.78	.692	.066

Table 33. One-Sample Test ValueFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
ValueFMS	-3.298	110	.001	-.217	-.35	-.09

Note. Test value = 3.

The data for the dependent variable should be approximately normally distributed. This assumption was tested using: (a) the Kolmogorov-Smirnov test of normality and (b) histograms with a superimposed normal curve (Laerd Statistics, 2015). The Kolmogorov-Smirnov test of normality was performed on the variable facility

management value as shown in Table 34. The histogram and normal curve is depicted in Figure 12. The Value of Facility Management Service scores were not normally distributed, as assessed by Kolmogorov-Smirnov test because $p <. 005 < \alpha = .05$.

Table 34. Tests of Normality ValueFMS

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ValueFMS	.203	111	.000	.943	111	.000

Note. a. Lilliefors Significance Correction

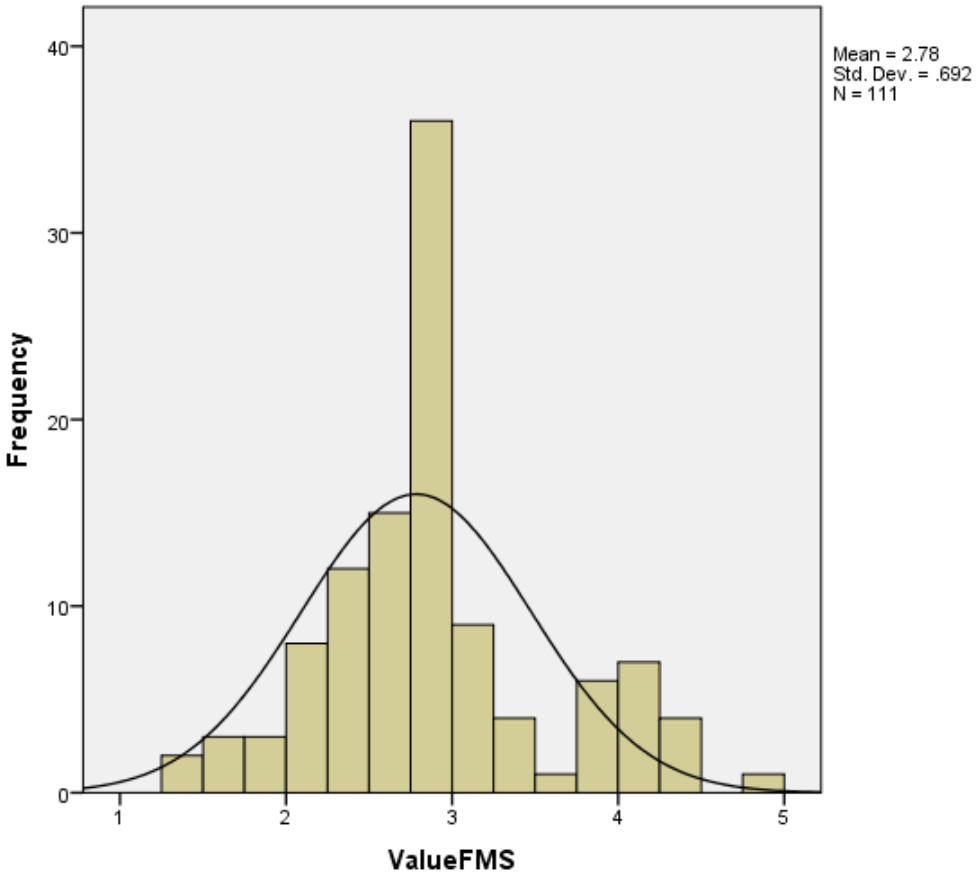


Figure 12. Histogram of ValueFMS.

The results of testing the third and fourth assumptions for the one-sample *t* test for RQ4 were as follows:

No significant outliers exist for the dependent variable. For this study, outliers were defined to be difference values that are more than ±3 standard deviations from the overall mean of the differences. This assumption was tested using box-and-whisker plots. Facility management reputation had three outliers in the data. The outliers are depicted in the box-plot shown in Figure 13. The results reveal 12 outliers that were identified in the data, as assessed by inspection of box-plots. The outliers were kept in the data, because a one-sample *t* test was run on each variable without outliers (see Tables 26, 31, 36), and with outliers (see Tables 28, 33, 38) and there was no statistically significant difference in the results.

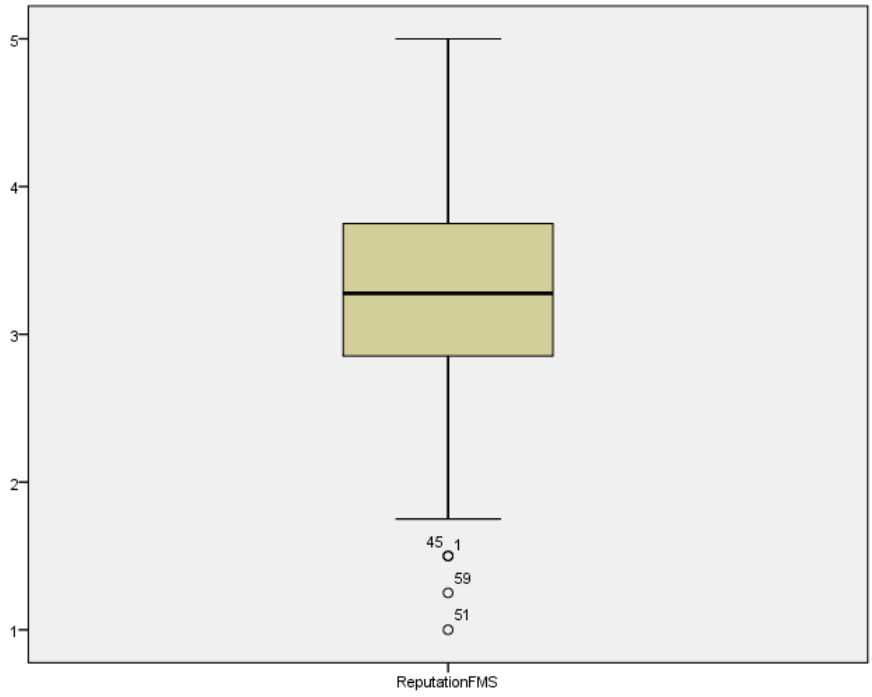


Figure 13. Box-and-whisker plot of ReputationFMS.

Table 35. One-Sample Statistics without Outliers ReputationFMS

	N	Mean	Std. Deviation	Std. Error Mean
ReputationFMS	88	3.29	.939	.100

Table 36. One-Sample Test without Outliers ReputationFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
ReputationFMS	2.846	87	.006	.285	.09	.48

Note. Test value = 3.

Table 37. One-Sample Statistics ReputationFMS

	N	Mean	Std. Deviation	Std. Error Mean
ReputationFMS	111	3.28	.838	.080

Table 38. One-Sample Test ReputationFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
ReputationFMS	3.482	110	.001	.277	.12	.43

Note. Test value = 3.

The data for the dependent variable should be approximately normally distributed. This assumption was tested using: (a) the Kolmogorov-Smirnov test of normality and (b) histograms with a superimposed normal curve (Laerd Statistics, 2015).

Kolmogorov-Smirnov test of normality was performed on the Reputation Facility Management Service as shown in Table 39. ReputationFMS was not normally distributed, as assessed by Kolmogorov-Smirnov test of normality because $p < .005) < (\alpha = .05$. The distribution of facility management reputation is depicted in the histogram, Figure 14.

Table 39. Tests of Normality ReputationFMS

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
ReputationFMS	.163	111	.000	.957	111	.001

Note. a. Lilliefors Significance Correction

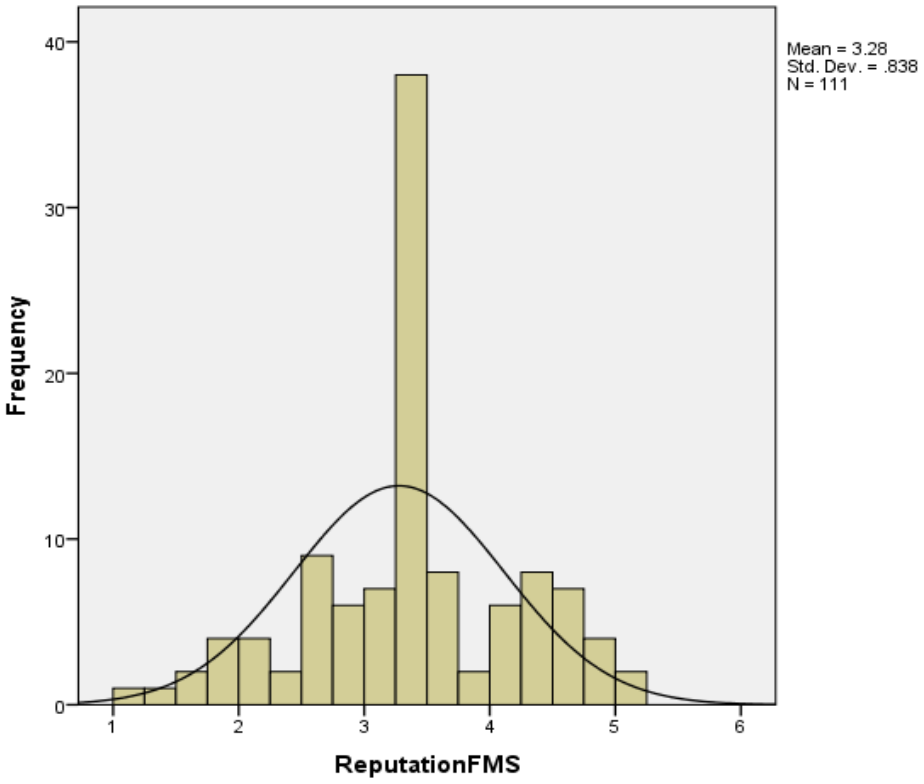


Figure 14. Histogram of ReputationFMS.

Hypothesis Testing

Hypotheses were tested to answer the four research questions associated with this study.

Hypothesis Testing for Research Question 1

A paired-samples *t* test was used to test the hypotheses associated with RQ1 (Laerd Statistics, 2015). To run the paired-samples *t* test, a new variable was created that was the difference between each of the paired values of the dependent variables Organizational Core Index and Facility Management Services Index. Descriptive statistics for the paired-samples *t* test appear in Table 40. The Organizational Core Index (OrgCore) had a higher value ($M = 3.05$, $SD = .596$) than did the Facility Management Services Index (FMService) ($M = 2.69$, $SD = .800$).

Table 40. Paired Samples Statistics with Outliers

		Mean	*N*	Std. Deviation	Std. Error Mean
Pair 1	OrgCore	3.05	111	.596	.057
	FMService	2.69	111	.800	.076

Table 41 presents the results for the paired-samples *t* test, which was run as a two-tailed test because $H_A: \mu_A \neq \mu_B$. The null hypothesis $H_0: \mu_A = \mu_B$ was not supported because $p < .0005 < \alpha/2 = .025$. That is, there is a statistically significant difference between the means of the Organizational Core Index and the Facility Management Services Index, which means that, the alternative hypothesis $H_A: \mu_A \neq \mu_B$ was supported.

Table 41. Paired Samples Test with Outliers

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	OrgCore - FMService	.354	.557	.053	.249	.459	6.697	110	.000

Note. Represents paired differences.

Hypothesis Testing for Research Question 2

A one-sample *t* test was used to test the hypotheses associated with RQ2 (Laerd Statistics, 2015). Descriptive statistics for the one-sample *t* test for RQ2 appear in Table 42. The arithmetic mean of the Essential Facility Management Services Index is 2.65 and the standard deviation is .615.

The value of the Essential Facility Management Services Index was tested against the value of the arithmetic mean (and median) of the possible values of the Likert scale for this question, which was 3.0. The hypothesis H_0: $\mu \leq 3$ was constructed as a one-tailed test to determine whether the Essential Facility Management Services Index was lower than the population mean Essential Facility Management Services Index score of 3.0.

Table 42. One-Sample Statistics with Outliers EssentialFMS

	N	Mean	Std. Deviation	Std. Error Mean
EssentialFMS	111	2.65	.615	.058

Table 43 presents the results for the one-sample *t* test for RQ2. The null hypothesis H_0: $\mu \leq 3$ was supported because t = -5.966 is negative. That is, the value of the population Essential Facility Management Services Index is ≤ 3.

Table 43. One-Sample Test with Outliers EssentialFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
EssentialFMS	-5.966	110	.000	-.348	-.46	-.23

Note. Test value = 3.

Hypothesis Testing for Research Question 3

A one-sample *t* test was used to test the hypotheses associated with RQ3 (Laerd Statistics, 2015). Descriptive statistics for the one-sample *t* test for RQ3 appear in Table 44. The arithmetic mean of the Value of Facility Management Services Index is 2.78 and the standard deviation is .692.

The value of the Value of Facility Management Services Index was tested against the value of the arithmetic mean (and median) of the possible values of the Likert scale for this question, which was 3.0. The hypothesis H_0: $\mu \leq 3$ was constructed as a one-tailed test to determine whether the Value of Facility Management Services Index was lower than the population mean Value of Facility Management Services Index score of 3.0.

Table 45 presents the results for the one-sample *t* test for RQ3. The null hypothesis H_0: $\mu \leq 3$ was supported because t = -3.298 is negative. That is, the value of the population Value of Facility Management Services Index is ≤ 3.

Table 44. One-Sample Statistics with Outliers ValueFMS

	N	Mean	Std. Deviation	Std. Error Mean
ValueFMS	111	2.78	.692	.066

Table 45. One-Sample Test with Outliers ValueFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
ValueFMS	-3.298	110	.001	-.217	-.35	-.09

Note. Test value = 3.

Hypothesis Testing for Research Question 4

A one-sample *t* test was used to test the hypotheses associated with RQ4 (Laerd Statistics, 2015). Descriptive statistics for the one-sample *t* test for RQ4 appear in Table 46. The arithmetic mean of the Reputation of Facility Management Services Index is 3.28 and the standard deviation is .838.

The value of the Reputation of Facility Management Services Index was tested against the value of the arithmetic mean (and median) of the possible values of the Likert scale for this question, which was 3.0. The hypothesis H_0: $\mu \leq 3$ was constructed as a one-tailed test to determine whether the Reputation of Facility Management Services Index was lower than the population mean Reputation of Facility Management Services Index score of 3.0.

Table 46. One-Sample Statistics with Outliers ReputationFMS

	N	Mean	Std. Deviation	Std. Error Mean
ReputationFMS	111	3.28	.838	.080

Table 47 presents the results for the one-sample *t* test for RQ4. The null hypothesis H_0: $\mu \leq 3$ was not supported because t = 3.482 is positive and $p = 001 < \alpha =$ .05. That is, the alternative hypothesis H_A: $\mu > 3$ is supported. The value of the population Reputation of Facility Management Services Index is greater than 3.

Table 47. One-Sample Test with Outliers ReputationFMS

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower	Upper
ReputationFMS	3.482	110	.001	.277	.12	.43

Note. Test value = 3.

Summary of Results

For Research Question 1, the null hypothesis for the test variable FM services and organizational core was not supported. The alternative hypothesis was supported. That is, there is a statistically significant difference between facility management services and the strategic alignment of an organization's core business. For Research Question 2, the null hypothesis for Essential Facility Management Service was supported. That is, facility management services are not statistically significantly essential to an organization's core business. For Research Question 3, the null hypothesis for the value of Facility Management Services was supported. That is, facility management services

do not add a statistically significant value to an organization's core business. For Research Question 4, the null hypothesis for the reputation of Facility Management Service was not supported, but the alternative hypothesis was supported. That is, facility management reputation has a statistically significant role in the alignment of facility management services to an organization's core business.

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Introduction

The premise of this study started with the belief that facility management was not fully integrated into the strategic decision making process of a University. An objective of this study was to investigate whether facility management was (a) a strategic decision-making partner that was aligned with the core decision-makers of a university or (b) just a service provider with very little input into the strategic decision making process. Based on a thorough review of the literature, a purpose statement and four research questions were developed.

The purpose of this study was to compare the alignment between facility management services and a university's core business from the perspective of strategic alignment. The study sought to answer four research questions.

Research Question 1 (RQ1): How does strategic alignment explain the difference between facility management services and an organization's core business?

Research Question 2 (RQ2): How are facility management services considered essential to an organization's core business?

Research Question 3 (RQ3): How do facility management services provide value to an organization's core business?

Research Question 4 (RQ4): How does facility management's reputation play a role in the alignment of facility management services and an organization's core business?

Significance of the Study

The significance of this study is to extend the research on how facility management services strategically align with the core business of higher education institutions by examining how facility management services, essential facility management services, facility management value, and, facility management reputation aligns with an organization's core business. Another aspect of this research study is to add to a modestly sized knowledge base because of the relatively small number of research studies that used quantitative hypothesis testing to study facility management. For example, Ventovuori et al. (2007) literature review of papers published between 1996 and 2005 found that only 25 published facility management studies involved hypothesis testing. An even smaller number of published research studies have attempted to study how facility management strategically aligns with an organization's core business using a quantitative hypothesis-testing methodology (Ventovuori et al., 2007).

Literature Reviewed

The literature reviewed was extensive and covered several major topics, such as facility management, organizational alignment, organizational structure, organizational culture, and organization technology. In order to understand how facility management aligns within an organization's core business, one needed to understand the relationships that exist between organizational technology, organizational structure, and organizational

culture. For example, the literature suggests that if organizational structure and technology facility management are aligned, the organization may be successful (Woodward, 1980). Culture also plays a role with how technology facility management and structure must fit in order to result in a successful organization. For example, Janićijević (2013) suggested that human behavior within organizations cannot be fully understood without understanding the relationship between organizational culture and organizational structure. Janićijević described culture as a set of assumptions and values that originate from organizational members that influences all organizational structures.

Technology is the work of organizations performed by organizational members (Perrow, 1967). For example, Perrow (1967) described technology as the actions used to transform input into output. In other words, technology is the function of organizations. As a result, technology represents the work performed by the various functions or units within an organization. Organizational functions may include information technology, accounting, human resources, and facility management. Establishing facility management as an organizational function was key to understanding the purpose of this study, which was to explain the alignment relationship between facility management and an organization's core business.

Methodology Used

A modified version of the Strategic Alignment Maturity survey instrument was used to collect the data and produce the findings for this study. The survey instrument was delivered to participants online using Survey Monkey.

Summary of Results

For Research Question 1, the null hypothesis for test variable facility management services and organizational core was not supported. For Research Question 2, the null hypothesis for test variable facility management essential was supported. For Research Question 3, the null hypothesis for test variable facility management value was supported. For Research Question 4, the null hypothesis for test variable facility management reputation was supported.

Study Findings

Based on an examination of the null and alternative hypotheses, the overall findings of the study seem to suggest there is no alignment relationship that exists between facility management and an organization's core business. The null hypothesis for Research Question 1 was not supported, suggesting that facility management professionals believe that a difference exists between facility management services and the strategic alignment of a university's core business. The null hypothesis for Research Question 2 was supported, suggesting that facility professionals believe that facility management services are not essential to a university's core business. Similarly, the null hypothesis for Research Question 3 was supported, suggesting that facility management professionals believe that facility management services do not add value to their university's core business. Finally, the null hypothesis for research 4 was not supported, suggesting that facility management professionals believe that facility management reputation plays a role in the alignment of facility management services and a university's core business.

Discussion of the Results

Research Question 1

Organizational core. Research Question 1 compared the relationship between facility management services and an organization's core business from a strategic alignment perspective. The data for Research Question 1 was based on participants' responses pertaining to facility management services and an organizational core business. Instrument Questions 5, 6, 8, 11, 12, 19, 25, and 26 pertain to organizational core. The arithmetic mean of Instrument Questions 5, 6, 8, 11, 12, 19, 25, and 26 was used to measure the variable Organizational Core Index (OrgCore). Instrument Questions 7, 10, 16, 20, and 28 pertain to facility management services. The arithmetic mean of questions 7, 10, 16, 20, and 28 was used to measure the variable Facility Management Services Index (FMService).

The null hypothesis for Research Question 1 was not supported suggesting a negative relationship between facility management services and an organization's core business from a strategic alignment perspective. The participants responding to instrument questions pertaining to Research Question 1 disagreed with the null hypotheses. For example, participants responding to survey Instrument Question 5, 8, 11, 12, responded to each of those questions at Maturity Level 3 or higher.

Instrument Questions 5 and 8 pertain to how communication is effectively aligned between facility management and a university's core business. Question 5 asked the participants, "To what extent does facility management understand the university's business environment, competitors, processes, and partners?" Forty-six percent (46%) of

the participants responded to Instrument Question 5 at Level 3. An explanation of Maturity Level 3 is provided in Appendix B.

Instrument Question 5 is an important strategic alignment question to this study for several reasons. Early scholars in facility management believed not enough was being done by the profession to explain the relationship between facility management and an organization's core. For example, Keith Alexander (1992) discussed the importance of researching the relationship between facility management and an organization's core business or strategic management. Alexander believed research could explain the relationship between facility management and an organization's core business. Alternatively, Bell (1992), believed a lack of focus contributed to the misalignment between facility management and strategic management.

Strategic Alignment Maturity Instrument Question 8 asked participants to respond to the type of communication style used between facility management and business. Sixty-two percent of the participants responded to Instrument Question 8 at a Level 4 (see Appendix B). A response of Level 4 suggests that a strong alignment relationship exists between the communication styles of facility management and a university's management structure (Sledgianowski et al., 2006). Most of the earlier research in facility management does not provide an indication of Level 4 maturity in communication. For example, facility management's lack of closeness to the customer (Carder, 1995) promotes senior management's lack of understanding regarding the facility management environment. McLennan (2004) suggested effective communication does not exist between facility management and business. Alternatively, this research

study suggests, as demonstrated by responses to Question 8, that the level of communication between facility management and business may be changing.

Survey Instrument Questions 11 and 12 pertain to the level of strategic alignment maturity of facility management governance between facility management and an organization's core business. According to Sledgianowski et al. (2006), governance refers to the level of decision-making granted (see Appendix B). Survey Instrument Question 11 asked the participants to respond to the level of planning that exists between facility management and their university's core business. This question was framed from the perspective of how upper management views their business planning relationship. Thirty percent (30%) of the participants responded to Instrument Question 11 at a Level 4. A Level 4 response by the majority of participants suggests a strong level of alignment between facility management and an organization's core business pertaining to the decision making process (Sledgianowski et al., 2006).

Survey Instrument Question 12 asked participants, from the perspective of facility management, how facility management views their planning relationship with upper management. Thirty-seven percent of participants responded to Instrument Question 12 at Level 3. According to Sledgianowski (2006), a Level 3 is a moderate maturity level. In other words, participants in this study believe that only a moderate level of formal planning exists between facility management and an organization's core business.

Facility services. Survey Instrument Questions 7, 10, 16, 20, and 28 pertain to facility management services. The arithmetic mean of Questions 7, 10, 16, 20, and 28 was used to measure the variable Facility Management Services Index. Survey Instrument Questions 7 and 10 examined the level of communication between facility

management services and a university's core business; responses to survey Instrument Question 7 and 10 seems to be mixed. Forty-eight percent of the participants responded to Question 7 at a Level 3, while 50% of the responses to Question 10 were at a Level 1, indicating no relationship between facility services and a university's management.

Similarly, 44 % of participants responded to survey Instrument Question 16 at Level 4. Survey Instrument Question 16 is located in the governance group of the Strategic Alignment Maturity survey instrument and pertains to how facility management and upper management work together to prioritize projects. A response rate of 44% at a Maturity Level 4 suggests there is strong alignment between facility management and university management in how projects are prioritized. Conversely, participants' responses to Instrument Questions 10, 20, and 28 were all below a Maturity Level 2.

Research Question 2

The null hypothesis for Research Question 2 examined the essentialness of facility management services to an organization's core business. Survey Instrument Questions 9, 13, 15, 17, and 27 pertain to the essential services provided by facility management. The arithmetic mean of Instrument Questions 9, 13, 15, 17, and 27 was used to measure the variable Essential Facility Management Services Index (EssentialFMS). Survey instrument questions grouped in the facility management essential category attempted to measure the maturity levels and alignment between these essential services: (a) knowledge sharing (Question 9), (b) budgeting (Question 13), (c) steering committee (Question 15), (d) ability to react (Question 17), and (e) career crossover (Question 27). Essential services for the purpose of this study refer mainly to management functions of facility management rather than the delivery of services.

The null hypothesis that facility management services are not statistically essential to an organization's core business was supported, suggesting a negative relationship between facility management and university core functions. The responses to Research Question 2 were mixed. For example, 27% of participants responded to Question 7 at a Level 3, suggesting that a moderate alignment of knowledge sharing exists between the essential nature of facility management and a university's core business. Similarly, 40% of participants ranked Instrument Question 17 at a Level 4, which suggests a strong level of alignment between facility management and a university's ability to respond to changing needs. Instrument Questions 13 and 27 were both ranked at a Level 2.

Research Question 3

The null hypothesis pertaining to Research Question 3 examined the level of facility management value that exists between facility management services and an organization's core business. The arithmetic mean of questions 14, 21, 24, and 30 was used to measure the variable Value of Facility Management Services Index (ValueFMS). For the purpose of this research study, facility management value is the level of customer service relationship that exists between facility management and an organization's core business (Kok et al., 2011). Research Question 3 examined the level of customer service relationship pertaining to: (a) the decision-making process (Question 14), (b) formal business processing (Question 21), (c) innovation (Question 24), and (d) the ability to attract and retain business and technical professionals (Question 30).

Barrett (2000) described customer service as the information linkage that exists between the customer and provider. According to Barret, facility management value may

be achieved by building a strong alignment relationship of the information linkages between facility management and an organization's core business.

The null hypothesis for Research Question 3 was supported suggesting that a negative relationship exists between the value of facility management services and a university's core business. Participant responses to Research Question 3 were mixed. For example, 48% of participants responded to Question 14 at or above Level 3, which suggests a favorable response. On the other hand, 59% of participants responded to Question 21 at or below Level 2. Fifty-one percent of participants responded to Question 24 at or above Level 3. Alternatively, 67% of participants responded to Question 30 at or below a Level 2.

Research Question 4

The null hypothesis pertaining to Research Question 4 examined the reputational relationship that exists between facility management services and an organization's core business. The data for Research Question 4 was based on participant responses pertaining to survey Instrument Questions 18, 22, 23, and 29. The arithmetic mean of Questions 18, 22, 23, and 29 was used to measure the variable Reputation of Facility Management Services Index (ReputationFMS). Each instrument question grouped in the facility management reputation category investigated the maturity level and alignment of a specific factor. For example, Instrument Question 18 measured the maturity level of perception. Instrument Question 22 attempted to measure the maturity level of trust between facility management and university core functions. Instrument Question 23 attempted to measure the level of sponsorship between facility management and

university core functions. Instrument Question 29 attempted to measure the level of interpersonal interaction between facility management and university core functions.

The null hypothesis for Research Question 4 was rejected, suggesting a positive reputational relationship that exists between facility management and an organization's core business. For example, 56% of participants responded to Instrument Question 18 at or above a Level 3. Eighty-one percent of participants responded to Instrument Question 22 at or above a Level 3. Similarly, 57% of participants responded to Instrument Question 23 at or above a Level 3. Finally, 82% of participants responded to Instrument Question 24 at or above a Level 3. The overall positive findings for Research Question 4 were not surprising.

Price et al. (2003) seem to suggest facility management reputation plays a role in the choice students make when choosing a university. In addition, the participants responding to this survey instrument seem to support the conclusion of Price et al. (2003). For example, each of the categories measured in facility management reputation (perception, trust, sponsorship, and interpersonal interaction) had a maturity level ranked at or above Level 3. Participants responding to Instrument Question 23 ranked sponsorship at a Level 5. Sponsorship refers to university core support for facility management projects (Sledgianowski, 2006).

In summary, the findings of study suggest a negative relationship between facility management and a university's core functions. While alternatively, the participant's responses were somewhat positive. For example, of the 13 questions comparing the alignment relationship between facility management services and an organization's core business, participants ranked the maturity level of six instrument questions at or above

Maturity Level 3. Similarly, participants ranked the reputation of facility management at or above a Level 3.

Theoretical Implications

The theoretical framework used to compare the relationship that exists between facility management and an organization's core business was the competing values model. Based on a thorough review of the competing values model literature, competing values model appeared to be an ideal framework to compare the relationships between facility management and an organization's core business for the following reasons. First, competing values model can accommodate many organizational forms (Yu & Wu, 2009). Second, the competing values model proposed a pathway in which culture, technology, structure, and the environment that are normally competing values, may be fitted together to achieve organizational alignment (Quiros, 2009). To illustrate the comparison between facility management and an organization's core business, constructs, such as study's research questions, items from the survey instrument, and the study's hypotheses were placed in the competing values model quadrants. Those constructs were placed in the competing values model quadrant that had characteristics similar to those constructs. Based on the fit between facility management constructs and the competing values model, the following theoretical implications were proposed.

The theoretical implications of the competing values model when comparing facility management and an organization's core business may be described as follows. First, the competing values model is a theoretical framework that can be used to compare facility management and an organization's core business from the perspective of

technology, structure, and cultural form. Second, although the test results of this study's hypotheses only showed a positive relationship between facility management reputation and an organization's core business, the competing values model serves as a theoretical foundation for this study's hypotheses. Similarly, Quiros (2009) seems to have reached the same conclusion, namely that the competing values model framework is a useful means for formulating alignment hypotheses.

Third, the performance implications of the competing values model seem to provide a viable explanation of the performance indicators of the Strategic Alignment Maturity survey instrument. For example, the competing values model proposes that when organizational subunits are vertically aligned with top management, the organization has a better chance of meeting their performance goals (Quiros, 2009). Similarly, the Strategic Alignment Maturity survey instrument proposes that when a certain level of maturity exists between organizational subunits and top management, the organization has a better chance of meeting their performance goals (Sledgianowski et al., 2006).

Implications for Practice

The findings of this study suggest that facility managers do not believe that a positive alignment exists between an organization's core and the study variables Facility Management Services Index, Essential Facility Management Services Index, and Value of Facility Management Services Index. This research study is believed to be the first one to use a quantitative approach to make such an assessment. Other researchers have speculated that facility management may align with an organization's core business, but

not using a comparative quantitative research design. Alternatively, a review of participant responses suggests a positive alignment exists between the variables Facility Management Services Index and Organizational Core Index.

Limitations

The most challenging limitation facing this study was that facility management is an under-researched discipline resulting in a limited knowledge base of published literature. This dearth of knowledge has been a barrier for facility management scholars since scholars began conducting research into facility management about 30 years ago (Alexander, 1994; Grimm, 1992; Nutt, & Grimshaw, 1999; Price et al., 2003).

The available published research is limited. For example, only six facility management studies that used a quantitative research design and only one of those studies involved the alignment of facility management to an organization's core business (McDonagh & Nichols, 2009). Based on a search of the literature, this study is the only study to attempt to assess the alignment and maturity level of facility management using a quantitative research design. Because there is such a limited amount of quantitative research in facility management, future research in facility management presents many opportunities.

In addition, this study does not attempt to provide solutions why some of the hypotheses were not supported. For example, the null hypothesis for Research Question 1 was not supported. That is, there is a statistically significant difference between facility management services and the strategic alignment of an organization's core business. The null hypothesis for Research Question 2 was not supported. The research does not

attempt to provide a solution why facility management services are not statistically significantly essential to an organization's core business. The null hypothesis for Research Question 3 was supported. That is, facility management services do not add a statistically significant value to an organization's core business. The study does not attempt to provide solutions to the null hypotheses with negative results.

Recommendations for Further Study

Each of the major variables in this dissertation presents opportunities for future quantitative studies. This research study primarily focused on how facility management aligned with an organization's core business from the perspective of facility services, the essentialness of facility management services, value, and reputation. This research study did not attempt to identify which facility management services were essential, or which facility management services provided value to an organization's core business. First, future studies could attempt to establish which facility management services are essential to an organization's core business using a quantitative research design. Second, future research studies could attempt to establish which facility management services add value to an organization's core business using a quantitative research design.

A considerable amount of discussion in this research study was devoted to organizational structure in an attempt to establish facility management as an organizational function, similar to accounting, finance, or human resources. Future research should attempt to examine the six dimensions of organizational structure from a facility management perspective using a quantitative research design. The six dimensions of organizational structure that were discussed in the literature review

(Chapter 2) are (a) specialization, (b) standardization, (c) formalization, (d) centralization, (e) configuration, and (f) flexibility.

Conclusions

The findings in this research study did little to counter the perceptions contained in the published literature relating to facility management. After more than 30 years, facility management is still struggling to determine the role of facility management within an organization. However, the responses to this study suggest a shift in how facility management is viewed, at least among facility managers. The study attempted to answer four basic research questions pertaining to facility management: (a) facility services strategic necessity, (b) the essentialness of facility management services, (c) the value of facility management services, and (d) the reputation of facility management within an organization. A careful review of participant responses shows a generally positive attitude towards the role of facility management within a university environment.

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APPENDIX B. SAM INSTRUMENT MATURITY LEVELS

Maturity Levels

Level 1 (initial process is the lowest level). At this level, there is no attempt between functional units and management to build an alignment relationship. Each group, functional units, and management are only looking out for their interests.

Level 2 (committed process level). No commitment exists between functional units or management to build an alignment relationship. This process is also as the lowest possible level.

Level 3 (established focused process). At this level, functional units and management have moved slightly closer to recognize the value of working together to build an alignment relationship. The level may be described as a moderate working relationship between functional units and management.

Level 4 (improve/managed process). At this level, functional units and management are working together to build an alignment relationship. The relationship may be described as strong.

Level 5 (optimized process). Functional units and management have achieved the proper fit to optimize alignment at the highest level.

Each of the five levels described above are used to assess the maturity of the organization based on several strategic alignment components or criteria: communications maturity, competence or value maturity, governance maturity, partnership maturity, scope and architecture maturity and skills maturity (Sledgianowski et al 2006).

Instrument Categories

- Communication maturity: The communication maturity component explains how well information is spread throughout the organization.
- Competency/value maturity: Value maturity represents functional unit contribution to organizational alignment.
- Governance maturity: This is the level of decision-making granted to functional units, which serves to indicate the importance of a particular functional unit to organizational alignment.
- Partnership maturity: This represents how close the working relationship are between functional units and the organization
- Scope and architecture maturity: This represents the amount of resources allocated to functional units.
- Skills maturity: This represents the level of innovative freedom of functional units.