DEVELOPMENT OF AN EFFECTIVE ORGANIZATIONAL PERFORMANCE

INSTRUMENT TO FACILITATE POST-SECONDARY INSTITUTIONAL

CHANGE: A VARIATION ON LIKERT'S

MANAGEMENT SYSTEMS 1–5

by

Thomas Gerhard Dorsch, MA, PhD

DISSERTATION

Presented to the Faculty of

The University of Houston – Clear Lake

In Partial Fulfillment

Of the Requirements

For the Degree

DOCTOR OF EDUCATION

in Educational Leadership

THE UNIVERSITY OF HOUSTON – CLEAR LAKE

FEBRUARY, 2020

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Acknowledgments

I would like to express my gratitude to my first dissertation chair, Dr. Bryan Morgan, who inspired and led me to develop this instrument. Sadly, he did not live to see the completion of my research. I am deeply indebted to Dr. John M. Decman for taking the role of my new dissertation chair and guiding me through the remaining process. Thank you Dr. Renée E. Lastrapes for guiding me through the methodology of this study and igniting my passion for quantitative research. I moreover acknowledge Dr. Tim Richardson and Dr. Felix Simieou for contributing to the success of this work as members of my dissertation committee.

Further, I'd like to express my appreciation due to Dr. Andrea Burridge, Dr. Dale Dlouhy, Dr. Norma Perez, Dr. Laurel W. Williamson, and Mr. Don Bowles-Towler. I'd like to thank all professors at the College of Education who guided me through all courses and made the program a learning experience I would not want to miss. Thank you to all my cohort members for sharing insight from your respective work environments and contributing much to inspirational discussions during all classes. Thanks to the employees of the Alfred R. Neuman library at the UHCL who were excellent in retrieving all resources I requested. A big big thank you goes out to everyone who took part in my survey and put their trust in the promised confidentiality of their records–without your responses this work would not have been possible at all.

A huge thanks to my dear parents Heide and Gerhard Dorsch who always supported my endeavors, and there are no words to express my gratitude to my wife Victoria. We relinquished countless moments that we could have shared if I were not so preoccupied with my studies and research.

ABSTRACT

DEVELOPMENT OF AN EFFECTIVE ORGANIZATIONAL PERFORMANCE
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University of Houston – Clear Lake, 2020

Dissertation Chair: John M. Decman, EdD

This study stemmed from the need to develop an instrument for assessing the
characteristics of an organization in terms of internal consistency of leadership behavior,
interaction–influences between colleagues, communication processes, and employee
motivation in institutions of post-secondary education. Commonly used surveys for
educational environments only partially measure the characteristics of an organization in
regard to human interactions and the implications of leadership behavior. The instrument is
based on a survey design by Rensis Likert who justified the need for a systematic approach
because internal consistency has far-reaching consequences for organizational health. Likert
put forward a theory of initially four management systems and conceptualized a for its

time revolutionary fifth system, which is congruent to principles of shared leadership. Although the theory proofed to be greatly beneficial in industrial work environments, there is a paucity in research as to what extent the theory is transferable to higher education. A survey was disseminated online to three post-secondary institutions. An exploratory–confirmatory factor analysis indicated five latent principles of the upgraded instruments, i.e., interaction–influence processes, leadership process, collaborative effectiveness, problem-solving, and motivational forces. The reliability measured by Cronbach's α for each factor ranges from .72 to .81, based on a total of 23 questions. As a result, a short and reliable questionnaire was successfully developed, that measures organizational/institutional performance characteristics based on Likert's theory of management Systems 1–5. The received data (N = 206) shows that employee perceptions of their work environment differ tremendously which suggests institutional inconsistencies. The question, therefore, arises as to whether this must be an inevitable condition of post-secondary educational institutions or to what extent future results of this instrument can be used to facilitate organizational and institutional change.

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CHAPTER I:

INTRODUCTION

In times of economic difficulties, it is imperative for post-secondary education to increase value, performance, institutional- and organizational effectiveness. To achieve such goals, an institution and its leaders must have a full understanding of the internal organization, interactions, behaviors, and performance tasks of all its members. The commonly used surveys for post-secondary education assess only partially the characteristics of an organization. As a solution to this problem, this study examines Rensis Likert's management systems 1–5 towards applicability in higher education.

Increasing value, performance, and effectiveness of a firm or a non-profit organization are recurring keywords in industrial and organizational (I-O) psychology (Smith & Hitt, 2005). Research concerning effectiveness, efficiency, motivation, leadership styles, and the psychological health within the realms of I-O psychology began to flourish in the second half of the 20th century (Hersey & Blanchard, 1978; Katz & Kahn, 1978; Likert, 1961, 1967; Maslow, A. H., 1943; Natemeyer, 1978; Vroom, 1964; Vroom & Yetton, 1973), and recent publications demonstrate a continued yet even stronger interest in I-O psychology in response to changes in society, economy and politics (Buble, 2012; Hall & Hord, 2015; Holloway, 2012, 2013; Schein, 2004; Wilson, 2010, 2014). One category of I-O psychology is *lean thinking* and its application as *lean management*. Lean rooted in the mindset of Benjamin Franklin, Henry Ford and Sakichi Toyoda, and continues to be a paradigm for solving issues of economy and competition (Liker, 2004; Womack, Jones, & Roos, 1990).

There is a paucity of research in what ways I-O psychology can be adapted for post-secondary education. Some researcher focused on climate and culture in educational organizations (Chaffee & Tierney, 1988; Tierney, 1988, 1990); others attempted

to develop surveys assessing institutional performance and effectiveness, student or employee satisfaction (Balzer, Francis, Krehbiel, & Shea, 2016; Comm & Mathaisel, 2000, 2003; Francis, 2014; Roueche & Baker III, 1987).

This study develops an instrument that assesses the organizational characteristics with regards to human interaction within post-secondary institutions. Once such characteristics are clear, existing problems, e.g., those that might hinder the implementation of transformational change, can be systematically addressed. This chapter provides the research problem, the significance of the study, the purpose of the study, research questions, and definitions of key terms used.

The Research Problem

The research interest of this study is twofold: 1) At present, there is a paucity of specialized instruments that allow for accurately and systematically assessing causal leadership, perceptions of thereof by leaders themselves, by faculties and staff regarding organizational characteristics, i.e., human interaction. This study focused on the development of an effective instrument for post-secondary education institutions to fathom leadership-, motivation-, interaction-influence- and communication processes based on Rensis Likert's management systems 1–5. 2) Evaluating and understanding such leadership (or management) processes is important for developing strategies for implementing change, e.g., improving organizational performance and effectiveness. However, the implementation of changes can only be successful if the organizational structure and climate—which primarily is based on behavioral characteristics of leaders and subordinates—is consistent and not subject to internal conflicts (Balzer, 2010; Likert & Likert, 1976; Likert, 1967; Likert Associates, 1972).

Balzer (2010) summarized several issues within the higher education community that impede the implementation of change, whereby he uses the advantages of Lean in

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Higher Education (LHE) as an example for achieving improvements: University processes often fail to benefit from the insight and recommendations of the employees who are directly involved in the process but have no formal mechanism to share their concerns and suggestions. University processes are often perceived as extremely slow and involve multiple superiors who work on their part of the process with no single authority responsible for ensuring that the process works efficiently and effectively. Many universities have not established a climate to support a learning organization that continuously improves itself to serve the individuals and organizations that are beneficiaries of their work. Further, for many university processes documentation is poor, with no formal written instructions or training that establish clear expectations for each of the steps and activities contributed by employees to each process (Balzer, 2010; Balzer et al., 2016).

For implementing any type of change an institution must be clearly aware of its weaknesses as well as its strengths and means necessary to establish a supportive context and positive organizational climate. An instrument is needed that clearly identifies the nature and organizational characteristics of an educational institution.

Hanover Research (2012) reviewed six nationally recognized surveys for performance in use: 1) The Institutional Performance Survey offered through the National Center for Higher Education Management Systems (NCHEMS); 2) The Chronicle of Higher Education "Great Colleges to Work For" Program; 3) The Higher Education Research Institute (HERI) Faculty Survey; 4) The Noel-Levitz College Employee Satisfaction Survey; 5) The Noel-Levitz Institutional Priorities Survey; and 6) The Faculty Job Satisfaction Survey of The Collaborative on Academic Careers in Higher Education (COACHE). None of these six surveys can be used as one single instrument to measure organizational characteristics of higher education institutions.

Most surveys use 5–point Likert scales, which consist of a series of statements followed by an odd or even number of ordered, contrasting categories. Likert scales have sig-

nificantly contributed to advancements of knowledge, for example, in sociology, psychology, or political science (Willits, Theodori, & Luloff, 2016). Likert (1967) invented an even more accurate instrument known as Profile of Organizational Characteristics which has been used by large corporations to assess and define leadership roles with the goal to evaluate leadership processes, to increase employee motivation, productivity, and financial revenue (Buble, 2012; Holloway, 2013; Wilson, 2010).

Likert and Likert (1976), Likert (1961, 1967) and Likert Associates (1972) developed a framework for a questionnaire in which he identified four different systems of leadership styles concerning companies and adaptable for any type of organization. Likert's research resulted in a survey using a 20–point scale that allows for assessing the nature of an organization (internal consistency of values, leadership styles, employee satisfaction, motivation) with remarkably high reliability and accuracy. Likert (1961, 1967) justified the need for a systematic approach as internal consistency has widespread consequences for organizational health, performance, climate, research and development, and any other form of resulting improvements. Therefore, reliable information concerning the internal state of an organization is a requirement for success and survival. This study adapted and varied Likert's management systems to develop an instrument for measuring organizational characteristics of post-secondary education. The data of this pilot study show to what extent these management systems can be instrumented for higher education.

Significance of the Study

Considering the expansive literature on leadership and change management in higher education, the aspiration of implementing Lean Higher Education, establishing learning organizations, or strategic planning in higher education (Balzer, 2010; Chaffee & Tierney, 1988; Morrill, 2007; Tierney, 1990), it is astonishing that post-secondary

education uses only a few recognized surveys to examine aspects of organizational characteristics and primarily evaluate institutional performance regarding effectiveness.

There is a paucity in recent research focusing on accurately assessing the internal consistency or inconsistency of organizational characteristics. Innovative ideas for improving an organization, i.e., increasing its effectiveness, and implementing changes cannot be successful if the characteristics of an existing organization and its conditions are unclear.

Therefore, this study focused on the adaption of an established I-O instrument and its further development towards an instrument that allows to accurately examine human interactions and organizational characteristics within post-secondary education, and the implied consequences for organizational effectiveness. This study closes a gap in the research of educational leadership and administration by offering an upgraded instrument helpful to facilitate institutional change.

Research Purpose and Questions

The purpose of this study was to develop an instrument that allows for accurate assessment of organizational characteristics and leadership behavior in post-secondary education, and the resulting implications for educational leadership. The instrument is based on Likert's (1967) management systems and questionnaire of organizational characteristics which examines the consistency or inconsistency of a firm, an organization, its underlying principles and procedures, and the resulting motivational and behavioral consequences.

The research questions of this study fall into two categories: The primary research question (RQ1) aims at the instrument development itself. The secondary research questions (RQ2) articulate survey questions integral to the questionnaire of the instrument. Hence, if RQ1 can be answered positively; the instrument can be used to collect data that will answer all questions of section RQ2:

Primary Research Question (RQ1): To what extent can Likert's management systems be adapted as an instrument for assessing performance characteristics of post-secondary education institutions?

Secondary Research Questions (RQ2 a–f):

a) Are there differences in perceptions of faculty towards institutional organization across different departments?

b) Are there differences in perceptions of administration towards institutional organization across different departments?

c) Are there differences in perceptions of what individuals believe the characteristics of their institution are?

d) Are there differences in perceptions of what individuals like the characteristics of their institution to be?

e) Are there differences in perceptions of organizational structures across institutions of higher education?

f) What are the perceptions of supportive relationships (professional and personal) with superiors and the organization?

Definition of Key Terms

Causal, Intervening, and End-Result Variables: 1) Causal variables determine the course of development within an organization and the results achieved. Causal variables include only those independent variables which can be changed by the organization. 2) Intervening variables reflect the internal state and health of the organization, e.g., loyalties, attitudes, motivations performance goals, and perceptions of all members and their collective capacity for effective interaction, communication and decision-making. 3) End-result variables are the dependent variables which reflect the achievement of an

organization, such as its productivity (or goal achievements), costs, loss and earnings (Likert, 1967).

Establishment Survey: a survey that is designed to measure the behavior, structure, or output of an organization, e.g., businesses, universities and colleges, or hospitals (DesRoches, 2008; Willimack, Lybery, Martin, Japec, & Whitridge, 2004). The instrument developed in the present study is an establishment survey.

Lean Management System: "A non-zero-sum principle-based management system focused on creating value for end-use customers and eliminate waste, unevenness, and unreasonableness using the scientific methods" (Emiliani, 2015, p. 7).

Likert Management System: Likert (1961, 1967) and Likert Associates (1972) defined four systems of management styles: 1) Exploitative Authoritative; 2) Benevolent Authoritative; 3) Consultative; and 4) Participative Group. Likert and Likert (1976) introduced a System 5 as even more effective, complex, and socially evolved form of management (or leadership) than System 4 (Likert & Araki, 1986; Reilly, 1978). Another term for Likert Management System in use is *Likert Theory* (MSG, n.d.), and *Likert Organizational Systems* Hall (1972).

Maslow's hierarchy of needs: a motivational theory in psychology comprising a five-tier model of human needs, often depicted as hierarchical levels within a pyramid. Maslow, A. H. (1943) stated that individuals must satisfy lower level deficit needs before progressing on to meet higher level growth needs.

Perception Questions: Perception questions aim at identifying subjective processes—in contrast to those assessing factual knowledge—on how individuals interpret, evaluate, judge, organize, make sense of, hence perceive, the environment in which they work or live (Nelson, 2008).

Systems Theory: also called social systems theory, in social science, the study of society as a complex arrangement of elements, including individuals and their beliefs,

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as they relate to a whole. "Systems theory is basically concerned with problems of relationships, of structure, and of interdependence rather than with the constant attributes of objects" (Katz & Kahn, 1978, p. 22).

Systems Thinking: a school of thought and management discipline that concerns an understanding of a system by examining the linkages and interactions between the components that comprise the entirety of that defined system (Caldwell, 2012; Kim, 1999; Senge & Sterman, 1992).

Summary

In times of economic difficulties and steadily rising tuition for students, it is imperative for higher/post-secondary education to increase value, performance, institutional and organizational effectiveness. To achieve this, an institution and its leaders must have a full understanding of the internal organization, interactions, behaviors, and performance tasks of all its members.

The commonly used surveys for post-secondary education assess only partially the characteristics of an organization. As a solution to this problem, this study examined Likert's management systems towards applicability in higher education. The research goal was to develop a practical instrument that measures accurately the characteristics of an institution and its readiness for successful change management. The following Chapter II reviews the literature on Likert's management systems, systems thinking, and systems theory, learning organizations, issues concerning organizational climate, and a variety of leadership styles.

CHAPTER II:

REVIEW OF THE LITERATURE

The purpose of this study was to examine organizational characteristics and leadership patterns in post-secondary education and the resulting implications for educational leadership based on the management systems of Rensis Likert (1967) as the primary theoretical construct. Likert (1961, 1967) justified the need for a systematic research approach by the fact that an assessment of internal organizational consistency has far-reaching consequences for organizational effectiveness, research, development, employee motivation and interactions with regard to improvements and change management. Therefore, reliable information about the internal condition and consistency of an organization is a prerequisite for success and survival. Likert (1967) sought to develop an instrument that "clearly reveals the management system and the principles and procedures of a firm and the resulting motivational and behavioral consequences" (Likert, 1967, p. 127).

Rensis Likert is widely known for his various scales to measure perceptions and attitudes in I-O psychology and social sciences (Carifio & Perla, 2007; Likert, 1932; Willits et al., 2016); Likert is also well known for his management systems for which he defined four different categories, Systems 1–4 (Likert, 1961, 1967). Throughout the 80s he extended his four systems with System 5 (Likert & Araki, 1986). Wilson (2010) investigated System 5 as a potential model for leadership and authority in the 21st century. Buble (2012) used Likert's systems and the underlying instrumentation to examine organizational culture and leadership styles in 32 large firms in Croatia.

Management vs. Leadership

The terms *management* and *leadership* are often used arbitrarily and interchangeably, but managers themselves, as well as executives and scientists, advocate clear distinctions in the respective tasks (Kotter, 1990, 2013; Stringer, 2002; Yukl, 2002). Likert

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(1961, 1967), Likert Associates (1972), and Likert and Likert (1976) also used both terms synonymous so that the theory of management systems does not imply the idea is limited to principles of management only. In fact, several variables of this study's instrument are aligned with the leadership questionnaire of Stringer (2002), Table 3–7 provides details.

While management produces authority that corresponds to responsibility, leadership relies on open dialog and mutual trust to resolve conflicts. Kotter (1990) emphasized two aspects of leadership that is direction-setting, a process that produces visions and strategies, and alignment as the process necessary to make people understand, accept, and follow in the chosen direction.

Yukl (2002) and Stringer (2002), reflecting on literature reviews, concluded, that management is primarily task-oriented, is about stability, organization, efficiency and effectiveness. "Managers are concerned about how things get done, and they try to get people to perform better. Leaders are concerned with what things mean to people, and they try to get people to agree about the most important things to be done" (Yukl, 2002, p. 5). In contrast to management, leadership deals with change, breaks with conventions and stimulates innovations (Stringer, 2002).

As the title of this study declares, the goal of this instrument is to use its measures and results for facilitating change to the betterment of an educational institution. Although citing Likert's management systems, the idea is rather what to take away for leadership thinking based on what can be learned from the theory of management systems.

Likert's Management Systems

Likert (1961, 1967) and Likert Associates (1972) developed a theoretical construct which identified four different management systems that concern firms as well as any other type of organization (e.g., schools). This research resulted in a survey that allows for assessing the nature of an organizational structure: System 1, Exploitative Authoritative;

System 2, Benevolent Authoritative; System 3, Consultative; System 4, Participative Group.

Every aspect of a firm's activity is determined by the competence, motivation, and general effectiveness of its human organization. Of all the tasks of management, managing the human component is the central and most important task (Likert, 1961). Likert aligned his systems range from low performance and low productivity (System 1) to high performance and high productivity (System 4), which can be achieved through, e.g., highly effective communication, mutual trust, participative decision-making, supportive behavior towards employees' work-related problems, and employees' personal struggles as far they are willing to share. In contrast, System 1 is characterized by the least desirable variables where leaders neglect communication and/or do not care much about employees. Hence, productivity and labor relations depend directly on organizational and performance characteristics of different management systems.

Likert (1961, 1967) developed an expansive survey to fathom such interdependencies: His Profile of Organizational Characteristics included 51 different organizational variables distributed over eight categories: 1) Leadership processes, 2) Character of motivational forces, 3) Character of communication processes, 4) Character of interaction-influence processes, 5) Character of decision-making processes, 6) Character of goal setting or ordering, 7) Character of control processes, and 8) Performance goals and training.

Figure 1 shows how this survey works: The first organizational variable of this survey is aimed at leadership processes and scrutinizes the extent to which superiors have confidence and trust in their subordinates. In Likert's (1967) questionnaire respondents had to find themselves, as a matter of self-perception within a range of four different characteristics: 1) Superiors "Have no confidence and trust in subordinates [2] Have condescending confidence and trust (…) [3] Substantial but not complete confidence

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and trust; still wishes to keep control of decisions [4] Complete confidence and trust [in subordinates] in all matters" (Likert, 1967, p. 197).
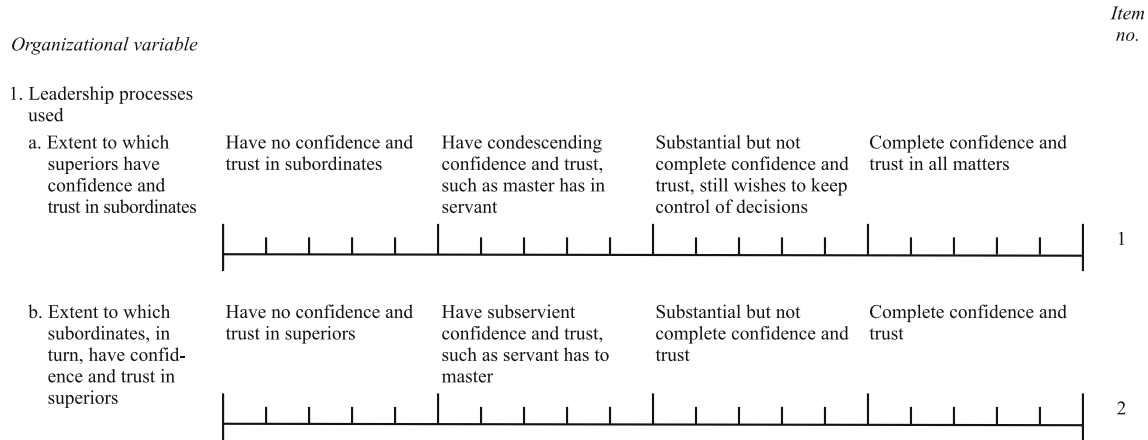
Figure 1. Two examples of Likert's organizational variables survey using four systems. Adapted from "The Human Organization: Its Management and Values," by Likert, 1967, p. 197. Copyright 1967 by McGraw-Hill. Adapted with Permission.

System 4 stands for most favorable attitudes, excellent labor relations and high productivity whereby System 3 shows similar characteristics, but to a lesser degree. System 2 is further diminishing downwards to the least preferable management model System 1, hence, a type of organization that lacks psychological health (Maslow, Stephens, Heil, & Bennis, 1998), employee motivation, and consequently yields lower productivity and achievement (exemptions are, e.g., assembling lines in factories, or military). A science-based management like System 4 requires great learning and appreciably greater skill to use it optimally but yields impressively positive outcomes compared to a strictly hierarchic organization with System 1 characteristics (Likert, 1961).

Causal, Intervening and End-Result Variables

Likert (1967) distinguished between 1) causal variables, 2) intervening variables, and 3) end-result variables. Causal variables are "independent variables which deter-

mine the course of developments within an organization and the results achieved" (Likert, 1967, p. 26). Causal variables include only those independent variables which can be changed by the organization's or institution's leadership, i.e., the structure of the institution, its policies, decisions, business and leadership strategies, skills, and behavior (Likert, 1967). Likert Associates (1972) described in more detail the nature of causal variables for schools, which are partially also applicable to post-secondary education institutions, whereby the organizational climate consists of three dimensions: goal commitment, decision process and team cooperation (Likert Associates, 1972, Section. III, p. 2). Based on these criteria, further causal variables include, e.g., support (psychological as well as technical/organizational), work facilitation, team building, a leader's receptivity to ideas, and decision-making processes.

Intervening variables reflect the internal state and the health of the organization, e.g., loyalties, attitudes, motivations, performance goals, and perceptions of all members and their collective capacity for effective interaction, communication, and decision-making (Likert, 1967). Likert Associates (1972) elaborated that it is useful for leadership success to measure and to learn to what extent a leader's behavior in dealing with subordinates is reflected in the behavior of subordinates interacting and influencing each other.

Such relationships, "called Peer Leadership variables, become a major intervening linkage between the leader's own pattern of management and the way subordinates see themselves operating together" (Likert Associates, 1972, Section. III, p. 4). Further, these linkages not only work side-ways, and downwards, but also upwards: Intervening variables can also describe to what extent employee attitudes or motivation have a direct influence on leadership styles. This is more likely the case in System 4 than in System 1 organizations or institutions.

End-result variables are dependent variables that reflect achievements of an organization or institution, e.g., in terms of productivity, cost-performance measures, or stu-

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dent enrollment/retention, faculty development, and the overall satisfaction of employees. End-result variables point at the outcome of a process over time, e.g., an improvement due to change implementation, or a decline in performance due to poor leadership. It is important to differentiate between causal, intervening variables, and end-result variables: Causal variables can be implemented directly by adapting different leadership styles. However, the intervening variables—employee behavior, attitudes, satisfaction, and motivation—will more likely change over time (depending on leadership).

Systems Approach and Reliability

   Systems Approach.   Likert (1967) stated that if one manager or leader of an organization indicates on some items of the survey a tendency towards System 4 or System 1 it can be expected that the respondent will consistently respond to all other remaining items in similar ways and that not one participant of his survey showed remarkable outliers that fell outside a system. Figure 2 displays the distribution of answers of middle and upper-level managers of several companies as published by Likert (1967). The diagram shows a broad answering spectrum to 43 questions that span across all systems for almost all characteristics. The visual design does not indicate to what extent individuals' perceptions fluctuate between the four systems.

   Reliability.   Likert (1967) reported extraordinarily high inter-correlations among the items and between each item and the total score of his survey: The reliability coefficients (Pearson's r) range from $+.73$ to $+.97$ with a corrected split-half reliability coefficient (Spearman-Brown) of $+.98$; no values for Cronbach's α were given (Likert, 1967; Likert Associates, 1972).

Figure 2. Distribution of answers of middle and upper-level managers of several companies. From "The Human Organization: Its Management and Values," by Likert, 1967, Fig. 3-2, p. 27. Copyright 1967 by McGraw-Hill. Reproduced with Permission.

Applicability for Higher Education

Likert adapted his management systems to education using a modified version of his industrial/organizational questionnaire for universities whereby he focused primarily using his theory for managing conflicts (Likert & Likert, 1976). Likert Associates (1972) also used systems to assess organizational characteristics of schools: Initially, there were forms for principals, teachers and students, and in 1969 Likert added forms for school board members, administrative staff, superintendents, and parents (Hall, 1972; Likert Associates, 1972). Based on studies, observations and newspaper reports, universities could be characterized as having a "scarcity of effective face-to-face communications and problem-solving channels between students, faculty, and administration, and, equally serious, within these groups" (Likert & Likert, 1976, p. 243).

Likert and Likert (1976) described issues mainly from students' perspectives who expressed their frustration over "corruption in higher places," "lack of proper regard for civil rights," and "irrelevant curricula and instruction" (p. 244). Likert and Likert (1976) did not reference any specific sources for their abstract conclusions about the organizational and institutional weaknesses of universities in the 60s and 70s. Nevertheless, the Likert duo posed a direct relation to management systems, i.e., faculty meetings in universities "employ parliamentary procedures which structure the meeting into a System 2 win-lose confrontation. The systematic, orderly problem solving done in the small committees does not and cannot occur in the large faculty meeting using *Robert's Rules of Order*" (Likert & Likert, 1976, p. 245).

Likert and Likert (1976) stated that the existing interaction-influence networks of large universities and mid-sized colleges are in their decision-making processes typically rather conflict-aggravating than conflict-solving. "Their structures lack the small groups joined together by linking pins and linking groups necessary for creative problem solving

and for the development of innovative and acceptable solutions to conflict" (p. 245). System 4 provides a structure and interaction-influence process with a high capability for the constructive resolution of conflict. Likert's key-components of these structures are linked pins and linked groups, i.e., instead of departments working isolated side by side, and only communicating up- and downwards, each department assigns representatives for their interests, spokespersons, who will communicate and interact with others, and thus eliminate potential sources for conflicts.

As a solution, Likert and Likert (1976) designed and proposed five organizational charts for changing universities and colleges to System 4 structures. Figure 3 shows the third of these charts representing an interaction-influence network of linked pins, and linked groups: The key idea is, to improve the down and up linkages between the president, the vice-presidents, deans and college/department chairs by adding diagonal and lateral linkages. For example, dean I, III, V and VI are tied together with the vice-president of research. Such work-groups could be concerned with establishing university-wide policies and procedures for research activities (Likert & Likert, 1976); or, dean III could build a work-group with the associated deans A, B, C, to connect different academic disciplines sharing a common mission and performance goal, e.g., concerns of a graduate school. In addition, employees in leadership positions such as vice-presidents, deans or department chairs of various academic disciplines could act as ambassadors for their respective working environments and discuss solutions for improving work-climate and organizational effectiveness. Interaction-influence on such levels would probably improve consistency of organizational characteristics campus-wide and create a good foundation for establishing a coherent management system, i.e., Systems 3–5.

The linked pin model focused on conflict solving only while implementing System 4 has far widespread consequences, such as increasing productivity, employee satisfaction, and motivation, hence improving organizational effectiveness (Likert & Likert,

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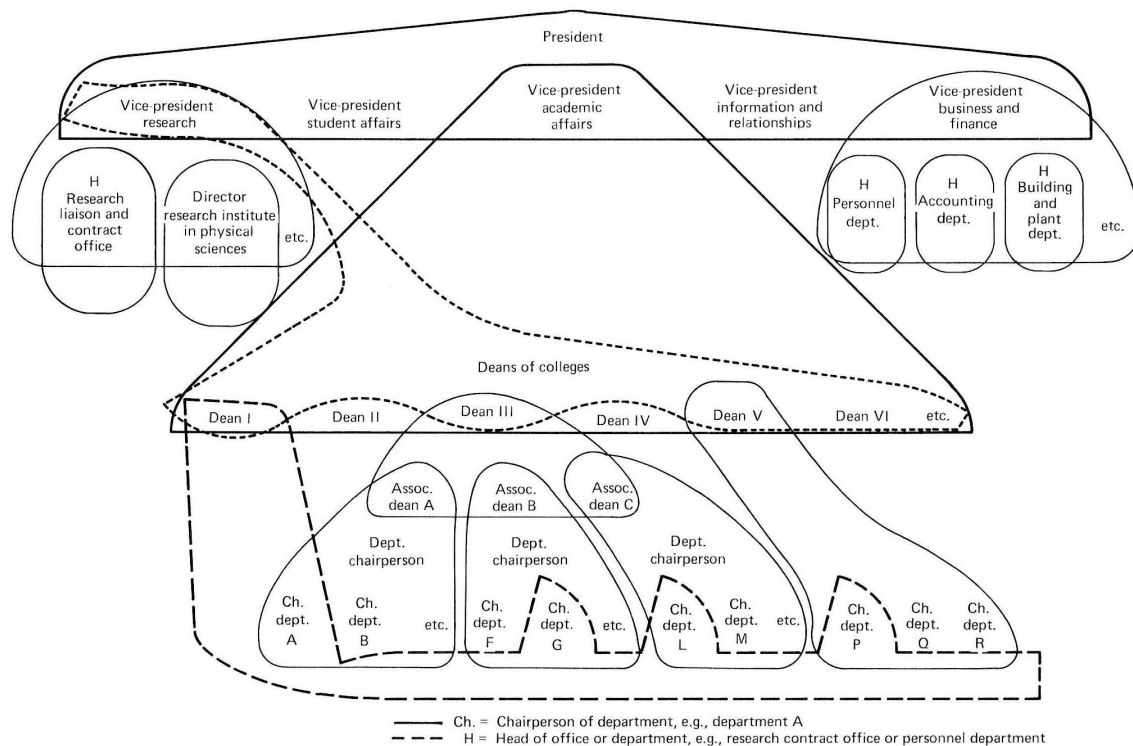
Figure 3. The Likert Interaction-Influence Model. Proposed organizational structure for university at college level and above. From "New Ways of Managing Conflict," by Likert & Likert, 1976, p. 251. Copyright 1976 by McGraw-Hill. Reproduced with Permission.

1976; Likert, 1961, 1967). The charts were based on observations and reports of higher education of the 70s without referencing sources for data.

Katz and Kahn (1978) discussed difficulties of Likert's theory as it was not "pushed far enough in dealing with the walls of the maze" (p. 282). For example, the first point of criticism was, that the voice of the rank-and-file member of the organization is prone to several reinterpretations through several levels of the organizational structure and becomes attenuated in its representation. Katz and Kahn's (1978) concern was, that "by the time the ordinary's member's voice is reinterpreted through several levels of the or-ganizational structure, it may be so faint as to be ghostlike" (Katz & Kahn, 1978, p. 282).

Katz and Kahn (1978) based their criticism on organizations or companies in general but did not consider possibly different characteristics of an educational environment.

Likert System 5

Likert and Likert (1976) introduced System 5 as an even more effective, complex, and socially evolved form of management than System 4. System 5 will have the structure and interaction processes of System 4, "but will lack the authority of hierarchy. The authority of supervisors will be derived from their linking-pin roles, from the influence exerted by the groups of which they are members, and from the larger organizational entities that they help link" (p. 33). System 4 will gradually emerge into System 5 that will provide "even better resources for handling conflicts constructively" (Likert & Likert, 1976, p. 41). The more socially evolved a management system becomes, the greater will be the magnitude of the motivational forces by an organization (or an institution) to accomplish its objectives.

Likert stated in an interview (Reilly, 1978) that emerging System 5 structures will lead to more matrix organizations. "There will be horizontal and vertical linkages, and sometimes the horizontal ones will be two or three dimensions rather than one dimension" (Reilly, 1978, p. 21). Likert (Reilly, 1978) explained further that in System 4 if a group cannot find a decision within a given time, it will be a manager's responsibility to decide. That's even the case if a group's decision is contrary to the manager's viewpoints, or contrary to the companies' or organizations' policies. In System 4, the manager has the final word. System 5 is different: Instead of a supervising single manager, there will be a supervising group of leaders or managers. If then the group in charge to find a decision fails to find consensus, the supervising group will review the "decision-making process of the lower group and begin to provide training or make other changes that are necessary in

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order to get the lower group to function effectively as a problem-solving group" eventually discharging its sole responsibility to the total organization (Reilly, 1978, p. 21).

Likert and Araki (1986) confirmed Likert's notion of System 5. In System 4 the leader "must create an atmosphere of support throughout the organisation" (p. 18), build teams, and make sure that all are supplied with the resources needed to do a satisfactory job. In System 5 however, leadership "would not have the sole (…) responsibility for the climate of the organisation and its effective operation" (p. 18). The concept of a participative group as described for System 4 is taken further to a participatory group that jointly assumes responsibilities. "Decisions as to policy would be made as all organizational decisions are made, through the linking-pin network" (Likert & Araki, 1986, p. 18); Likert (Reilly, 1978) later called this model organizational matrix.

Such a network system can only work if all its members share to some extent also expertise in each other's fields, because each member must be able to critically question expertise and problem-solving approaches by his or her colleagues. Likert and Araki (1986) remarked that members "would be persons of competence in the various fields relevant to the organization's goals and would be useful linkages to those persons with similar competences in other parts of the enterprise" (p. 18). System 5 leadership also employs the idea of rotating leadership roles, i.e., one leader will assign his/her role to another member who then would focus on clearly designated tasks, e.g., improving the work-climate and/or employee motivation of departments or work-groups. "Leaders would become leaders through their contribution to the efforts of the group, not to their place in the hierarchy" (Likert & Araki, 1986, p. 20).

Systems Theory

Likert and Araki's (1986) definition of System 1 through System 5 is an example of applying systems theory for management (or leadership) within human/social organi-

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zation. The focus on management systems was on a small range within the much wider framework of systems theory which in social science is representing the study of society as a complex arrangement of elements, including individuals and their beliefs, as they relate to a whole. "System theory is basically concerned with problems of relationships, of structure, and of interdependence rather than with the constant attributes of objects" (Katz & Kahn, 1978, p. 22). As social organizations are acutely dependent on their external environment they can hardly be characterized as closed systems, instead they must be open systems. According to Katz and Kahn (1978) closed systems thinking within organizations implies that irregularities in the functioning of a system (due to environmental influences) are error variances whereby the open systems approach considers environmental factors not as error sources, but as integral for a social system and an organization. This rationale is congruent with the 20\80 Pareto Principle, i.e., "20% of a person's performance being attributable to their own capability, and 80% affected by factors connected with what surrounds them" (Tate, 2013, p. 4).

Katz and Kahn (1978) expansively discussed models of social psychology of organizations and various approaches to investigating human relations interactions. They asserted, however, that these researchers did not develop an organizational theory and remained personality theorists at heart. "An outstanding exception is to be found in Rensis Likert (1961, 1967), whose earlier work on interpersonal aspects of organizational life was followed by the brilliant integration of structural concepts and principles of human relations which he calls linked-pin theory" (Katz & Kahn, 1978, p. 278).

Likert (1961) described that effective groups (within a company or organization) with high group loyalty are not only characterized by efficient communication but moreover by the fact that members respect and influence each other. The linking pin function applies to groups and individual leaders as well: In a hierarchic model, groups are bigger at a lower level than at the higher (leadership) level. The linking process is more impor-

tant at higher than at lower levels because any decision important to the organization as a whole will affect the majority of people working at lower hierarchic levels (in Pareto thinking, 20% of an organization's leadership affect the remaining 80%). Likert (1961) further pointed out, that an organization takes a serious risk when it relies on a single linking pin (communicator) or process to tie all parts of the system together.

Systems Thinking

Systems thinking is a school of thought and management discipline that concerns an understanding of a system. By examining the linkages and interactions between the components that comprise the entirety of a defined system it will become clear what components are redundant, seldom active, or essential for the function of a system (Caldwell, 2012; Kim, 1999; Senge & Sterman, 1992).

The advantages of systems thinking take shape when, e.g., comparing systems with collections: In systems, all components have each a specific purpose as they interrelate and interact interdependently. In contrast, items of a collection are not dependent on one another; they rather co-exist, and it does not matter if a component is added or removed. While this is true for objects and matter it is not for an organization: Whenever people are added to a collection it will be transformed into a system (Kim, 1999).

Systems thinking can be especially useful to analyze interactions and work processes within an organization to increase its effectiveness whereby it is crucial that participants are working on the system, but not in the system. Working in the system stands for being merely an operator while working on the system implies helping to improve, re-design and upgrade an existing system (Kim, 1999). In regard to Likert's management systems, working on the system can only be possible within the System 4–5 characteristics of a participative group.

Shared Leadership Models

A Continuum of Leadership Patterns

Tannenbaum and Schmidt (1973) defined a continuum of seven leadership behaviors ranging from an authoritarian model where managers make decisions authoritatively to a model in which a "manager permits the group to make decisions within prescribed limits" (p. 5). The described continuum is almost identical with Likert's construct of four different systems spanning from authoritative hierarchical leadership to participative and a low-hierarchic organization, but no direct reference to Likert's research was given. The original article was first published in 1958, then revised and again published in 1973. Possibly, Likert (1961, 1967) found inspiration for his four management systems in Tannenbaum and Schmidt's (1973) ideas.

The key issue was how managers can be democratic in their behavior and relationships with subordinates while at the same time maintaining the necessary authority and control in the organization for which they are responsible. Researchers of social science underscored the importance of employee involvement and participation in decision-making, and the emerging concept of group dynamics with a focus on the team rather than solely on its leader (Cartwright & Holmes, 2006; Hersey & Blanchard, 1978; Herzberg, 1959; Morrill, 2007; Tannenbaum & Schmidt, 1973).

Tannenbaum and Schmidt (1973) posed questions that aligned well with Likert's research interest and the objectives of this study: For example, how important is it for supervisors' subordinates to know what type of leadership they are using in a situation? "What factors should they consider in deciding on a leadership pattern? What difference do their long-run objectives make as compared to their immediate objectives?" (Tannenbaum & Schmidt, 1973, p. 4). Moreover, leaders who sympathize with the participative paradigm will certainly ask themselves if they have heard the ideas of everyone, and if

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they have the knowledge necessary to make a significant contribution to the solution of the given problem (Tannenbaum & Schmidt, 1973).

Considering the spectrum from authoritarian to participative leadership styles, Tannenbaum and Schmidt (1973) discussed four important questions: 1) Can superiors ever relinquish their responsibility by delegating it to others? Superiors or managers must be held responsible for their decisions regardless if those are based on group consent or were delegated to subordinates. 2) Should a superior participate with subordinates once he or she has delegated responsibility to them? Managers or superiors should carefully consider if their mere presence may hinder or support problem-solving processes. And, although the superior's role within the group may be defined as a member rather than an authority, responsibilities will not be shared but held by the leader. 3) How important is it for the group to recognize what kind of leadership behavior a superior is using? It does make a remarkable difference: When superiors make clear how they plan to use their authority relationship problems, confusion and resentments in decision-making processes can be avoided. It is important for managers to be honest and clear in describing what authority they are keeping and what role they are asking their subordinates to assume in solving a problem. 4) Can you tell how democratic a superior is by the number of decisions the subordinates make? Rather than the number of decisions subordinates are making, the significance of the decisions is much more important to indicate how far superiors trust their subordinates.

Tannenbaum and Schmidt (1973) identified three factors/forces that leaders generally consider, 1) forces in the manager, 2) forces in the subordinates, and 3) forces in the given situation. Managers, superiors or supervisors behave according to their value system, their confidence in subordinates, their own leadership inclinations, and their feeling of security in uncertain situations. Subordinates might be permitted more freedom if they show interest in a problem, have the necessary knowledge and experience to deal with the

problem and demonstrate readiness in assuming responsibly. Further, leaders must be able

to learn sharing decision-making, e.g., when they have obtained strong leadership and

are then suddenly confronted with the request to include others in the decision-making

process often results in negative attitudes. In contrast, persons who have enjoyed a con-

siderable amount of freedom resent supervisors who lead by making all decisions by

themselves.

The above three leadership styles depend on the type of organization, one may

work better with an authoritative leader, and another may put more emphasis upon the

executive's ability to work effectively with a team whereby group effectiveness per se may

dictate a leadership style. One important factor for choosing a leadership style is given

by the experience a group has had in working together. Degrees of confidence in team

members, the nature of the problem, and possibly time pressure have a direct influence on

leadership style.

The article emphasized two implications: 1) Successful leaders are aware of the

forces which are most relevant to their behavior at any given time. "They accurately

understand themselves, the individuals and groups they are dealing with, and the company

and broader social environment in which they operate. And certainly, they are able to

assess the present readiness for growth of their subordinates" (Tannenbaum & Schmidt,

1973, p. 9). 2) Successful leaders are those who can behave appropriately in any given

situation and relation with subordinates. If an authoritative leadership is in order, they

are able to direct; if a problem-solving task calls for considerable participative freedom, a

great leader will provide the freedom needed.

Therefore, successful managers are those who are flexible in their behavior and

know how to accurately identify forces and factors for choosing a leadership style. In the

continuum from authoritative to participative leadership styles, most leaders will seek

to raise the level of employee motivation, to increase the readiness of subordinates to

accept change, to improve the quality of all managerial decisions, to develop teamwork

and morale, and to further the individual development of employees. To achieve this ideal,

a leader will incline towards a participative shared leadership model.

Life Cycle Theory of Leadership

Life Cycle Theory (LCT) is a construct by Hersey and Blanchard (1978) based

on observations of how supervisors and subordinates interact with each other, and how

work-relationships move through various stages. In educational institutions, this model

transforms into how leadership interacts with faculty and staff.

The theory does define four quadrants through which a leader-follower relation-

ship moves: "as the level of maturity of one's followers continues to increase, appropri-

ate leader behavior not only requires less and less structure (task) but also less and less

socio-emotional support (relationships)" (Hersey & Blanchard, 1978, p. 221). Hersey

and Blanchard (1978) presented this theory independently of Likert's Systems 1–4, and

although it uses four stages (categories of behavior) the theory is not directly comparable

with Likert's constructs.

Hersey and Blanchard (1978) referenced Likert's (1961) findings that supervisors

with the best records of performance were employee-centered (high relationships), while

job centered (high task) supervisors were found more often to have a low-producing

section. Indeed, Live Cycle Theory and Likert's management systems are congruent

in the aspect that high task-high relationships show System 4 characteristics. However,

the Live Cycle Theory suggests that high relationships should change to a low task-low

relationship: A supervisor (leadership) will eventually learn that her/his subordinates

are mature enough to structure their own environment. Maintaining a high relationship

leadership style could be misunderstood and interpreted by a subordinate as reinforcement

for low-level performance.

Hersey and Blanchard (1978) emphasized that the supervisor must change appropriately, at any time. Further, Hersey and Blanchard believed that Likert and other organizational scientists did not consider thoroughly that implementing changes from one system to another in a relatively short time may be very difficult to achieve. Likert had pointed out, however, that depending on the size and complexity of the organization, it could take three to seven years for a new management theory to be implemented effectively (Likert, 1961).

Hersey and Blanchard did not differentiate what exactly high task–high relationship management would be whereas Likert (1967) defined eight categories with more than 204 variables. For example, in Likert's System 4, a supervisor could foster a high relationship on a personal level and support an employee's psychological needs, while at the same time granting high decision-making authority due to the employee's level of maturity as Hersey and Blanchard (1978) described it.

Level 5 Leadership

Wilson (2010) presented a literature review of Likert's System 5 Theory and rendered a comparison with Collin's (2001) concept of Level 5 leadership which introduced a "type of leadership required for turning a good company into a great one" (p. 12). Collins (2001) did not reference Likert's management systems and the concept of System 5. In Collins' (2001) model, Level 1 stands for a highly capable individual, Level 2 for a contributing team member, Level 3 a for competent manager, Level 4 for an effective leader, and Level 5 for an executive who "builds enduring greatness through a paradoxical blend of personal humility and professional will" (p. 20).

Collins (2001) emphasized on several principles for Level 5 leadership, but these are not directly comparable with Likert's idea of System 5, e.g., first selecting the right people and getting rid of the wrong people, and then setting a new vision and strategy,

hence "First Who (…) Then What" (Collins, 2001, p. 13), confronting brutal facts, exploring new opportunities (Hedgehog Concept), and creating a culture of discipline. Collins (2001) explained: "When you have disciplined people, you don't need hierarchy. When you have disciplined thought, you don't need bureaucracy. When you have disciplined action, you don't need excessive controls" (p. 13). Following Collins (2001) would imply that System 5, that lacks hierarchy and authority, can only be established by working with the right and most disciplined people.

According to Collins and Powell (2004): "Individual team members would talk about their colleagues and their amazing achievements, and how fortunate they considered themselves to have been a part of the company at such a challenging time. Every member of these teams talked about everybody else that way, downplaying their own contributions" (p. 712). Level 5 leader would tend to select people who are confident, but not self-centered. Team members would tend to attribute success to others and blame themselves when problems arise (Collins & Powell, 2004, p. 712). Collins' Level 5 leadership mirrors a philosophy congruent with Likert's ideas of how System 5 ought to be characterized.

Lean in Higher Education

Lean rooted in the mindset of Benjamin Franklin, Henry Ford, and Sakichi Toyoda, and continues to be a paradigm for solving issues of economy and competition (Liker, 2004; Womack et al., 1990). In recent years the idea of *Lean* has been adapted by several universities and colleges whereby Lean "appears to have significant and measurable value when used to improve academic and administrative operations in higher education" (Balzer et al., 2016). Improvements are effective at the department/unit level or throughout the entire institution (Balzer, 2010; Balzer et al., 2016). Within this context, some higher education institutions moreover aspire to transform into *learning organizations* as Lean Higher Education (LHE) gives a suitable framework for successfully

establishing a learning organization (Balzer, 2010; Francis, 2014; Garvin, Edmondson, & Gino, 2008).

According to Balzer (2010) the goal of LHE is to eliminate unnecessary steps and activities that overburden employees and contribute no value to the workflow within an institution. Employees are relieved of unnecessary and nonproductive tasks, thereby allowing them to focus on opportunities that add value to an existing university process and make the institution more effective. LHE engages and empowers faculty and staff to use their expertise and creativity to improve the process in which they are involved, team members are given the authority to recommend and implement changes. "This enriches their jobs, and enhances their own satisfaction and performance. In this way, both the employee and the university benefit, creating a climate of trust and mutual support" (Balzer, 2010, p. 16). Balzer (2010) further, "LHE provides a powerful tool for implementing change within the university that meets the expectations of the individuals served frees up resources for reinvestment, and helps transform the university into a true learning organization" (Balzer, 2010, p. 18).

For Lean Higher Education to work, an institution must establish first a supportive context and organizational climate that allows for implementing and developing LHE effectively. Balzer (2010) and Balzer et al. (2016) outlined some characteristics required for implementing Lean in Higher Education but remained superficial in referencing and justifying criteria that allow for accurate assessments.

Learning Organizations

Senge (1990a, 1990b) defined five disciplines as conditional for successfully establishing a learning organization: 1) Building Shared Vision, 2) Personal Mastery, 3) Mental Modes, 4) Team Learning, and 5) Systems Thinking. Team learning is based on a dialog to explore a given problem or any topic while a discussion is used to funnel

ideas, solutions, and the best alternative towards decision-making. The process of dialog and discussion works best when teams consciously separate both thinking processes (Senge, 1990a, 1990b). Within the framework of the five disciplines that are important cornerstones for learning organizations, systems thinking is the discipline that merges the first four disciplines, i.e., shared vision, personal mastery, mental modes and team learning in a coherent framework for theory and practices (Fulmer & Keys, 1998; Senge, 1990b).

Francis (2014) presented a literature review on the relation of Lean and learning organizations in higher education. Unfortunately, there is no single definition for *learning organization*; and in the context of colleges and universities–per se institutions of learning–the term learning organization could be entirely misunderstood.

Garvin et al. (2008) posit that leaders can judge how well their teams, units or companies operate by assessing three critical areas within the organization. The authors refer to these areas as "three building blocks of a learning organization" (Garvin et al., 2008, p. 109). For the organization to be considered a learning organization it must, 1) have a supportive learning environment, 2) maintain concrete learning processes and practices, and 3) have leadership that consistently reinforces learning. The first building block, a supportive learning environment, has four distinguishing characteristics: First, employees feel a sense of psychological safety. They feel that they are allowed and encouraged to express their opinions without fear of being belittled or marginalized when they disagree with their supervisors. Second, strong learning organizations have a culture of appreciating differences. The authors believed that learning occurs when people become aware of opposing differences and have a constructive dialog about them. Third, take risks and explore the unknown. Finally, leaders in learning organizations are open to new ideas and invest time for reflection (Garvin et al., 2008; Tortorella, Marodin, Fogliatto, & Miorando, 2015). A healthy learning organization shows characteristics that fall into

Likert's System 3–4 or even System 5. If an organization can be led into operating within the framework of at least System 3 it is prepared to implement the principles of a learning organization.

Strategic Educational Leadership

Strategic leadership is considered as one of the most important disciplines in management and describes a systematic method of decision-making. It should not be understood as an authoritarian management tool but as a method of collaborative "interactive leadership that clarifies purposes and priorities, and mobilizes motivation and resources" (Morrill, 2007, p. xi).

Morrill (2007) explored issues in leadership and governance in higher education whereby he focused on presidential leadership, challenges and conflicts of collegial governance, and decision-making. He further examined different leadership motifs such as relational leadership, moral leadership, or integrative leadership. One other important aspect is the focus on goals and achievements since many campus strategic plans are light on measurable goals (Balzer, 2010; Balzer et al., 2016; Morrill, 2007).

There seems to be a certain resistance to define strategies by measurable goals, which are, based on characteristics of collegiate culture and governance, in particular, weak top-down authority, uncertainty of resources, political conflicts, and "the inability or unwillingness to take responsibility for the organization's future" (Morrill, 2007, p. 188). Measurable goals are not necessarily quantifiable but depending on how well indicators were defined results are comparable with objective scientific facts. Good examples for such measurable goals are the guidelines for a quality enhancement plan (QEP) by the Southern Accreditation of Colleges and Schools (SACSCOC, 2012).

Morrill (2007) discussed the limits and possibilities of strategic leadership and that its success depends on external and smart reaction on unforeseeable conditions. If

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the governing board is conflicted, if faculty and administration developed diametrical positions, or if faculty members are at each other's throats, then strategic leadership will be corrupted and cannot be effective. "Strategic leadership ultimately depends on a fundamental consensus about the values that the organization exists to serve" (Morrill, 2007, p. 248). Fundamental consensus can only be achieved in an organization that is in good psychological health (Likert, 1967; Maslow et al., 1998).

Shared Leadership vs. Shared Governance

Likert's (1961, 1967) construct of System 4, participative group (and the advanced System 5) are idealistic models for participative leadership or management, that may not be applicable for every company, organization or institution equally well. Morrill (2007) concluded, with the educational task of transforming human possibilities, the quest for learning, and the challenge of meeting human needs, people experience the powerful norms of a community that serves a great common cause. "In such a community it becomes nearly impossible to draw sharp lines between those who lead and those who follow" (Morrill, 2007, p. 267). As a former president of a university, Morrill (2007) questioned the traditional and positional role of a college or university president. Morrill (2007) proposed a future-oriented *shared governance* solution whereby an academic leader's most important form of influence derives from his or her function "as an intellectual and educational partner with the faculty" (p. 25). In contrast, Olson (2009) pointed out, that shared governance "is a delicate balance between faculty and staff participation in planning and decision-making processes, on the one hand, and administrative accountability on the other. The truth is that all legal authority in any university originates from one place and one place only: its governing board" (para. 6). Also, according to Kezar and Holcombe (2017), shared governance is rooted in the principles of faculty and administration holding different areas of delegated legal authority and decision-making.

Regarding legal authority, shared governance and shared leadership must be clearly distinguished from one another.

Shared leadership is more flexible and could include various individuals on campus with relevant expertise. This allows multiple perspectives likely superior over a single decision-making body, e.g., only faculty or administration. "Conditions that promote and sustain shared leadership include team empowerment, supportive vertical or hierarchical leaders, autonomy, shared purpose or goal, external coaching, accountability structures, interdependence, fairness of rewards, and shared cognition" (Kezar & Holcombe, 2017, p. v). All these are in fact key factors of motivational forces (Chapter V) which suggests that shared leadership has an immediate positive impact on organizational climate.

Organizational Climate vs. Culture

Organizational culture concerns assumptions underlying the organization, while climate focuses on the organization's accessible perceptions, particularly their impact on motivation and performance (Schein, 2004; Stringer, 2002; Tierney, 1990). According to Schein (2004) "Survey responses can be viewed as cultural artifacts and as reflections of the organization's climate, but they do not tell you anything about the deeper values or shared assumptions that are operating" (p. 362). For assessing dimensions of culture, at least Tierney (1990) suggested a qualitative approach as more appropriate than quantitative research. In this sense, the instrument development in this study does not consider aspects of culture, in particular regarding the multicultural diversity of today's post-secondary educational campuses.

Implications of organizational climate became subject to deeper research in the 60s (Stringer, 2002; Tagiuri, Litwin, & Barnes, 1968). Likert (1961, 1967) recognized climate as a result of leadership. Taylor and Bowers (1972) measured organizational climate by incorporating Likert's (1967) original questionnaire items, and by constructing new

items congruent to Likert's wording and intent. Likert Associates (1972) and Likert and Likert (1976) described organizational climate as consisting of three basic dimensions: goal commitment, decision-making processes, and team cooperation; climate within interaction-influences processes is a causal factor for performance.

Balzer (2010) referenced several models of organizational climates and emphasized in particular on the groundbreaking work of Litwin and Stringer (1968) who have identified six key factors. 1) Structure: the extent to which employees perceive that the university is well organized and they understand their roles and responsibilities. 2) Standards: the extent to which employees perceive pressure to improve their performances. 3) Responsibility: the extent to which employees have autonomy and authority for decisions. 4) Recognition: the extent to which employees feel the emphasis is placed on reward. 5) Support: the extent to which employees feel a sense of trust and mutual support within their work-group. 6) Commitment: the extent to which employees take pride in being part of the organization and are committed to its goals.

From these six factors, Balzer (2010) identified the climate dimensions standards, support and commitment as most important and remarked that an evaluation of leadership practices in comparisons to the organizational environment must be a key consideration before embarking on Lean in Higher Education. These factors certainly translate well to any other endeavors for implementing organizational institutional improvements. Commitment is closely tied to motivational forces (as discussed in Chapter V).

Recognized Surveys for Post-Secondary Education

Hanover Research (2012) presented six nationally recognized surveys in use to assess post-secondary education. These surveys address partially common issues, i.e., the six key factors of organizational climate as outlined by Balzer (2010). They target primarily institutional effectiveness, some key factors of organizational climate

as outlined by Balzer (2010), and examine student satisfaction. None of these survey's are based on Likert's systems approach. The surveys cited by Balzer (2010) are:

- The Institutional Performance Survey offered through the National Center for Higher Education Management Systems (NCHEMS)
- The Chronicle of Higher Education "Great Colleges to Work For" Program
- The Higher Education Research Institute (HERI) Faculty Survey
- The Noel-Levitz College Employee Satisfaction Survey
- The Noel-Levitz Institutional Priorities Survey
- The Faculty Job Satisfaction Survey of The Collaborative on Academic Careers in Higher Education (COACHE)

The NCHEMS Institutional Performance Survey and the Noel-Levitz Institutional Priorities Survey, are not primarily designed to measure the job satisfaction of faculty and/or staff. The focus of the NCHEMS survey is student's educational satisfaction, academic progress, career development, and personal maturing as the major criteria for institutional effectiveness (Hanover Research, 2012; Steiner, Hassel, & Tepper, 2004).

The Chronicle of Higher Education Great Colleges to Work For Program is a survey used to assess faculty and staff satisfaction at institutions of higher education across the United States. The program adopted a survey from the Forbes Magazine 100 Best Companies to Work For but considers groups of colleges for specific policies and best practices (Hanover Research, 2012). The survey uses a typical 5–point Likert scale and includes about 90 items in 12 features and four major categories, i.e., 1) Leadership, 2) Compensation, 3) Careers, 4) The Workplace (The Chronicle of Higher Education, n.d.). All accredited institutions in the United States are annually invited to participate in the Great Colleges to Work For Program, participation is free. The survey aims at full-time faculty, administrators, and exempt professional staff, and should provide a random sample of 400–600 individuals from these three job categories (Hanover Research, 2012).

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Considering that higher education institutions continue to avoid hiring full-time faculty and increasingly employ adjunct faculty, excluding this group of such a survey will lead to validity issues as the overall result, for example, for employee satisfaction and compensation may turn out very different and likely not in favor of the institution. The Noel-Levitz Institutional Priorities Survey focuses on employees' perception of how their institution meets student expectations regarding a variety of college services and experiences (Hanover Research, 2012). Further, these surveys have been primarily used to support accreditation processes, they allow little customization for the institutions' different needs. In contrast, Hanover Research (2012) remarked, that internally developed surveys offer a much higher level of customization than commercially available instruments. A less well known survey is the Personal Assessment of the College Environment (PACE) survey, which took into account Likert's system approach 1 to 4, but no System 5 potentials were examined. The survey is primarily aimed at institutional effectiveness (Roueche & Baker III, 1987). As previously mentioned, Likert (1967) had no intentions of measuring performance outcomes which he defined as end-result variables. Therefore, the PACE survey differs significantly from Likert's original questionnaire.

Conclusion

The literature review revealed a wide range regarding various aspects of educational leadership, but the results in terms of Rensis Likert's management systems in general and more so regarding education are sparse. The theory has not been thoroughly tested within post-secondary education. At least, Likert Associates (1972) adapted the theory to assess management styles and organizational effectiveness for Schools. And, Likert and Likert (1976) published basic guidelines to use management systems for conflict resolutions in colleges and universities. Further, Roueche and Baker III (1987) included a

section of Likert's questionnaire and partially adapted the concept of four management systems for surveying community colleges.

A review of the bibliography yielded secondary sources on Likert's systems, insight to systems theory and systems thinking, Lean in Higher Education, participative leadership, the concept of learning organizations, research on organizational climate, all of which are central aspects of Likert's management systems.

Chapter III presents the methodological aspects of this study along with a detailed description of theoretical constructs, the research purpose, questions, the research design, and the research design limitations of this study.

CHAPTER III:

METHODOLOGY AND INSTRUMENTATION

Overview of the Research Problem

This study focused on the development of an instrument to examine organizational characteristics and human interactions within post-secondary education, and the implied consequences for institutional change and organizational effectiveness. The research interest of this study was twofold:

1) There is a paucity of specialized instruments that allow for accurately and systematically assessing causal leadership, perceptions of thereof by leaders themselves, by faculties and staff regarding organizational characteristics with a focus on human interaction. This study concerns the development of an effective instrument for post-secondary education institutions to fathom leadership processes, motivational forces, interaction-influence processes and communication processes based on Likert's (1967) management systems 1–5.

2) This study sought to examine universities' and colleges' organizational characteristics as this information is important for developing strategies for implementing transformational change, i.e., organizational climate, performance, and effective improvements. The implementation of change can only be successful when the organizational climate—which is (primarily) based on behavioral characteristics of leaders and subordinates—is consistent and does not suffer from internal conflicts (Balzer, 2010; Likert & Likert, 1976; Likert, 1967).

Operationalization of Theoretical Constructs

The theoretical constructs followed primarily Likert's (1961, 1967, 1972) initially four different management systems and their organizational variables. By the end of the

70s, Likert and Likert (1976) developed ideas for a fifth system, only for participative decision-making processes, but not for all organizational variables that Likert (1967) had established in his earlier questionnaires (Likert & Araki, 1986; Reilly, 1978).

For the purpose of extending the instrument from the original Systems 1–4 on a consistent scale of Systems 1–5 throughout all variables (i.e., leadership processes, character of communication processes, interaction-influence processes, or character of motivational forces, decision-making processes) the researcher defined descriptive statements and response choices for a System 5 and its classification *Nonhierarchical and Participative Responsible* based on notions of Likert and Likert (1976), Likert and Araki (1986) and Reilly (1978). Collins (2001), Collins and Powell (2004), and Stringer (2002) discussed aspects of organizational climate that correspond to System 5 characteristics and were too considered as references for the theoretical framework of this study. Table 1 provides an overview of Systems 1–5 and their formative sources.

Table 1

Systems Classifications and References

Systems Classifications	References
1 Exploitative Authoritative	
2 Benevolent Authoritative	(Likert, 1961, 1967; Likert & Likert, 1976)
3 Consultative	
4 Participative Group	
5 Nonhierarchical and Participative Responsible	(Collins, 2001; Collins & Powell, 2004; Likert & Araki, 1986; Reilly, 1978; Stringer, 2002; Wilson, 2010)

The five systems were further distinguished into five (of originally eight) groups of organizational characteristics containing various variables; Likert (1967) did not use the term construct, but "operating characteristics" (p. 27) and "organizational characteristics" (p. 197), also "framework" (p. 212). Table 2 provides an overview of the selected organizational characteristics and references.

Table 2

Organizational Characteristics and References

	Organizational Characteristics	References
1	Character of Leadership Processes, LS	
2	Character of Motivational Forces, MF	(Likert & Likert, 1976; Likert, 1961, 1967; Likert Associates, 1972)
3	Character of Communication Processes, CP	
4	Character of Interaction-Influence Processes, II	
5	Character of Decision-Making Processes, DM	

Likert (1967) defined three more categories of organizational characteristics: 1) character of goal setting or ordering, 2) character of control processes, and 3) performance goals and training. Considering the willingness of participation and expected response time of the survey, which of course depends on the overall number and complexity of questions, these characteristics were excluded from the research.

As presented in Chapter II, Likert (1967) defined three categories of variables as an underlying construct for organizational characteristics: 1) Causal variables to be "independent variables which determine the course of developments within an organization and the results achieved" (Likert, 1967, p. 26). In general, causal variables are to be assessed through questions and descriptive statements aiming at leadership processes, supportive behavior, and decision-making processes. 2) Intervening variables reflect the

internal state and the health of the organization, and they are tied to interaction-influence processes, motivation and perceptual variables, and communication processes. 3) End-result variables are dependent variables that reflect the achievements of an organization or institution. End-result variables are subject to performance/financial analysis. Likert Associates (1972) stated that "end results of an educational process are primarily measurable by objective performance criteria" (p. 4.), and regarding education that the "Likert School Profile Instruments do not themselves measure these performance criteria" (p. 4).

Likert (1967) provided a "Table of Organizational Variables" (p. 212), i.e., how to utilize the categorical causal, intervening and end-result variables, and matched them with questions and descriptive statements which guided the development of the survey questions. As shown in Table 2, the constructs of the present study were anchored in selected organizational characteristics and processes. A Principal Component Analysis (PCA), an Exploratory Factor Analysis (EFA), and a Confirmatory Factor Analysis (CFA) were performed to detect and/or confirm Likert's causal and intervening variables as latent factors of the survey items and constructs.

Further, the questionnaire developed for this study sought to detect past and present states of organizational variables, and what members desire for the future of their organization and work environment. However, the survey was not designed (or improved) to measure end-result variables following Likert (1967) who had already excluded such research ambitions; doing so would require a different, possibly longitudinal research design.

Purpose of Study and Research Questions

The purpose of this study was to develop an instrument that allows for accurate assessment of organizational characteristics and leadership patterns in post-secondary education, and the implications for educational leadership.

The instrument was based on Likert's (1967) management systems and a questionnaire of organizational characteristics which examined the consistency or inconsistency of a firm, an organization, its underlying principles and procedures, motivational and behavioral consequences, and consequently performance efficiency and organizational effectiveness.

Research questions that guided this study were distinguished into two sections: The primary research question (RQ1) concerned the instrument development itself. The secondary research questions (RQ2) could only be answered if the questionnaire of the instrument proofed reliable data.

Primary Research Question (RQ1):

To what extent can Likert's (1967) management systems be adapted as an instrument for assessing performance characteristics of post-secondary education institutions?

Secondary Research Questions (RQ2 a–f):

a) Are there differences in perceptions of faculty towards institutional organization across different departments?

b) Are there differences in perceptions of administration towards institutional organization across different departments?

c) Are there differences in perceptions of what individuals believe the characteristics of their institution are?

d) Are there differences in perceptions of what individuals like the characteristics of their institution to be?

e) Are there differences in perceptions of organizational structures across institutions of higher education?

f) What are the perceptions of supportive relationships (professional and personal) with superiors and the organization?

Research Design

A questionnaire instrument was developed to examine organizational characteristics and perceptions, such as attitudes, opinions, beliefs, and practices in institutions of higher education. The research design for this study followed Creswell's (2012) outline of eight steps for survey designs:

1. Decide if a Survey is the Best Design to Use

2. Identify the Research Questions of Hypothesis

3. Identify the Population, the Sampling Frame, and the Sample

4. Determine the Survey Design and Data Collection Procedures

5. Develop or Locate an Instrument

6. Administer the Instrument

7. Analyze the Data to Address the Research Questions or Hypotheses

8. Write the Report (Creswell, 2012, p. 403).

As stated before, the instrument development for this study was based on questionnaires by Likert (1961, 1967) that he ab initio established to explore and assess profiles of organizational characteristics in industrial corporations. Likert's survey can be used for any other type of organization as well (Likert, 1961, 1967); Likert Associates (1972) used the systems approach to examine profiles of schools.

As post-secondary education was the research target of this study, Likert's (1967, 1972) original surveys were modified to match today's educational terminology, word choice and phrasing, and institutional culture of post-secondary education. The appropriateness and clarity of all questions is a result of IRB approval processes and conversations with individuals in post-secondary education, and three survey experts. Moreover, the selection and relevancy of survey items (variables) were grounded in the literature, i.e., Likert Associates (1972), Likert (1961, 1967), Stringer (2002), Taylor and Bowers (1972)

to ensure a high degree of reliability and validity. Appendix A exhibits all formative sources.

Likert's (1967) questionnaire assessed perceptions of the present and retrospectively how respondents perceived their organization one to two years ago. This concept was also adapted for this survey, the time frame was defined as one to six years ago considering that implementing change may take up to eight years for taking effect (Hall & Hord, 2015). Although the survey examines perceptions of the past and present data collection was performed at one point in time. Hence, this is a cross-sectional survey design (Creswell, 2012).

The survey was disseminated electronically using Qualtrics (2019) and providing anonymous links. The retrieved data was processed in MS Excel (version 1902) by converting all responses to ordinal data tables. The statistical software **R** (R Core Team, 2019) with RStudio Team (2019) was used for in-depth data analysis (see below: Data Analysis Procedures).

Instrument Development

This instrument developed is an establishment survey and a variation of Likert (1961, 1967), Likert Associates (1972) and Likert and Likert's (1976) management systems concept to examine organizational characteristics of an industrial corporation or any other organization. Further formative sources for developing and selecting questionnaire variables were Collins (2001), Collins and Powell (2004), Likert and Araki (1986), Reilly (1978), Stringer (2002), Taylor and Bowers (1972), and Wilson (2010).

Likert (1961, 1967) categorized four different systems of management: 1) Exploitative Authoritative, 2) Benevolent Authoritative, 3) Consultative, and 4) Participative Group (Likert, 1967). By the mid-70s, Likert extended the four systems through conceptualizing a System 5 to be even more advanced than System 4 (Likert & Likert, 1976;

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Reilly, 1978). This survey called "Profile of Organizational Characteristics" (Likert, 1967, p. 197) included 51 organizational variables distributed over eight categories: 1) leadership processes used, 2) character of motivational forces, 3) character of communication processes, 4) character of interaction-influence processes, 5) character of decision-making processes, 6) character of goal setting or ordering, 7) character of control processes, and 8) performance goals and training. The survey (Likert called it table) "can be used for other purposes by appropriate modifications in the instructions" (Likert, 1967, p. 211).

Scale Development

Participants used a 15–point rating scale spreading over five columns corresponding to five different systems whereby each column was further dived into three entry fields. Participants were instructed to treat each organizational variable "as a continuous variable from the extreme at one end to that at the other end" (Likert, 1967, p. 197). Nevertheless, the three response fields in each section could also be read as "disagree," "neutral," and "agree." A respondent could agree to a statement in the second category (System 2) but moving one step further to the right would mean to disagree with the characteristics of the next best category (System 3).

Likert has become widely known for his 5–point or 7–point scales (DeVellis, 2012). This survey too utilizes a Likert scale, either by means of a declarative sentence or a question, followed by response options and based on a 15–point scale. Figure 1 shows Likert's (1967) first two questions in the original layout using a 20–point response scale, with five entry fields for each category (Systems 1–4). Figure 4 shows an example of the new online format in Qualtrics (2019), adapted for post-secondary education, using a 15-point Likert scale with three options for each response category (Systems 1–5); the layout shows the System 5 category on the right. The question is part of the construct

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decision-making processes (DM) shown in Table 7 and the last question (No. 33) of the survey (Appendix C).

To what extent do you consider your team members' ideas for decision-making?

Not involved in decisions, and not consulted	Never involved in decisions, occasionally consulted	Usually consulted, but ordinarily not involved in decision-making	To a very great deal involved in decision-making	Fully involved and included in all decision-processes
	p	n	f	

Figure 4. Example of an adapted survey question using five systems.

Likert Associates (1972) deviated from five response fields for each category and used binary options instead, equivalent to "agree" or "disagree." The researcher chose three response choices as this permits a neutral response in the center of each category. By providing a central option, respondents may feel less pressured to "agree" or "disagree" (DeVellis, 2012). Further, the data analysis of a 15–point scale provides good gradation and will show responses within the visualization of Likert's systems in more detail than a 10–point or even 5–point scale with only one response field for each category.

In contrast to typical 5–point or 7–point Likert scales, that require only one check-mark per question, the concept adapted from Likert's (1967) questionnaire requires respondents to enter characters: Likert (1967) instructed: " Please place an ***n*** at the point which, *in your experience*, describes your organization at the present time (n = now). Treat each item as a continuous variable from the extreme at one end to that at the other" (p. 197). In addition, if respondents had been with their organization for one or more years, Likert (1967) instructed survey participants to "place a ***p*** on each line at the point which, *in your experience* [i.e., retrospectively], describes your organization at it was one to two years ago [p = previously]" (p. 197). Likert (1967) found in his analysis, that perceptions of the past scored in a lower system range than perceptions assessed for the present. However, Likert (1967) did not define what one or more years exactly might be.

This could pose an issue because for some p could mean five or even fewer years ago and for others 10, 25 or even more years ago which renders p as vague information regarding rather recent changes in the work environment and organization. To retrieve more specific information, for this survey, p was anchored in a period from one to six years ago. In addition, respondents could indicate *Years of experience* (total) and *Number of years of experience at your current position* via check-boxes in the demographic information section at the end of the survey.

Taylor and Bowers (1972) asked occasionally for how respondents like their firm or organization to be in the future. This feature was adapted, as an enhancement to Likert's (1967) method, the preamble instructed respondents to place an f (future desired state) into any segment of the scale for how they would like the institution to be in the future. The underlying idea is to explore if respondents are content with the current n state or to what extent they desire improvements.

Finally, respondents could enter more than one character per box, for example, p, n or n, f or p, n, f in case there was no perceived difference of past and now, and no changes were desired for the future. If a question could not be answered at all, "n/a" anywhere on the scale was offered as another option; a missed answer for any question was interpreted as "n/a."

Following the survey's philosophy of being entirely voluntarily, none of the survey questions was configured in Qualtrics to force a response. The researcher was mindful that a respondent may miss a question or may not feel comfortable responding to it. Entering "n/a" at least would indicate that the respondent did not overlook a question. Further, forcing responses might irritate participants, they may not answer honestly at all, or they may leave the survey unfinished.

Distortion Factors and Cognitive Issues

Likert (1967) sought to develop a valid and reliable systems approach to examine management structures and discussed the extraordinarily high inter-correlations among the items and between each item and the total score of his survey: The reliability coefficients (Pearson) range from $+.73$ to $+.97$ with a corrected split-half reliability coefficient (Spearman-Brown) of $+.98$ (Likert, 1967; Likert Associates, 1972). Given that high magnitude of inter-correlation Likert (1967) examined factors that could distort the overall picture and found that labeled headers and response bias could introduce errors.

Labeled Headers.   In earlier versions, the original survey included labeled headers (Exploitative Authoritative to Participative Group) corresponding to the four systems as determined by Likert (1967); arranged from System 1 at the left to System 4 to the right. For label headers, Likert (1967) found that they could influence the response of participants, therefore labels were omitted for this study as well.

Response Bias.   The second factor to distort the result is *response set*, also known as *acquiescence response bias*, which denotes the tendency of respondents to identify content patterns and place each answer at about the same point from the left to right of each item on the answer sheet. Response set could occur when the content of Likert Scale items from left to right are all aligned in the same general relationship, or questions are either all worded towards positive or negative responses in contrast to using randomly both approaches.

Likert (1967) at first excluded response set distortions by randomly reversing System 1 through System 4 items in the vertical alignment. Figure 1 shows the first two organizational variables whereby System 1 (Exploitative Authoritative) is placed to the left, System 4 (Participative Group) at the right. Likert Associates (1972) later discarded alternating positions of system items based on field tests that showed that the response

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error is negligible and appears to be less than the error respondents make when a random pattern of scale reversal was used, and surveys with a consistent scale order shorten the overall response time of participants (Taylor & Bowers, 1972).

Watson (1992) found that alternating questions to stimulate positive or negative responses along random orientation of questionnaire items within Likert scales yield in general higher validity than a survey design that does not address acquiescence factors. Further, response bias can vary across cultures, e.g., the Greek or citizens of the Philippines seem to respond in general more positive to surveys which were disseminated simultaneously in other countries (Smith, Bond, & Kagitcibasi, 2006).

For this study, the survey items were aligned consistently from left (System 1) to right (System 5) primarily for the following reason: According to DeVellis (2012) "the respondent's ability to discriminate meaningfully between response options will depend on the specific wording or physical placement of those options" (p. 90). In other words, a clear order will rather help than distract the respondent to differentiate between response choices. As stated before, this instrument defines System 5 characteristics throughout all variables (questions), supported by reviewed literature (Collins, 2001; Collins & Powell, 2004; Likert & Araki, 1986; Likert & Likert, 1980; Likert & Likert, 1976; Likert, 1967; Reilly, 1978; Stringer, 2002; Wilson, 2010). Following DeVellis (2012), System 5 declarations and response options are clearer for respondents when consistently aligned to one side of the survey layout. Consequently, respondents will obviously perceive the right column (System 5) as the qualitative highest level of all choices on the scale.

Wording and Phrasing of Questions and Response Choices

There was a need to reword and rephrase the language regarding today's organizational culture and political correctness, i.e., for post-secondary education environments. Strong terms like "condescending," "hostile," "subservient attitudes," "or great suspicion"

were softened due to IRB approval procedures concerning inflammatory language. Further, words such as "industry" were replaced with "institution," and "manager" replaced with "leadership" or "team leader." Figure 1 shows an example of the original questionnaire items.

According to DeVellis (2012), the primary concern in developing questions is to write statements that are not offensive. However, items that are too defensive, too mild, or too soft, could be perceived by nearly all respondents as agreeable. The third concern could be the absence of an unfavorable response option. Therefore, to establish a good scale, the response choices must range from strongly unfavorable to strongly favorable options, and still avoid any offensive language, i.e., not offensive for the respondent and not offensive for the surveyed institution.

Some of Likert's (1967) and Likert Associates' (1972) questions were compound questions, also known as double-barrel questions, e.g., asking for "amount and character of interaction" or "confidence and trust" (p. 204). Following Fowler (1995), a good question "produces answers that are reliable and valid measures of something we want to describe" (p. 2). Questions that aimed, e.g., at *confidence* and *trust* were revised to use only *confidence* to focus the question as these two words describe slightly different concepts: *Confidence* is rooted in the notion of assurance, while *trust* is the belief in another individual. Therefore, any questions that could be perceived as ambiguous were condensed to a single motive. Ambiguous questions could have been split into two separate questions, but this would have increased the overall survey length and time to respond, which is undesirable.

Fowler (2004) proposed to develop and evaluate survey questions by using alternative wording and phrasing in two different survey version disseminated to comparable sample populations (split-sample experiment). This method allows validating whether a simplified or a more elaborated question–aiming at the same topic–yields accurate re-

sults. In general, a well-elaborated question generates more precise responses than the simplified version of the same question; the main criteria, at any rate, is the *clarity* of the question. For entirely new and untested questionnaires Fowler's (2004) method is certainly an effective approach. This survey, however, was based on a rather conservative research-design by re-evaluating and varying an original Likert (1967) instrument.

The response options defined by Likert (1967) were often as complex as his questions: For example, superiors "Display no supportive behavior or virtually none" (p. 197) could be considered as two adjacent choices. Interpreting and understanding such wording could slow down the response process. On the other hand, the reading- and reacting time cannot be the only criteria for a survey, because respondents should genuinely think about which of the options given would best describe their own situation. Another example: A response choice like "have subservient confidence and trust, such as a servant to a master" (p. 197) not only displays redundancy, in addition, the wording could be considered offensive by today's culture. Hence, response options were carefully revised considering Fowler's (1995, 2004) method for quality questions that also a well-elaborated response option will result in a more accurate choice by the respondent.

As stated before, all questions and also all response choices were anchored in the reviewed literature (Likert, 1967; Likert Associates, 1972; Stringer, 2002; Taylor & Bowers, 1972), discussed and clarified with individuals and survey experts of post-secondary education–following recommendations for developing an establishment survey (DesRoches, 2008; Fowler, 2004; Fowler, 1995; Willimack et al., 2004).

Visual Design and Layout

The survey was disseminated online using Qualtrics (2019) software which allowed to reproduce Likert's (1967) original design and layout along with customizations to achieve good screen design that is user-friendly, inviting, and easy to follow through.

Dillman, Sinclair, and Clark (1993) investigated visual design options to test, e.g., how respondents identify what questions belong together, or if there is a difference whether check boxed are contrasted against a darker background or not. Although Baker, Crawford, and Swinehart (2004) recommended a white background for screen design, the researcher preferred a warm white that allowed to contrast and emphasize the plain white entry fields for the 15–point scale. Questions that touched similar concepts were grouped, only two or three questions were displayed at once per page.

Further, it was of concern whether to include a progress bar or not and if placement at the top or bottom makes a difference. Baker et al. (2004) recommended not to include a progress bar. However, progress bars have become common and are even expected for any type of software, whether used for a rendering process of a video animation, and installation process, or a survey. Research by Survey Monkey (Mingnan, n.d.) showed, that placing a progress bar at the bottom of a page yielded higher completion rates, than when it was placed at the top of the page. Hence, a progress bar was included at the bottom of each screen page between the forward and backward buttons. No question numbers were given as they are irrelevant for respondents.

For convenience, the survey was designed and delivered online only. Web-based surveys usually result in low response rates and could fail due to technical problems or security issues. Offering an additional paper version likely increases response rates (Creswell, 2012; Greenlaw & Brown-Welty, 2009). Such issues were taken into consideration and compensated by using a large mailing list, which should increase the sample size. Further, it might be difficult to assure anonymity when delivering and retrieving a paper version of a survey. In that case, considering the confidential and sensitive nature of most questions, participants may not feel comfortable at all to respond honestly.

Finally, paper versions are not only more difficult to administer, but also harder to prepare for analysis than using a software in the first place. All data would need to be

manually transferred into a software format, which would take considerably more time and could even introduce errors. Lastly, it stands to question if paper version vs. online versions of the same survey might be perceived differently which could result in reliability issues (this could be subject to further research).

Constructs, Variables, and Formative Sources

The following tables provide an overview of the survey constructs and organizational variables, used for the present survey with a total of 33 questions. As stated before, the questions were selected based on how frequently they were used in the questionnaires of Likert (1967), Likert Associates (1972), Taylor and Bowers (1972), and Stringer (2002). All formative sources, i.e., exemplary questions and categorical variables, are detailed in Appendix A. Another selection criterion was what leaders might want to know about their work environment to improve organizational climate and effectiveness.

Table 3 displays 10 organizational variables concerning the construct leadership processes (LS) with references to their formative sources. All leadership variables, LS1–LS10, are congruent with Likert's category of causal variables (Likert, 1967; Likert Associates, 1972). The first number is the variable number, the second number corresponds to the order of appearance in the survey.

Table 3

Leadership Processes, Variables and Formative Sources

Leadership Processes (LS), Variables	Formative Sources
1–1. Extent to which you have confidence in your immediate department leader.	(Likert, 1967; Likert Associates, 1972)

(continued)

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Leadership Processes (LS), Variables	Formative Sources
2–2. Based on your perception: How much confidence does your immediate department leader have in you?	(Likert Associates, 1972; Taylor & Bowers, 1972)
3–4. Extent to which your department leader displays supportive behavior.	(Likert, 1967; Likert Associates, 1972; Stringer, 2002; Taylor & Bowers, 1972)
4–5. To what extent does leadership give you useful work-related information?	(Likert Associates, 1972; Taylor & Bowers, 1972)
5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	(Likert, 1967; Likert Associates, 1972; Taylor & Bowers, 1972)
6–8. How often are your ideas sought by your team leaders regarding work-related problems?	(Likert, 1967; Likert Associates, 1972; Taylor & Bowers, 1972)
7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	(Likert Associates, 1972; Taylor & Bowers, 1972)
8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	(Taylor & Bowers, 1972)
9–23. To what extent does leadership (i.e., the director of your department, chair, dean) hold effective group meetings where colleagues can discuss work-related matters?	(Stringer, 2002; Taylor & Bowers, 1972)
10–19. To what extent does leadership encourage faculty or staff to work as a team?	(Likert Associates, 1972; Taylor & Bowers, 1972)

Table 4 displays eight questions concerning the construct motivational forces (MF) and its variables with corresponding formative sources. The questions aim at working climate, motivation, attitudes, job-satisfaction and upholding or striving for institutional goals. Categorically, these variables are all intervening variables (Likert, 1967; Likert

Associates, 1972). Employee behaviors and feelings, e.g., *general attitudes towards your institution* can be caused by leadership behavior, or influenced by interaction with colleagues, or both.

Table 4

Motivational Forces, Variables and Formative Sources

Motivational Forces (MF), Variables	Formative Sources
1–11. Who feels responsible for achieving high performance goals in your institution?	(Likert, 1967; Likert Associates, 1972)
2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	(Stringer, 2002; Taylor & Bowers, 1972)
3–13. What is your perception of colleagues regarding their attitude towards the institution's goals?	(Likert, 1967; Stringer, 2002)
4–14. In your perception, what is the working climate among your colleagues?	(Likert, 1967)
5–15. What is your general attitude towards your institution?	(Likert Associates, 1972)
6–16. Overall satisfaction derived by being a part of the institution.	(Likert Associates, 1972; Taylor & Bowers, 1972)
7–17. Overall satisfaction with leadership for your department (i.e., department director, chair, dean).	(Likert Associates, 1972; Taylor & Bowers, 1972)
8–30. How often do you try to be supportive to your colleagues?	(Likert Associates, 1972; Taylor & Bowers, 1972)

Table 5 presents six questions concerning communication processes (CP) with their formative sources. Likert (1967) grouped these questions under communication processes. The questions refer partially to leadership behavior, and as such, they are causal variables (CP1–CP3) and aim at interaction-influence with colleagues, hence

intervening variables (CP4, CP5). Question CP6 can be explained as a causal as well as an intervening variable. The questions explore primarily the profundity and effectiveness of communication.

Table 5

Communication Processes, Variables and Formative Sources

Communication Processes (CP), Variables	Formative Sources
1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional and organizational objectives.	(Likert, 1967; Likert Associates, 1972)
2–25. To what extent do you feel that your department leader is interested in your success?	(Likert Associates, 1972; Taylor & Bowers, 1972)
3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	(Likert, 1967)
4–21. Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution.	(Likert, 1967; Likert Associates, 1972; Taylor & Bowers, 1972)
5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	(Likert, 1967; Likert Associates, 1972; Taylor & Bowers, 1972)
6–24. Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff).	(Likert, 1967; Likert Associates, 1972; Taylor & Bowers, 1972)

Table 6 shows seven questions regarding interaction-influence processes (II) along with formative references. Interaction-influence variables aim primarily at situations in which colleagues at the same hierarchic level work with each other and explore motivations, attitudes, cooperation, team building, mutual support, and confidence in one another. The questions are throughout consistent with Likert's (1967) category of intervening variables.

Table 6

Interaction-Influence Processes, Variables and Formative Sources

Interaction-Influences (II), Variables	Formative Sources
1–3. To what extent do you have confidence in your department colleagues?	(Stringer, 2002; Taylor & Bowers, 1972)
2–7. How comfortable do you feel talking to colleagues about matters related to your work?	(Likert Associates, 1972)
3–26. In your perception, what is the character of interaction between department colleagues?	(Likert, 1967; Likert Associates, 1972)
4–27. To what extent do your department colleagues encourage each other to work as a team?	(Likert Associates, 1972; Stringer, 2002; Taylor & Bowers, 1972)
5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	(Taylor & Bowers, 1972)
6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	(Taylor & Bowers, 1972)
7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	(Taylor & Bowers, 1972)

Table 7 presents the construct decision-making processes (DM), variables and the formative sources. Likert (1967) defined being involved in decision-making as an intervening variable. Notwithstanding, the two questions fathom leadership behavior by seeking opinions of employees (and make use of them). Hence, the underlying motive is receptivity to ideas, which is categorically a causal variable (Likert, 1967; Likert Associates, 1972).

Table 7

Decision-Making, Variables and Formative Sources

Decision-Making (DM), Variables	Formative Sources
1–32. To what extent are you involved in major decisions related to your work?	(Likert, 1967; Likert Associates, 1972; Stringer, 2002; Taylor & Bowers, 1972)
2–33. To what extent do you consider your team members' ideas for decision-making?	(Likert Associates, 1972; Taylor & Bowers, 1972)

Demographic Information

At the end of the survey respondents were given the option to voluntarily provide their position and academic discipline or mission of their department. While such information is crucial to render an accurate picture of differences in perceptions of employees across colleges and departments, no response was forced. In fact, about 10% of all respondents skipped answering for unknown reasons; likely because they were concerned about being identifiable. Participants were also asked whether they work for a two- or four-year institution, their years of experience at their current institutions and their years of experience at the current position. Finally, respondents were offered to provide gender information and leave comments. Questions about ethnicity, nationality or other personal information were excluded as irrelevant for this study.

Population and Sample

This pilot study was conducted at two public universities and one large community college located in the southwestern United States. The target population of this study was the personnel of internal governance (Kaplin & Lee, 2014) including personnel in various leadership roles, such as provost and higher, deans and associate deans, department chairs,

program directors, and similar positions. Further, the survey was disseminated to all faculty, all administrative and non-administrative staff, including all part-time employees.

Upon request, based on the Texas Public Records Act (1993), public colleges, and universities shared email addresses of all their employees, i.e., administration, faculty, and staff. Some other contacted institutions to be included in this study simply ignored the researcher's request for public records. The received mailing lists of public records varied in the number of addresses and given details for each employee. In some cases, titles and positions were indicated, in other cases only a plain email list without any further details could be obtained. The survey was disseminated to all available contacts which ideally would permit conclusions about the whole organization/institution, comparable to a census study (Creswell, 2012).

The sample size resulted from the sum of all usable answers given. The number of responses varied among institutions and differ in terms of survey completeness. With an average response rate of 1.4% the sample size was N = 274, due to incomplete responses the number of records that could be used for statistical analysis was N = 206.

Recommendations for factor analysis typically range from 10 to 20 respondents per question/variable to obtain valid data (DeVellis, 2012; Field, Miles, & Field, 2012; Mundfrom, Shaw, & Ke, 2005; Thompson, 2004). Gorsuch (1983) suggested that "an absolute minimum ratio is five individuals to any variable, but not less than 100 individuals for any analysis" (p. 332).

For the Factor Analysis of this study, 206 records were used of which 41 records with only one missing answer were included using data imputation. The Kaiser-Meyer-Olkin (KMO) measure of .83 (overall MSA) indicated very good sample adequacy. Criterion based post-stratification was used to describe and categorize the data retrieved from specific populations, i.e., administrative positions only, faculty and staff only. This method was applicable only to Institution C giving enough responses for allowing this approach.

Data Collection Procedures

The researcher had obtained permission and written approval by either Institutional Review Boards (IRB) of the sampled institutions or by Committee on Protection of Human Subjects (CPHS) of the research institutions of the universities and colleges to be examined during 2019. Not all institutions required IRB approval.

The survey was configured and distributed through Qualtrics (2019). Based on the Texas Public Information Act (1993), email addresses could be obtained directly from the participating institutions. For pretesting, the survey was sent to 50 respondents to verify that the instructions, questions, and declarative statements were clear, and whether the answering options were clearly distinguishable as well.

Pretesting did not indicate any issues. Therefore, the survey was administered to 13,154 contacts at three different large institutions. Most responses were recorded within the first week after emails were sent, sending one to two reminders resulted in additional responses. Data were collected between September and November 2019.

Email distributions of such dimensions may be blocked by information technology (IT) as unsafe for the target institution. In one case, IT security indeed classified the distribution of the survey as a risk, although IRB had approved the research. The survey still was conducted after the researcher found support from executive leadership. In other cases, some addressees have contacted their IT-department or the researcher to inquire about the legitimacy of the survey. Fears of opening an unsafe email could have contributed to low response rates.

With increasing awareness of internet security and considering tracking and telemetry of computer users—which evokes mistrust in anonymity disclaimers—optional paper versions of surveys (although less convenient and more costly) might overall yield better response rates than exclusively electronic dissemination (Creswell, 2012; Greenlaw

& Brown-Welty, 2009). Considering the total number of email addresses received, a paper version did not seem to be necessary. Nonetheless, it will be equally difficult to engage members of an organization in taking a paper survey. Participation in the study remained voluntary throughout all stages assuring no coercive pressure to participate. Data that allowed for the identification of respondents were handled with the utmost confidentiality.

Data Analysis Procedures

The data was exported from Qualtrics (2019) and processed in MS Excel, version 1902. All **p**, **n**, and **f** entries were converted into three different tables and ordinal numbers matching the used 15–point Likert scale. Visualizations of data as shown in Figure 5 were created in Excel.

The observed mean $\overline{X}$ for each data set was converted into a score along the System 1 to System 5 continuum using Likert's (1967) modified formula [(observed mean $\overline{X}$) x 5 / 15 $+$.5]. The number 5 represents the number of systems, divided by the length of the scale 15. Example: with a $\overline{X}$ of 6.4 calculate: $\frac{6.4 \, x \, 5}{15}$ $+$.5 = 2.63, a score that matches System 3. The parameter $+$.5 is a corrective argument to 1) fit the lowest possible score of System 1 into the pre-defined range 0.5–1.5, and 2) to render a scoring system for easy interpretation. Table 8 defines the scores to systems relations.

Table 8

Score to Systems Relations

	System 1 Exploitative Authoritative	System 2 Benevolent Authoritative	System 3 Consultative	System 4 Participative Group	System 5 Nonhierarchical Responsible
Scores	0.5 – 1.5	1.51 – 2.5	2.51 – 3.5	3.51 – 4.5	4.51 – 5.5

The data of each examined institution were analyzed towards assessing the population and an initial qualitative interpretation of all responses as presented in Tables 9 to 17 and graphically visualized in Figures 5, 6, and Figure 7.

For in-depth statistics, all data were combined to meet the criteria for an appropriate sample size for factor analysis. The software **R** (R Core Team, 2019; RStudio Team, 2019) was used for the following statistical procedures and methods:

- Data imputation, Amelia II
- Kaiser-Meyer-Olkin
- Bartlett's Test of Homogeneity and Sphericity
- Principal Component Analysis
- Exploratory Factory Analysis
- Confirmatory Factor Analysis
- Cronbach's α
- Correlation Matrix

All statistical analyzes were performed for comparisons both with complete data N = 165 and with imputed data N = 206 to check for any significant deviations. There were no significant differences between complete cases only and imputed data. For reasons of larger sample size and achieving a stable factor analysis, the imputed data were used for all further analyzes.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy computed .83 for N = 206. Bartlett's Test of Homogeneity and Sphericity indicated strong variances, and overall there are significant correlations among the variables (Appendix D).

To determine factor extraction, Principal Component Analysis (PCA) was combined with a scree test (Figure 8) and a non-graphical parallel analysis in **R**. PCA could narrow down the number of possible factors. However, exploratory factor analysis (EFA) was done in multiple runs using different numbers of factors to examine the interpretabil-

ity of results. The parallel analysis pointed at five factors as optimal, and indeed, the factor loadings into five latent variables make the most sense regarding underlying motives of variables and constructs compared to other factor models. Table 19 shows the EFA results.

Confirmatory Factor Analysis (CFA) was run for *goodness-of-fit index*, first to verify that five factors yielded good measures for fit, and second, to verify that no other factor model could imply a better fit of measures. Table 20 shows measures for four different factor models and measures of an optimized five-factor model based on CFA factor loadings.

Privacy and Ethical Considerations

Anonymity has been protected at all stages, reported findings do not allow for determining any participant's identity. All collected data that could be used to identify participants has been stored in a password-protected directory on the principal investigator's personal computer. The data has been securely archived and will be deleted after five years.

Research Design Limitations

The internal validity of this research design was limited by a low response rate and is based on a sample size of N = 206 for statistical analysis. Validity was moreover limited by occasional response errors (typos), incomplete responses, response set, subjective self-perception and bias of participants, and the honesty of all participants. External validity and generalizability are limited due to the limited number of received responses and by the number of participating universities and colleges.

Summary

The purpose of this study was to develop an instrument with which the organizational characteristics and leadership behavior in post-secondary education can be accurately assessed. The research is primarily grounded in questionnaires developed by Rensis Likert (1967, 1972) on characteristics of human organization and the resulting theory of management systems 1–5.

The key question was to what extent Likert's Systems 1–5 can be applied to post-secondary education today to facilitate institutional change. This chapter presented the quantitative research design (Instrument Development), i.e., theoretical constructs and variables, selection and development of questions, scale development, the target populations, necessary sample size, data collection and statistical analysis measures. Chapter IV presents findings and reflections on the research questions.

CHAPTER IV:

FINDINGS AND RESULTS

Demographics of Participants

The survey was sent to 13,154 email contacts, the average response rate was less than 1.5%. Because the survey assured participants anonymity and confidentiality, information that allows identification of participants has been concealed. Data on age, ethnicity or nationality were not collected, as these data are irrelevant to the study. The survey closed with the opportunity for respondents to provide comments. Some respondents included a note on the survey design and specific questions, but most remarks aimed at workload and work climate. For reasons of confidentiality and the risk that respondents could be identified, such information could not be included.

Institution A

Institution A, the smallest of all three surveyed institutions, returned a total of 64 interpretable responses with varying degrees of completeness in each dimension of past *p*, present/now *n*, and desired future *f*, whereby the data for present *n* displays the highest degree of survey completion. Data consists of four major groups: 1) 16 responses from leadership personnel, i.e., administrative staff director/leader, department or college chairs, program coordinators and program directors from different academic programs; 2) 15 responses from full-time faculty in various academic fields; 3) 15 responses from administrative and non-administrative staff, and 4) 18 responses without giving demographic information.

In terms of reported work experience, seven respondents entered for *years at current position* higher values than *for years at the institution*, for which two explanations are possible: 1) Some participants simply confused these two options. 2) Some have in-

deed worked in their position for as long as indicated but at another institution. Therefore, they could have transferred to their current position and reported on their entire work experience.

Table 9 displays the number of responses in relation to work experience at the institution and at the current position in three categories 1) Leaders, 2) Faculty, and 3) Staff. The fourth category *anonymous* lacks any information about positions and work experience. At least 43 respondents worked one year and longer for the institution and at the current position. This work experience enables respondents to answer the survey regarding the institution's work climate and organizational effectiveness as it was in the past up to six years ago; the time frame was declared in the instructions, as defined in Chapter III.

Of all the respondents who indicated their gender, 32 were female, 10 male, and 24 participants did not disclose this information; possibly to protect their identities. There are not enough responses from a single department or college that would allow for comparing perceptions of a rather homogeneous group guided by local and direct leadership (e.g., a department director, dean or chair), only three responses came from members of the same faculty.

Institution B

Institution B, a large institution with over 5000 employees, returned a total of 76 responses with varying degrees of completeness in each dimension of the past, present (now), and desired future. The answers to the present state display the highest degree of completion. The data consists of five main groups: 1) 18 responses from leadership personnel, i.e., administrative staff director/leader, department or college chairs, program coordinators and program directors from different academic programs; 2) 11 responses

Table 9

Job/Position and Years of Work Experience of Institution A

Respondents				Years at the	
Leading	Faculty	Staff	anon	Current Position	Institution
1				< 1	< 1
		1		3–6	< 1
1				> 15	< 1
1	2	3		1–2	1–2
1		2		< 1	3–6
1		1		1–2	3–6
2	4	5		3–6	3–6
	1			7–10	3–6
1				11–14	3–6
	1		1	> 15	3–6
		1		1–2	7–10
	1			3–6	7–10
		1		7–10	7–10
				3–6	11–14
	2			7–10	11–14
	1			> 15	11–14
				< 1	> 15
2	1			3–6	> 15
	1	1		11–14	> 15
5	1			> 15	> 15
			18		
15	15	15	19		

from full-time faculty in diverse academic fields; 3) 13 responses from part-time faculty; 4) 16 responses from staff; and 5) 18 responses were anonymous.

Regarding the reported work experience, like in the previous data set, several respondents entered for *years at current position* higher values than *for years at the institution* for two possible reasons as described before. Table 10 shows the number of responses in relation to work experience at the institution and at the current position in four categories 1) Leaders, 2) Full-Time Faculty, 3) Part-Time Faculty, and 4) Staff. In the fifth

category *anonymous* there is no information on positions and professional experience. At least 70 respondents worked one year and longer for the institution and at the current position which allows for answering the survey in terms of the institution's work climate and organizational effectiveness, as it was up to six years ago.

Table 10

Job/Position and Years of Work Experience of Institution B

Respondents					Years at the	
Leading	FT-Faculty	PT-Faculty	Staff	anon	Current Position	Institution
1		1	1		< 1	< 1
	1	1	4		1–2	1–2
			1		7–10	1–2
1					11–14	1–2
1					> 15	1–2
	1				< 1	3–6
			1		1–2	3–6
		3	2		3–6	3–6
	1				11–14	3–6
		1	1		> 15	3–6
1					1–2	7–10
		1			3–6	7–10
1		2			7–10	7–10
		1			11–14	7–10
1					> 15	7–10
1					1–2	11–14
1					7–10	11–14
			1		11–14	11–14
1					> 15	11–14
1			1		< 1	>15
1			1		1–2	>15
3	1	1			3–6	>15
2	4				7–10	>15
		1			11–14	>15
2	3	1	3		> 15	>15
				18		
18	11	13	16	18		

Of the respondents, 32 were female, 21 male, and 23 participants did not provide information; probably to protect their identities. There are not enough responses from a single department (or college) that would allow for comparison of the perceptions of a more homogeneous group led by a local team leader/director. Only three answers came from members of the same faculty.

Institution C

Institution C, another large institution with over 5000 employees, returned a total of 122 responses with varying degrees of completeness for the past, present (now) and future. Once again, the now/present state displays the highest degree of completion.

The data were retrieved from three major groups: 1) 50 responses from leadership personnel, i.e., administrative staff director/leader, department or college chairs, program coordinators and program directors from different academic programs; 2) 40 responses from full-time faculty in varying academic disciplines, two of which indicated that they are part-time; and 3) 32 responses from administrative staff and various other positions, grouped into the staff category. In Table 11 the number of responses is displayed in three categories: 1) leaders, 2) faculty, and 3) staff in terms of work experience at the institution and at the current position.

At least 110 respondents worked one year and longer for the institution and at the current position. That is an experience that allows respondents to answer how the organization was in the past, up to six years ago. Of the respondents, 72 were female, 45 male, and five preferred not to indicate their gender. There are not enough answers from a single department or college to compare perceptions of a more homogeneous group directed by a local team leader.

The retrieved data from all Institutions A, B, and C display a remarkable variety of positions for administrative leadership, faculty of various academic disciplines and

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administrative as well as non-administrative staff. Among all respondents, there is also a significant variance of years of work experience. Therefore, diversity in perceptions of organizational characteristics can be expected.

Table 11

Job/Position and Years of Work Experience of Institution C

Respondents			Years at the	
Leading	Faculty	Staff	Current Position	Institution
2	2	4	< 1	< 1
	1		3–6	< 1
7	2	3	1–2	1–2
		3	3–6	1–2
1			11–14	1–2
4	1	2	> 15	1–2
2	1		< 1	3–6
6	1		1–2	3–6
2	10	3	3–6	3–6
1		2	11–14	3–6
		2	> 15	3–6
1		1	1–2	7–10
1	1	1	3–6	7–10
3	5	1	7–10	7–10
		1	> 15	7–10
		1	< 1	11–14
3		1	1–2	11–14
3	1		3–6	11–14
	1	1	7–10	11–14
2	1		11–14	11–14
1			1–2	>15
4	3	2	3–6	>15
1		1	7–10	>15
2	2		11–14	>15
4	8	3	> 15	>15
50	40	32		

The ordinal data given by Likert scales allows for an immediate interpretation of the responses: The lowest number is typically the worst while the highest number represents the best rating. The 15–point scale used is divided into five sections, each representing a management system as defined by Likert and in Chapter III and shown in Table 1. Ratings from 1–3 fall into System 1, ratings from 5–6 for System 2, 7–9 for System 3, 10–12 is System 4, and ratings 13–15 are indicators for System 5 characteristics. Table 12 displays responses from Institution A distributed as entered on the provided 15–point scale and aligned to Systems 1–5. The column to the left displays construct variables as defined in Chapter III: Table 3 Leadership Processes (LS), Table 4 Motivational Forces (MF), Table 5 Communication Processes (CP), Table 6 Interaction-Influence Processes (II), and Table 7 Decision-Making Processes (DM).

The column "N" to the right displays the sample size for each record. Since respondents either missed questions, or could not or did not want to answer, N varies. The values corresponding to the 15–point scale indicate the absolute number of responses, not the percentages.

Institution A Data

In Table 12, the data retrieved by Institution A for the present state is styled as a heat map. The distribution of answers immediately indicates that perceptions of all constructs are perceived as very different, which could be explained by the heterogeneous population in different departments and colleges. There is a strong tendency for respondents to use the answer field in the neutral center of each answer choice (which does represent a system). Nevertheless, the distribution shows that options for "worse" and "better" than "neutral" were appreciated, giving a more detailed picture than a 5–point scale would allow. Most answers are distributed in the middle column of System 1 (Exploitative Au-

thoritative), System 2 (Benevolent Authoritative) and System 3 (Consultative). Fewer answers were given for System 4 (Participative Group) and there are some more responses again in System 5 (Nonhierarchical Responsible); as shown above in Tables 1, 8.

Table 12

Distribution of all Responses from Institution A

	System 1			System 2			System 3			System 4			System 5			N
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
LS 1–1.	1	7	1	2	14	4	6	7	3	1	9	3	0	5	1	64
LS 2–2.	0	4	1	5	12	2	5	17	6	3	3	3	1	2	0	64
LS 3–4.	5	11	4	5	16	1	1	6	1	0	3	0	3	6	3	65
LS 4–5.	3	13	2	7	6	0	3	7	2	1	3	1	3	10	2	63
LS 5–6.	9	3	4	3	11	2	1	8	0	0	2	1	2	12	3	61
LS 6–8.	2	11	2	4	5	3	4	10	2	3	5	0	4	2	1	58
LS 7–9.	3	10	2	1	8	6	6	9	0	3	5	1	1	2	1	58
LS 8–10.	1	11	3	3	5	0	6	11	1	4	4	2	4	0	1	56
LS 9–23.	3	10	2	4	5	1	2	7	2	2	3	1	0	3	1	46
LS 10–19.	2	3	3	5	13	1	4	10	1	0	2	1	1	2	1	49
MF 1–11.	4	11	0	3	17	1	4	5	1	1	3	1	0	0	1	52
MF 2 –12.	4	12	2	3	13	3	2	3	1	0	0	0	2	8	1	54
MF 3–13.	1	6	1	4	14	3	4	14	1	1	2	1	0	0	0	52
MF 4–14.	2	7	1	5	13	2	5	9	1	0	3	0	2	1	0	51
MF 5–15.	3	12	5	4	14	2	3	5	1	0	1	0	1	1	0	52
MF 6–16.	4	11	1	8	8	2	2	8	1	0	0	1	1	4	0	51
MF 7–17.	7	11	1	3	9	1	1	7	0	0	2	0	2	4	0	48
MF 8–30.	4	13	2	3	11	0	0	1	1	0	0	0	3	8	2	48
CP 1–18.	2	7	3	3	6	1	4	10	3	3	6	0	1	1	1	51
CP 2–25.	2	7	2	4	10	0	1	6	1	0	2	2	3	6	1	47
CP 3–20.	3	8	3	3	8	1	7	10	2	0	3	0	0	0	1	49
CP 4–21.	1	12	2	5	14	2	3	1	1	0	0	0	3	3	1	48
CP 5–22.	3	2	2	5	11	4	2	11	1	0	0	0	1	2	0	44
CP 6–24.	2	6	1	2	9	1	4	11	3	1	1	0	1	5	1	48
II 1–3.	4	15	0	8	12	5	1	7	0	1	1	0	3	6	2	65
II 2–7.	4	11	2	4	14	4	4	5	1	0	1	0	2	6	2	60
II 3–26.	2	8	2	5	17	1	0	5	0	0	1	1	1	4	1	48
II 4–27.	2	6	4	5	11	2	0	6	1	1	2	1	0	5	1	47
II 5–28.	2	10	2	3	11	2	1	2	0	2	3	1	2	6	1	48

(continued)

Variable	System 1			System 2			System 3			System 4			System 5			N
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
II 6–29.	0	8	1	3	7	0	2	10	2	2	5	1	1	5	1	48
II 7–31.	2	8	3	7	13	2	1	4	1	0	1	1	2	2	1	48
DM 1–32.	5	7	2	2	15	2	4	2	1	1	2	0	2	0	1	46
DM 2–33.	6	17	2	2	9	1	0	2	0	1	5	0	2	0	1	48

While the design of Table 12 displays much detail on how leadership and administration, faculty and staff of Institution A responded to a 15–point Likert scale across System 1–5, Table 13 summarizes answers per System as percentages calculated as follows: For each variable, all scale points that represent one of the five systems were combined. For example, 20 respondents answered for one variable either in the fields seven, eight or nine. Then those 20 answers for System 3 were related to a total number of received answers per variable, i.e., 20 out of 64 answers results in 31.25%; percentages are all rounded.

As readable of Table 13, for leadership processes (LS), LS 1–1, 31% of all respondents have little confidence, 25% considerable confidence, 20% complete confidence, but also 14% no confidence at all in their immediate department leaders. In turn, LS 2–2 shows that 44% of all participants believe their immediate department leader has considerable confidence in subordinates' capabilities, while 30% tended towards little confidence. Regarding supportive behavior (LS 3–4) and receiving useful work-related information (LS 4–5) perceptions are quite diverse: While a majority gave low ratings there are nevertheless 18% and 24% who indicated their leaders show the highest degree of supportive behavior, frequently checks on needs to optimize efficiency and effectiveness and provides useful information as possible or reasonable.

Table 13

Organizational Characteristics of Institution A

Variable / Characteristics	Systems 1–5, N					
Leadership Processes	1	2	3	4	5	N
LS 1–1. Extent to which you have confidence in your immediate department leader.	14	31	25	20	9	64
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	8	30	44	14	5	64
LS 3–4. Extent to which your department leader displays supportive behavior.	31	34	12	5	18	65
LS 4–5. To what extent does leadership give you useful work-related information?	29	21	19	8	24	63
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	26	26	15	5	28	61
LS 6–8. How often are your ideas sought by your team leaders regarding work-related problems?	26	21	28	14	12	58
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	26	26	26	16	7	58
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	27	14	32	18	9	56
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	33	22	24	13	9	46
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	16	39	31	6	8	49
Motivational Forces	1	2	3	4	5	N
MF 1–11. Who feels responsible for achieving high performance goals in your institution?	29	40	19	10	2	52
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	33	35	11	0	20	54
MF 3–13. What is your perception of colleagues regarding their attitude towards the institution's goals?	15	40	37	8	0	52
MF 4–14. In your perception, what is the working climate among your colleagues?	20	39	29	6	6	51
MF 5–15. What is your general attitude towards your institution?	38	38	17	2	4	52
MF 6–16. Overall satisfaction derived by being a part of the institution.	31	35	22	2	10	51

(continued)

Variable / Characteristics Institution A	Systems 1–5, N					
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean).	40	27	17	4	13	48
MF 8–30. How often do you try to be supportive to your colleagues?	40	29	4	0	27	48
Communication Processes	1	2	3	4	5	N
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	24	20	33	18	6	51
CP 2–25. To what extent do you feel that your department leader is interested in your success?	23	30	17	9	21	47
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	29	24	39	6	2	49
CP 4–21. Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution.	31	44	10	0	15	48
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	16	45	32	0	7	44
CP 6–24. Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff).	19	25	38	4	15	48
Interaction–Influence Processes	1	2	3	4	5	N
II 1–3. To what extent do you have confidence in your department colleagues?	29	38	12	3	17	65
II 2–7. How comfortable do you feel talking to colleagues about matters related to your work?	28	37	17	2	17	60
II 3–26. In your perception, what is the character of interaction between department colleagues?	25	48	10	4	13	48
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	26	38	15	9	13	47
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	29	33	6	13	19	48
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	19	21	29	17	15	48
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	27	46	13	4	10	48
Decision–Making Processes	1	2	3	4	5	N
DM 1–32. To what extent are you involved in major decisions related to your work?	30	41	15	7	7	46
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	52	25	4	13	6	48

While the majority of all participants indicated they feel uncomfortable talking to team leaders about matters related to their work—nine out of 64 people gave the lowest possible rating for this matter—there were 17 respondents (28% percent) who were within System 5 at the most ideal end of the scale (LS 5–6). Regarding the previous high ratings in System 5, it could be assumed that all high ratings came from the same person or group of persons, but this is not the case: Lowest and highest ratings differ dramatically from answer to answer. Just because one said that they would feel safe talking to their manager does not necessarily mean that they have a high level of trust in the same person. There is quite a diverse range of answers regarding LS 6–8, "How often are your ideas sought by your team leaders regarding work-related problems." The answering option for System 3 was that leaders would usually ask for ideas and opinions and try to make constructive use of them, Table 12 shows that about a half of all respondents rated this question as an eight and higher, nevertheless, 11 respondents gave only a two on the 15–point scale. While the low ratings came from anonymous, the higher ratings are either from various administrative departments or faculty in various academic disciplines. Another notable finding for leadership processes in Institution A is that teamwork (LS 10–19) is not very encouraged, which is congruent with an authoritative or at best consultative system, i.e., System 1–3.

As motivational forces depend on leadership processes (Chapter II) it is no surprise that most answers indicate the presence of an authoritative work climate in the range of Systems 1–3. Only about a fifth of those surveyed believes that leaders, faculty, and staff feel a real responsibility for the institution's goals (MF 1–11), and/or agreed that they themselves would feel to a great or very great extent a real responsibility towards the institution's goals (MF 2–12). The majority of participants agreed, that leadership shows responsibility while lower levels, i.e., faculty and staff, often behave non-cooperative or show only occasionally support. Naturally, such behavior has a negative impact on atti-

tudes (MF 3–13, MF 5–15), working climate (MF 4–14), overall satisfaction (MF 6–16, MF 7–17), and the willingness to be supportive to colleagues (MF 8–30). However, about a third reported they would always try to be supportive to their colleagues.

For the construct communication processes, there too is a tendency towards the less favorable Systems 1–3, but the perceptions of the respondents are slightly different concerning the individual questions: About a third of all answered, that there would be a considerable amount of interaction between leadership and employees aimed at achieving institutional goals (CP 1–18) while almost a half of all disagreed, which is congruent to the answers for motivational forces MF 1–11 and MF 2–12. For CP 2–25, a question to fathom perceptions on to what extent department leaders show interest in one's personal success, at least a fifth (21%) responded using the option "could not ask for more" which would be a characteristic of a System 5. A closer look at the data shows that these answers did not come from a specific department or group of employees. These are isolated personal perceptions of employees, possibly dependent on mutual likability, confidence, and trust. The ratings for CP 3–20 to CP 6–24 vary mostly between Systems 2–3, nonetheless with 20% to 30% giving the lowest possible ratings. There are two 15% System 5 ratings for CP 4–21, communications accepted by employees, and for CP 6-24, the extent to which leaders know of job-related problems faced by employees.

The ratings for interaction-influence processes and decision-making processes are consistent with the previous ratings, mostly in the ranges of Systems 2–1 and are evenly distributed across all other systems. Here too, the perceptions of organizational characteristics inherent to the construct questions are very different.

Figure 5 shows all received data for the time frames past p, now n, and desired future f in a similar style as Likert (1967); as reproduced in Figure 2, Chapter II.
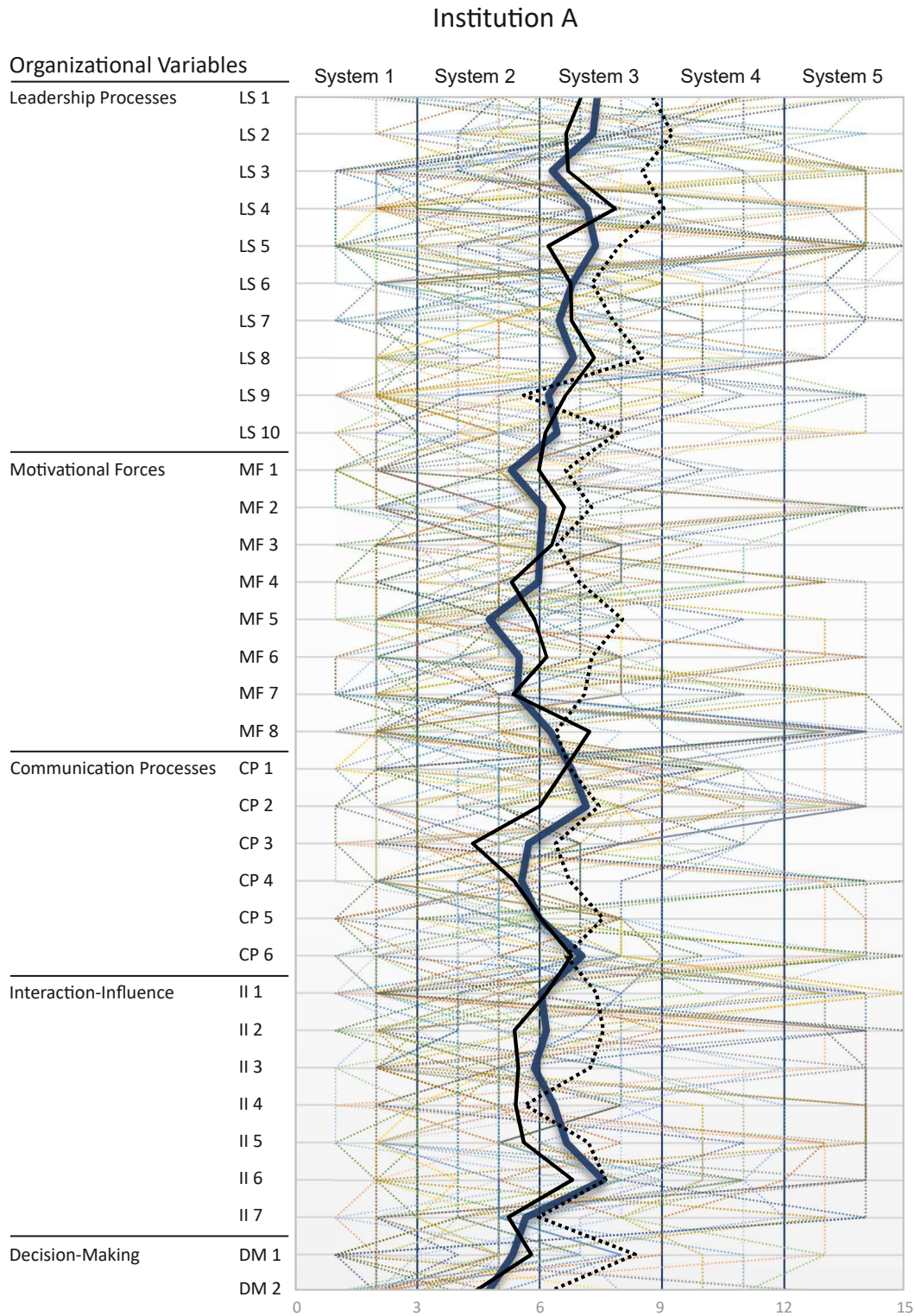
Figure 5. Distribution of Answers Across Systems 1–5 of Institution A and observed means $\overline{X}$ for past, present, and desired future.

The colored dotted lines connect the answer points along the 15–point scale and show how respondents perceive their work environment now **n**. Because many answers fall into the System 2–3 range overlapping lines create a visual density in that area. The bold lines represent observed means $\overline{X}$ for the responses to questions whereby past **p** is displayed as a solid bold line, now **n** as a very bold solid line, and the desired future **f** is shown as a bold dotted line.

Likert (1967) calculated scores based on the observed means $\overline{X}$ using the formula $\frac{\overline{X} \, x \, 4}{20}$ which has been adapted to $\frac{\overline{X} \, x \, 5}{15}$ to match the concept of using five systems categorizations over a 15–point scale, instead of four systems over a 20–point scale. The parameter $+.5$ is a corrective argument to fit the lowest possible score of System 1 into the pre-defined range 0.5–1.5. Table 8 defines the scores to systems relations.

Table 8 (repeated from Chapter III)

Score to Systems Relations

	System 1 Exploitative Authoritative	System 2 Benevolent Authoritative	System 3 Consultative	System 4 Participative Group	System 5 Nonhierarchical Responsible
Scores	0.5 – 1.5	1.51 – 2.5	2.51 – 3.5	3.51 – 4.5	4.51 – 5.5

The scores for Institution A are: 1) for the past **p** 2.59, which is barely a System 3, 2) for the present **n** 2.54, which is on the upper end of a System 2, and 3) responses given for a desired future **f** scored 2.94, which is still only a consultative System 3. For some variables, e.g, for LS 9–23, the extent to which leadership holds effective group meetings, or II 4–27, the extent to which department colleagues encourage each other to work as a team, there is a recession to lower systems for the desired dotted future **f** line. Those very low ratings were not given by a specific group, but came from faculty, some leadership personnel, administrative staff, and anonymous. Therefore, causes must be very subjective

and because the survey was administered strictly anonymous there was no option to double-check with participants what these negative ratings possibly could mean.

It is remarkable that the $\overline{X}$-lines for past and p and n follow overall the same path between the Systems 2–3, and alter only for a few variables from better to worse, e.g., LS 4–5, the extent to which leadership provided useful work-related information was better in the past, but LS 5–6, how comfortable does one feel to talk to team leaders regarding work-related problems is better now. Even more remarkable, employees at Institution A desire only moderate improvements for the future f, the dotted line barely touches the System 4 range.

The distribution of answers range over the entire spectrum and across all Systems for almost all characteristics. Employee perceptions in relation to the constructs vary widely across departments or colleges and various academic areas, which raises the question of how far an observed mean $\overline{X}$ or score can reflect the true characteristics of an organization. Obviously, an evaluation based on a mean value, represented as a single score, or as a mean line as shown in Figure 5 cannot show weaknesses and strengths of an organization in the same way as Table 12 and Table 13.

In addition, many respondents expressed their opinion on Institution A not only based on the answering options in the questionnaire but also through comments, which for confidentiality reasons cannot be cited. Most comments are complaints and suggest that the organizational climate and effectiveness of Institution A was better in the past compared to now. The comments are of course subjective, and not extensive enough to draw conclusions. Nevertheless, for implementing change in terms of improvements, such comments shall be taken seriously because they could point at other issues to be further explored by quantitative and/or qualitative research designs. For example, some comments point to unfair salaries, unnecessary leadership roles, and age discrimination.

Institution B Data

Table 14 shows the distribution of 76 responses for the present *n* state received from a large institution with over 5000 employees. One reason for the low response rate was certainly that IT security of Institution B flagged the distribution of the survey as a security risk, i.e., a phishing scam, and sent a rather defamatory warning to all employees not to follow the link to Qualtrics. Such IT safety processes vary widely; Institution C, e.g., leaves it up to employees to decide whether to open an email. After leadership cleared the issue with IT the survey was disseminated a second time along with a statement of the legitimacy of the survey. Nevertheless, employees may have avoided following the link to Qualtrics or didn't even read the invitation email anymore.

Most responses of Institution B are in Systems 1–3, with some construct variables receiving ratings according to a System 4 and even a System 5; much like the response distribution of Institution A. Although most answers were given in the neutral middle field of Systems 1–3 it is also remarkable, that respondents opted for slightly "worse" or somewhat "better" than neutral. Similar to Institution A, LS 3–4, LS 4–5, and LS 6–8 received some high ratings in System 5, i.e., leaders show supportive behavior, give useful work-related ideas, and leaders create the best possible work-climate so that employees feel comfortable talking about work-related issues.

There are also a number of noteworthy high ratings for MF 2–12, the extent to which you feel a real responsibility for achieving the institution's goals, for MF 7–17, overall satisfaction with your department leader, and for MF 8–30, how often do you try to be supportive to your colleagues. About a third of all respondents have a quite positive perception of each of these items. Again, such views came from individuals in different colleges, departments and positions.

Table 14

Distribution of all Responses from Institution B

	System 1			System 2			System 3			System 4			System 5			N
Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
LS 1–1.	7	5	2	2	9	2	4	12	3	0	12	4	7	6	1	76
LS 2–2.	7	5	0	5	12	5	9	12	8	0	8	1	0	1	1	74
LS 3–4.	6	15	7	3	8	0	2	9	1	0	4	1	7	10	1	74
LS 4–5.	5	8	3	3	6	1	6	11	0	0	6	0	4	18	2	73
LS 5–6.	6	9	2	2	10	3	4	9	0	0	8	0	3	14	4	74
LS 6–8.	7	12	3	3	8	4	6	13	1	0	8	2	1	2	1	71
LS 7–9.	5	13	4	2	9	1	7	13	2	0	7	0	2	5	1	71
LS 8–10.	5	11	1	3	10	1	6	11	2	0	9	2	2	8	1	72
LS 9–23.	5	6	3	3	8	2	8	11	1	0	9	1	0	2	0	59
LS 10–19.	4	7	0	4	15	2	4	9	3	0	4	0	1	9	2	64
MF 1–11.	5	12	2	2	13	2	4	10	4	0	4	1	0	4	1	64
MF 2–12.	4	19	3	5	12	3	1	2	1	0	1	0	4	11	2	68
MF 3–13.	5	7	0	5	19	4	5	8	4	0	4	1	1	3	0	66
MF 4–14.	5	16	2	6	17	0	8	4	4	0	1	0	1	3	0	67
MF 5–15.	4	14	4	2	11	3	3	10	6	0	2	0	2	5	0	66
MF 6–16.	6	11	1	4	15	3	4	7	4	0	2	0	0	8	0	65
MF 7–17.	3	12	1	1	8	3	2	6	1	0	4	3	6	13	2	65
MF 8–30.	1	15	4	4	12	1	0	2	0	0	1	0	9	9	3	61
CP 1–18.	6	9	1	6	14	1	3	10	2	0	6	0	2	6	0	66
CP 2–25.	5	8	4	2	5	1	4	9	0	0	7	1	5	9	1	61
CP 3–20.	4	5	1	4	13	4	5	12	2	0	6	1	1	5	0	63
CP 4–21.	1	18	1	6	10	4	0	9	1	0	0	0	5	7	1	63
CP 5–22.	3	6	2	3	19	3	4	6	2	0	5	0	3	4	1	61
CP 6–24.	5	7	1	4	10	0	5	17	4	0	3	0	1	4	1	62
II 1–3.	4	13	5	7	22	6	4	6	1	0	1	0	2	3	1	75
II 2–7.	5	14	5	5	11	4	3	13	0	0	0	0	3	8	3	74
II 3–26.	5	9	3	3	18	3	5	9	1	0	1	0	0	4	1	62
II 4–27.	5	10	3	7	12	2	5	9	3	0	2	0	0	3	1	62
II 5–28.	8	12	3	4	17	0	1	6	0	0	2	0	2	4	1	60
II 6–29.	7	8	2	4	7	2	1	14	4	0	6	0	1	3	1	60
II 7–31.	2	11	6	5	14	3	1	7	0	0	2	0	3	4	1	59
DM 1–32.	5	10	1	5	10	0	3	8	3	0	6	0	3	3	0	57
DM 2–33.	3	14	5	3	12	2	3	3	0	0	6	0	1	4	1	57

Table 15 shows the Organizational Characteristics of Institution B in comparison to the survey questions. In contrast to Table 14, the answers given for each system are shown in percentage values. The distribution of answers ranges over the entire spectrum and across all Systems for almost all characteristics, employee perceptions in relation to the constructs vary widely across departments or colleges and various academic areas. Nonetheless, as shown in Table 15 and Table 14 most of the answers condense between System 1 and System 3 albeit some higher ratings were given in the ranges of System 4 and System 5, as already described.

It is noteworthy, that members of Institutions A do not seem to have great confidence in their department leaders (LS 1–1), nor have the impression their leaders display confidence in their subordinates (LS 2-2). And more than 76% of all employees also do not have confidence in their department colleagues (II 1–3). At the same time, there is no real interaction between departmental colleagues (II 3–26), which raises new questions: For example, could there be poor interaction due to a lack of mutual confidence between the members? Or, could the lack of confidence in one another be a result of previous interactions between colleagues? The concept of the survey to assess perceptions of past and present did not lead to data that allows for specific conclusions for what reasons interaction and confidence in one another may have changed.

Table 15

Organizational Characteristics of Institution B

Variable / Characteristics	Systems 1–5, N					
Leadership Processes	1	2	3	4	5	N
LS 1–1. Extent to which you have confidence in your immediate department leader.	18	17	25	21	18	76
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	16	30	39	12	3	74

(continued)

Variable / Characteristics Institution B	Systems 1–5, N					
LS 3–4. Extent to which your department leader displays supportive behavior.	38	15	16	7	24	74
LS 4–5. To what extent does leadership give you useful work-related information?	22	14	23	8	33	73
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	23	20	18	11	28	74
LS 6–8. How often are your ideas sought by your team leaders regarding work-related problems?	31	21	28	14	6	71
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	31	17	31	10	11	71
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	24	19	26	15	15	72
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	24	22	34	17	3	59
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	17	33	25	6	19	64
Motivational Forces	1	2	3	4	5	N
MF 1–11. Who feels responsible for achieving high performance goals in your institution?	30	27	28	8	8	64
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	38	29	6	1	25	68
MF 3–13. What is your perception of colleagues regarding their attitude towards the institution's goals?	18	42	26	8	6	66
MF 4–14. In your perception, what is the working climate among your colleagues?	34	34	24	1	6	67
MF 5–15. What is your general attitude towards your institution?	33	24	29	3	11	66
MF 6–16. Overall satisfaction derived by being a part of the institution.	28	34	23	3	12	65
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean).	25	18	14	11	32	65
MF 8–30. How often do you try to be supportive to your colleagues?	33	28	3	2	34	61
Communication Processes	1	2	3	4	5	N
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	24	32	23	9	12	66
CP 2–25. To what extent do you feel that your department leader is interested in your success?	28	13	21	13	25	61

(continued)

Variable / Characteristics Institution B	Systems 1–5, N					
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	16	33	30	11	10	63
CP 4–21. Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution.	32	32	16	0	21	63
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	18	41	20	8	13	61
CP 6–24. Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff).	21	23	42	5	10	62
Interaction–Influence Processes	1	2	3	4	5	N
II 1–3. To what extent do you have confidence in your department colleagues?	29	47	15	1	8	75
II 2–7. How comfortable do you feel talking to colleagues about matters related to your work?	32	27	22	0	19	74
II 3–26. In your perception, what is the character of interaction between department colleagues?	27	39	24	2	8	62
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	29	34	27	3	6	62
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	38	35	12	3	12	60
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	28	22	32	10	8	60
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	32	37	14	3	14	59
Decision–Making Processes	1	2	3	4	5	N
DM 1–32. To what extent are you involved in major decisions related to your work?	28	26	25	11	11	57
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	39	30	11	11	11	57

Figure 6 shows all received data for the time frames past *p* (solid line), now *n* (bold line), and desired future *f* (dotted line). The scores for Institution B are: 1) for the past *p* 2.72, for the present *n* 2.67, and 3) for the future *f* 3.16. Therefore, all assessments refer to a Consultative System 3 (2.51–3.5), whereby there is no significant difference between past and present perceptions of the Institution.
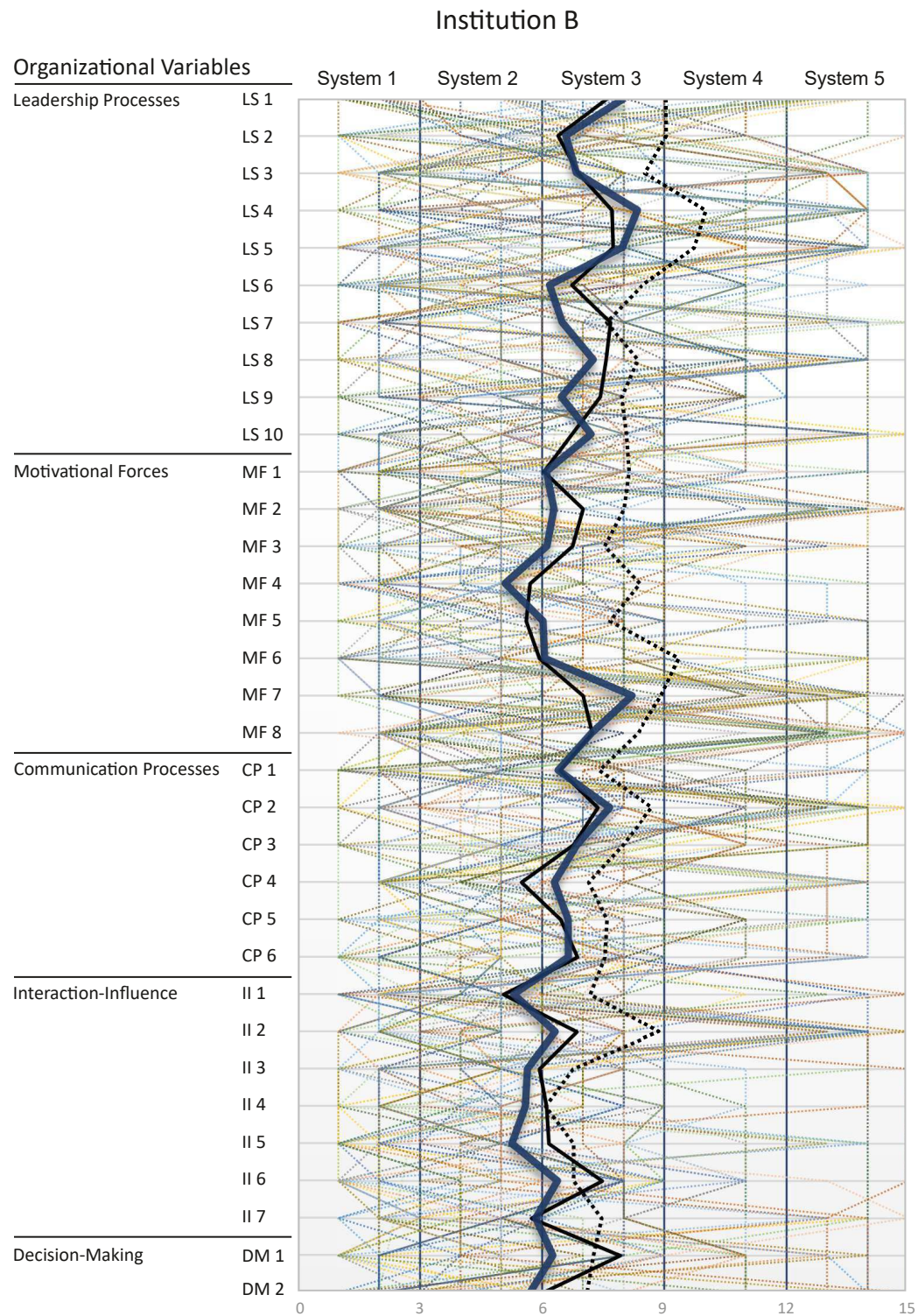
Figure 6. Distribution of Answers Across Systems 1–5 of Institution B and observed means $\overline{X}$ for past, present, and desired future.

In contrast to Institution A, the respondents of Institutions B understood the concept of a desirable future f much better and clearly expressed wishes for improvements, albeit somewhat modestly: the achieved score is still only a System 3 and the dotted mean–line shown in Figure 6 reaches only occasionally the threshold to a System 4: As can be seen from Tables 15 and 14, employees wish for more support from the supervisors (LS 4–5), more useful work-related information from leadership (LS 5–6), higher satisfaction in being a part of the institution (MF 6–16), and wish their colleagues would be more approachable to talking about work issues (II 2–7). Similar to the data of Institution A, perceptions for the present show the highest degree of completeness, followed by perceptions of the past, and here too there is a high proportion of missing data for the desired future f.

Institution C Data

Table 16 shows the distribution of up to 134 responses for the present n state received from a large institution with over 5000 employees. Compared to Institution A and B, C returned the most responses, although the response rate was far lower than that of institution A.

The heat map formatting of Table 16 shows a more saturated color than the previous Tables 12 and 14 because the sample and population is almost twice as large. Like Institution A and B, the middle/neutral values of Systems 1–3 received the most responses and again the 15–point scale providing options for "worse" or "better" than neutral in each category were well accepted. Table 16 straightaway shows that relatively high ratings were given in the ranges for Systems 4–5, especially for the constructs leadership processes (LS) as well as for motivational forces (MF).

Table 16

Distribution of all Responses from Institution C

Variable	System 1			System 2			System 3			System 4			System 5			N
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
LS 1–1.	1	12	2	5	22	9	11	23	6	8	19	6	4	4	2	134
LS 2–2.	1	4	2	11	30	13	7	29	7	6	12	5	4	1	0	132
LS 3–4.	10	23	11	5	20	7	3	8	4	4	5	2	11	15	6	134
LS 4–5.	3	19	6	8	15	6	4	18	8	3	5	3	12	17	6	133
LS 5–6.	11	19	9	7	14	7	4	13	5	3	5	2	8	20	6	133
LS 6–8.	10	24	9	3	18	13	4	14	8	8	8	1	4	9	1	134
LS 7–9.	7	22	6	5	19	4	3	14	6	7	10	3	7	15	5	133
LS 8–10.	7	14	6	4	21	6	6	16	4	7	10	3	8	16	5	133
LS 9–23.	12	19	4	4	12	2	8	19	6	6	8	3	6	12	0	121
LS 10–19.	10	16	2	8	22	3	3	14	9	4	10	3	10	12	0	126
MF 1–11.	7	21	5	12	38	4	4	11	3	3	3	0	7	7	1	126
MF 2 –12.	11	36	11	9	19	7	3	2	1	4	2	0	6	16	5	132
MF 3–13.	3	17	2	11	34	11	4	18	9	1	3	0	7	8	1	129
MF 4–14.	9	17	6	9	34	9	6	11	4	3	4	0	8	8	1	129
MF 5–15.	12	28	6	7	24	6	4	12	2	2	1	2	10	13	2	131
MF 6–16.	11	30	10	8	19	6	4	5	3	2	2	2	9	15	1	127
MF 7–17.	14	14	6	10	17	7	4	6	2	5	6	5	10	20	2	128
MF 8–30.	14	30	9	5	12	5	0	8	3	0	0	0	13	18	4	121
CP 1–18.	4	11	7	10	30	8	5	19	6	4	6	1	4	12	0	127
CP 2–25.	7	16	15	7	11	6	1	16	5	6	5	4	7	13	3	122
CP 3–20.	9	16	2	8	24	7	8	19	7	6	8	2	8	4	0	128
CP 4–21.	9	17	7	8	29	10	3	7	2	2	3	0	11	12	1	121
CP 5–22.	9	18	5	13	31	4	2	11	5	1	2	1	6	7	0	115
CP 6–24.	7	17	1	9	16	7	7	25	6	3	9	2	8	5	0	122
II 1–3.	9	24	6	10	30	14	0	13	4	4	0	0	11	8	1	134
II 2–7.	10	30	11	7	20	11	4	13	1	3	0	1	6	12	5	134
II 3–26.	10	18	5	13	27	12	3	11	6	2	1	0	6	8	0	122
II 4–27.	9	16	4	10	14	8	6	17	12	1	5	3	7	9	0	121
II 5–28.	8	24	5	6	29	9	3	9	3	2	5	1	7	9	1	121
II 6–29.	8	13	4	8	17	8	3	19	7	7	13	5	6	3	0	121
II 7–31.	13	12	4	13	26	8	1	11	7	1	5	2	8	8	0	119
DM 1–32.	8	18	4	9	21	11	4	9	6	4	8	2	5	7	3	119
DM 2–33.	15	29	7	6	25	5	3	2	2	2	4	1	9	9	0	119

Table 17 summarizes answers per System as percentages: The responses for management processes are predominantly evenly distributed across all Systems, which suggests strongly different perceptions of employees, but also different management styles and management philosophies. In terms of confidence in immediate department leaders (LS 1–1) and in return, perceived confidence in one's abilities demonstrated by leaders (LS 2–2), the data clearly ranges between Systems 2–4.

Similar to the data distribution of Institution A and B, employees at Institution C gave relatively high rankings for the extent to which department leaders demonstrate supportive behavior (LS 3–4, 24%), the extent to which leadership provides useful work-related information (LS 4–5, 26%), and for a working environment in which subordinates feel free to talk to their team leaders about work-related problems (LS 5–6, 26%). However, the majority of all answers were placed across Systems 1–3, whereby 33% of 134 respondents gave only System 1 equivalent ratings for LS 3–4, and 29% rated very negatively for LS 5–6. Regarding the research questions the data suggests—similar to the survey date of Institution A and B—that individual perceptions of leadership personnel and colleagues across different departments or colleges of different academic disciplines widely vary. Even when filtering the data for leadership responses, faculty, or staff responses only, the responses are by no means consistent to a specific System.

In terms of motivational forces, there is a strong tendency to rather unfavorable perceptions among all variables towards Systems 1–2. For example, out of 132 responses, 44% feel only to a very little extent a real responsibility towards achieving the institution's goals. If that data could be generalized, that would suggest that almost half of all employees at Institution C do not care much about goal setting.

In terms of overall satisfaction (MF 6–16), 40% of 127 responses range in a System 1, and 44% indicated they would be rarely supportive of their colleagues (MF 8–30). However, there are also notable responses indicating System 5 qualities across all motiva-

tional forces variables, i.e., MF 5–MF 8. A closer look at the raw data shows, that these answers did not come from a specific group of people or definable departments but are rather based on very individual perceptions of quite different persons.

The ratings for communication processes, interaction-influence processes, and decision-making process fall mostly into the unfavorable ranges of the exploitative author-itative System 1 and the benevolent authoritative System 2. Congruent with the previous assessment that most employees feel only to a very little extent a real responsibility to-wards achieving the institution's goals 38% answered for CP 1–18 that there is only little interaction between leadership and employees aiming at institutional/organizational ob-jectives. In terms of communications accepted by employees (CP 4–21) 39% out of 121 believe that communications remain often ignored; at least 20% of all would strongly dis-agree as they chose the System 5 answering option "communications are always accepted as contents were established upon consensus" (Appendix C: Question No. 16). Institution C also suffers from a lack of side-ward communication (CP 5–22), 42% chose an answer option according to which valuable information is often not exchanged between peers due to a competitive climate.

Similar to Institution A and B, members of Institutions C also have little confi-dence in department colleagues (II 1–3), they don't feel comfortable at all to talk to col-leagues about matters related to their work (II 2–7), and there is no or little interaction with department colleagues (II 3–26). Further, question II 7–31, to what extent do your department colleagues exchange ideas for solving job-related problems, received rather low ratings. However, the answers for II 6–29, to what extent do your colleagues in your team really helps you find ways to improve your work performance, are almost equally distributed across all systems. The interaction– influencing variables explore slightly different dimensions of the interaction: For example, it does not necessarily have to be relevant for employees to encourage each other to work in a team or to exchange ideas

for solving work-related problems. Therefore, lower ratings for that matter may not be an indicator of an unfavorable working environment.

Decision-making processes received also remarkably low ratings, clearly in the Systems 1–2 range. The two questions fathom to what extent someone is involved in decision-making (DM 1–32) or involves others in such processes (DM 2–33). The rather low ratings, as they can be observed for all Institutions A, B, and C, indicate the presence of a hierarchical system typical for traditional higher education environments. Further, observed responses for the desired future f of all Institutions suggest, that employees do not necessarily want to be involved in decision-making processes and take shares of leadership responsibilities as a System 4 or even System 5 would require (Likert & Araki, 1986).

Table 17

Organizational Characteristics of Institution C

Variable / Characteristics	Systems 1–5, N					
Leadership Processes	1	2	3	4	5	N
LS 1–1. Extent to which you have confidence in your immediate department leader.	11	27	30	25	7	134
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	5	41	33	17	4	132
LS 3–4. Extent to which your department leader displays supportive behavior.	33	24	11	8	24	134
LS 4–5. To what extent does leadership give you useful work-related information?	21	22	23	8	26	133
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	29	21	17	8	26	133
LS 6–8. How often are your ideas sought by your team leaders regarding work-related problems?	32	25	19	13	10	134
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	26	21	17	15	20	133

(continued)

Variable / Characteristics Institution C	Systems 1–5, N					
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	20	23	20	15	22	133
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	29	15	27	14	15	121
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	22	26	21	13	17	126
Motivational Forces	1	2	3	4	5	N
MF 1–11. Who feels responsible for achieving high performance goals in your institution?	26	43	14	5	12	126
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	44	27	5	5	20	132
MF 3–13. What is your perception of colleagues regarding their attitude towards the institution's goals?	17	43	24	3	12	129
MF 4–14. In your perception, what is the working climate among your colleagues?	25	40	16	5	13	129
MF 5–15. What is your general attitude towards your institution?	35	28	14	4	19	131
MF 6–16. Overall satisfaction derived by being a part of the institution.	40	26	9	5	20	127
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean).	27	27	9	13	25	128
MF 8–30. How often do you try to be supportive to your colleagues?	44	18	9	0	29	121
Communication Processes	1	2	3	4	5	N
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	17	38	24	9	13	127
CP 2–25. To what extent do you feel that your department leader is interested in your success?	31	20	18	12	19	122
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	21	30	27	13	9	128
CP 4–21. Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution.	27	39	10	4	20	121
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	28	42	16	3	11	115
CP 6–24. Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff).	20	26	31	11	11	122

(continued)

Variable / Characteristics Institution C	Systems 1–5, N					
Interaction–Influence Processes	1	2	3	4	5	N
II 1–3. To what extent do you have confidence in your department colleagues?	29	40	13	3	15	134
II 2–7. How comfortable do you feel talking to colleagues about matters related to your work?	38	28	13	3	17	134
II 3–26. In your perception, what is the character of interaction between department colleagues?	27	43	16	2	11	122
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	24	26	29	7	13	121
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	31	36	12	7	14	121
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	21	27	24	21	7	121
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	24	39	16	7	13	119
Decision–Making Processes	1	2	3	4	5	N
DM 1–32. To what extent are you involved in major decisions related to your work?	25	34	16	12	13	119
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	43	30	6	6	15	119

Figure 7 shows all received data for the time frames past **p** (solid line), now **n** (bold line), and desired future **f** (dotted line). The scores for Institution C are: 1) for the past **p** 2.63, for the present **n** 2.7, and 3) for the future **f** 3.16. Accordingly, all ratings refer to a Consultative System 3 (2.51–3.5). It is noteworthy that there is no significant difference between perceptions of the past and present, both mean lines for *observed* $\overline{X}$ follow almost the same path. However, respondents understood the concept of how they like to be their working environment in the future **f** very well. Although an **f**–score of 3.16 would still only be a Consultative System, but in some aspects, e.g., LS 1–4, LS 8–10, MF 6–8 characteristics of a System 4 are desired.
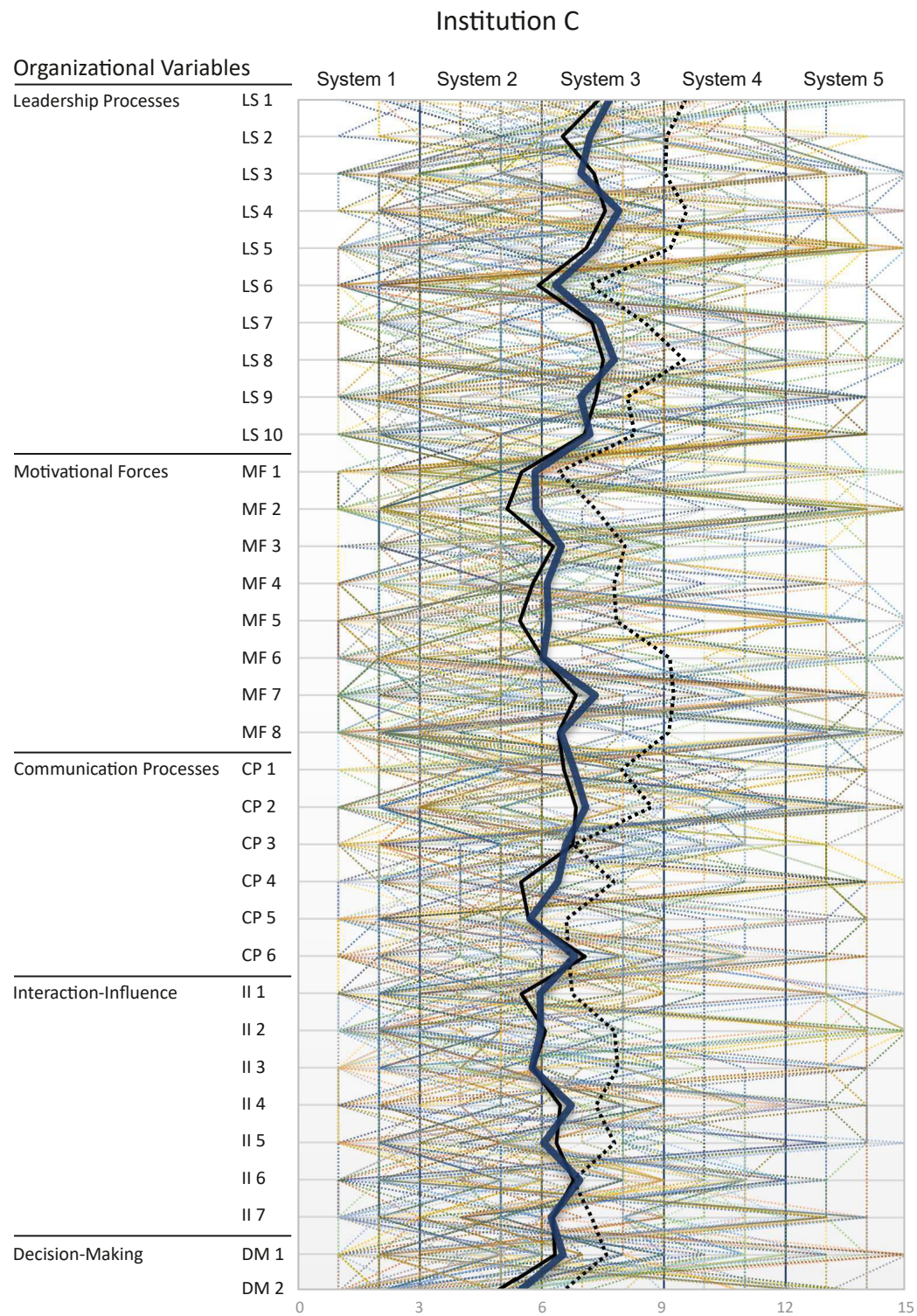
Figure 7. Distribution of Answers Across Systems 1–5 of Institution C and observed means $\overline{X}$ for past, present, and desired future.

In contrast to Institution A and B, Institution C resulted in the most responses from one single organizational environment; enough responses to isolate perceptions of 1) leadership personnel, 2) faculty, and 3) administrative as well as non-administrative staff. Surprisingly, separating the data to specific groups does not show differences in terms of scores and in terms of how answers are distributed across Systems 1–5. The according charts would look very much as Figure 7 and thus nearly identical for all three categories; the calculated scores do not vary much:

Based on 49 responses received from leadership personnel, the (observed) scores are for past p 2.51, now n 2.55, and future f 3.27. For faculty, based on 49 responses, the scores are for past p 2.70, now n 2.71, and future f 2.90. For administrative and non-administrative staff, based on 37 responses, the scores are for past p 2.70, now n 2.85, and future f 3.32.

For all groups, the scores for the past p are insignificantly lower than for now n, and members of all groups, on average, desire only moderate improvements for the future. All scores are within the range of System 3. Looking at the individual responses reveals a much more complex spectrum of positive and negative responses: Some directors, some program coordinators, some faculty members, and some staff members rated their work-environment very high throughout the whole questionnaire and for all variables. In contrast, other colleagues gave throughout low ratings for their work-environments. Given the distribution of responses across all systems, condensing the data to averages, observed means $\overline{X}$ and scores are not exactly useful to draw conclusions and plan improvements in a targeted manner.

The data from all three sampled institutions does not reveal common characteristics of a single department or group of employees led by a single supervisor. The data from Institution A, B and C look similar in both detail and observed mean $\overline{X}$ and suggest the presence of a System 3. If all the data from three institutes were combined, they would

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appear to come from a single institution. At last, such similarity of the data is a good prerequisite for a factor analysis.

Exploratory–Confirmatory Factor Analysis

Data Preparation

The total number of answers per question varies because data is missing completely at random (MCAR) or missing at random (MAR): Some respondents completed only the first part of the survey aiming at leadership variables and answered remaining questions only sporadically for unknown reasons. While a total of 274 responses were considered valuable to generate the data visualization as shown in Table 9 and Table 10, incomplete responses with more than one missing answer were excluded for in-depth statistical analysis.

For statistical analysis of the data, it was necessary to further process the incomplete answers: Depending on the function called, statistical software typically defaults to pairwise or listwise deletion, even when only one answer is missing, which would reduce the sample size of this study to 165 complete records. To avoid losing valuable data, various data imputation methods can be used to estimate values for missing answers (Finch, 2010; Groves et al., 2009; Honaker, King, & Blackwell, 2011; Horton & Kleinman, 2007; Tabachnick, Fidell, & Ullman, 2013; Wu, Jia, & Enders, 2015). Finch (2010) emphasized on the benefits of data imputation, at least for normally distributed data: "(...) ignoring the missing values (...) is inappropriate, whether the data are MCAR or MAR. In both cases, the standard errors, and results of hypothesis tests for the slopes varied from the complete data case to a greater extent than did the results for any of the imputation methods" (p. 373). Even mean imputation gives more advantages compared to losing valuable data by listwise deletion (Harrell, 2015; Tabachnick et al., 2013).

Following recommendations by Tabachnick et al. (2013) and Wu et al. (2015),

who recommended specifically data imputation methods on categorical variables of

ordinal Likert data, the Expected-Maximization (EM) normal approach and multiple

imputations (m = 5) were applied using Amelia II (Honaker et al., 2011) in the statistical

software **R** (R Core Team, 2019).

There were 41 records with only one missing answer that could be included;

therefore, the overall imputation rate was less than 1%. In comparison, Finch (2010)

and Wu et al. (2015) examined the effects of data imputation up to 30% and nonetheless

received reliable statistics. With an imputation percentage of less than 1% the benefits of

a 25% increase in sample size outweigh any concerns about data imputation.

Only the data sets for present *n* were used as those resulted in the highest degree

of completion in comparison to the answers addressing retrospective perceptions of the

past *p* and desires for the future *f*. All records from Institutes A, B and C were combined

to achieve a sample size that is suitable for the statistical analysis methods proposed in the

research design of this study, giving N = 206.

Preliminary Analysis

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) varies

between 0 and 1. Values close to 1 indicate patterns of correlations that are relatively

compact and factor analysis should yield reliable factors (Field et al., 2012; Tabachnick

et al., 2013). For both data sets, default and imputed, KMO computed .83 (overall MSA),

which is a particular good value promising a reliable factor analysis.

Bartlett's test examines whether the data is appropriate for factor analysis (Field

et al., 2012): The test of homogeneity of variances in **R** (Appendix E: R Code) resulted

in Chi-Square χ^2 = 179.62, df 32, p-value < 2.2e-16. The test of sphericity returned: χ^2

= 2219.928; df = 528; p-value < 2.22e-16; thus, the p-values are effectively zero which is

significant with regards to p < .05. The data matches Bartlett's criteria for appropriateness of a factor analysis.

A correlation check using Pearson's r method (alpha level p < .05) showed that there are four strong correlations between variables that are greater than $+.5$, which are MF 5/MF 6 = $+.6$, LS 7/LS 8 = $+.58$, II 4/II 5 = $+.53$, II 3/II 4 = $+.51$, and 14 significant correlations in the $+.4$ range (Appendix D). These correlations are congruent with the extracted factors.

Field et al. (2012) recommended another diagnostic tool for factor analysis which checks the correlation matrix for a determinant. The determinant can have values between 0, indicating the correlation matrix is singular, or 1, when all variables are completely unrelated. Ideally, the value should be greater than 1.0e-05. **R** computed for the data 1.021e-05, hence the determinant value fits into the required range. Overall, the preliminary analysis revealed parameters that are all well suited for factor analysis.

Principal Component Analysis

A principal competent analysis (PCA) was performed to establish linear variates within the data and to evaluate the most important components to be used for factor analysis. Following Field et al. (2012), a PCA resulted in nine components with eigenvalues that are greater than 1 (Kaiser's criterion); results for only the complete cases (N = 165) and for the imputed data (N = 206) were nearly similar. With an eigenvalue of 7.85, the first component PC1 theoretically explains 24% of the variances. PC2 with an eigenvalue of 2.39 could explain another 7%, and so on. Cumulative, these nine components explain 63% of the total variance of all 33 variables. Table 18 provides an overview of the first 10 components (no rotation).

The components PC10–PC15 have eigenvalues higher than .7 and could be included considering Joliffe's criterion (Field et al., 2012). However, this approach contra-

Table 18

Principal Components Analysis

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10
SS loadings	7.85	2.39	1.97	1.66	1.45	1.19	1.14	1.11	1.00	.95
Proportion Var	.24	.07	.06	.05	.04	.04	.03	.03	.03	.03
Cumulative Var	.24	.31	.37	.42	.46	.50	.54	.57	.60	.63
Proportion Explained	.24	.07	.06	.05	.04	.04	.03	.03	.03	.03
Cumulative Proportion	.24	.31	.37	.42	.46	.50	.54	.57	.60	.63

dicts the idea of factor analysis to reduce variables to the substantial underlying factors (Field et al., 2012; Nunnally, 1994; Tabachnick et al., 2013; Thompson, 2004).

Kaiser's criterion possibly overestimates the number of factors that should be extracted (Field et al., 2012) and although frequently used, it is not necessarily a reliable criterion for factor analysis (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999). According to Field et al. (2012) Kaiser's criterion is "only accurate if the numbers of variables is less than 30" (p. 762); a scree plot for a sample size larger than 200 may be a better approach to estimated factor extraction. Field et al. (2012) suggested drawing two lines summarizing vertical and horizontal parts. The lines then intersect at a *Point of Inflection* where the slope of the lines drawn by component values dramatically changes, the inflection point itself is not to be included (Costello & Osborne, 2005; Field et al., 2012). Figure 8 shows this point labeled as *Acceleration Factor* (AF). That approach would result in only one single factor and eliminate eight components that have an eigenvalue higher than 1.

Costello and Osborne (2005) too recommended using a scree test to find the break point along with parallel analysis to detect the number of optimal factors more

Non Graphical Solutions to Scree Test
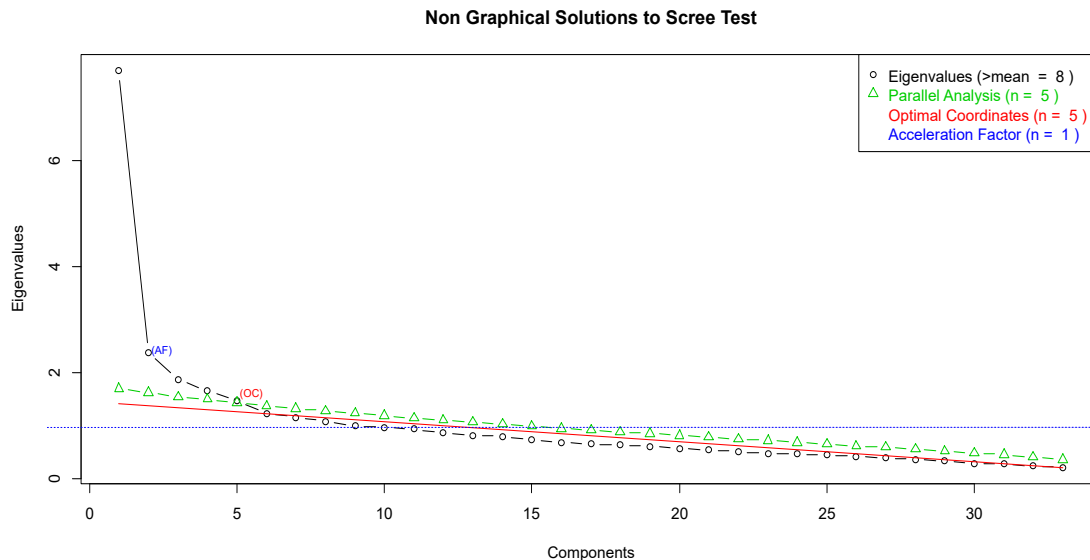
Figure 8. Non Graphical Solutions to Scree Test to Evaluate Factor Extraction. R computed optimal coordinates (OC) to n = 5. The horizontal dotted line represents Kaiser's criterion for eigenvalues.

precisely. **R** computed by *Non Graphical Solutions to Scree Test* parallel analysis and optimal coordinates (OC) to n = 5 as shown in Figure 8.

　　　　To determine an appropriate number of factors the value for measure of fit should be greater than .90 (Field et al., 2012). With the given data, measure of fit values are at .89 for 2 factors, .91 for three, .94 for five, and .95 for nine factors.

　　　　Field et al. (2012) also suggested comparing the factor load matrix with the correlation matrix, in that residuals with absolute values greater than .05 should not exceed 50% in total. For the data set N = 206, and a nine-factor model, **R** calculated 32.5% residuals > .05, a five factor model computed 39.5% residuals > .05, which are good values. Residuals seem approximately normal distributed and there are no outliers.

　　　　Finally, Velicer's criteria can be helpful to narrow options (Costello & Osborne, 2005). With the given data, **R**'s test of VSS complexity and Velicer's MAP returned parameters that suggested 3 to 5 factors to be extracted.

Factor Analysis

While principal component analysis is useful for finding significant factor loadings and eigenvalues for limiting the number of factors to be extracted, software alone cannot determine the number of factors that make sense. Following Costello and Osborne (2005), the data was run multiple times setting the numbers of factors between two and nine, using varimax and orthogonal rotation, for comparing the tables in terms of the cleanest factor structure, loadings above .32, overlapping variance (cross loadings), and factor models with less than three items were excluded (Costello & Osborne, 2005; Fabrigar et al., 1999; Gorsuch, 1983; Tabachnick et al., 2013; Thompson, 2004). The final choice of the cutoff size is a matter of researcher preference (Tabachnick et al., 2013). Factors were investigated regarding the interpretability of latent principles and what variables could be omitted to reduce the overall number of questions.

Factor analysis was performed using the *factanal* function in **R** combined with a confirmatory factor analysis (CFA) using Lavaan's *structural equation modeling* (Rosseel, 2012). This approach was explored with various numbers of factors and the resulting factor loads were examined towards the goodness-of-fit through CFA calculations.

As a result, five dominant factors clearly emerged and closely resemble the five theoretical constructs as outlined in Chapter III. Table 19 provides an overview of all extracted factors, those that were excluded, factor loadings, commonalities, eigenvalues, and Cronbach's α.

Factor I, interaction-influence processes, loaded in all models as the most dominant principle and matches Likert's (1967, 1972) category of interaction-influence processes. Since most questions aim at the interaction among colleagues, *collegiality* could be considered as a more descriptive term than interaction-influence for the latent variable

in Factor I. Cronbach's computed to α .81, thus the combination of questions proofs good reliability.

Factor II, leadership processes, loaded five items of the original leadership processes construct and most questions fathom psychological closeness between leadership and employee personnel, or as Likert may have described it, the relations between supervisors and subordinates, and to what extent supervisors display supportive behavior.

Table 19

Summary of Exploratory–Confirmatory Factor Analysis

Factors and Variables	Factor Loadings, Varimax					
Factor I: Interaction–Influence Processes	I	II	III	IV	V	Co.*
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	**.68**	.20	.12			.52
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	**.63**		.37	.16		.56
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	**.60**			.27	-.13	.45
II 3–26. In your perception, what is the character of interaction between department colleagues?	**.59**	.18	.28			.47
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	**.55**	.24	.26	.12		.45
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	**.43**	.10	.25		.12	.28
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	**.40**	.22	.19		.13	.26
Factor II: Leadership Processes						
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	.22	**.65**		.19		.51
LS 3–4. Extent to which your department leader displays supportive behavior.		**.53**	.18	.19		.35
LS 1–1. Extent to which you have confidence in your immediate department leader.		**.51**				.27
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean).		**.51**	.32	.20		.41

(continued)

Factors and Variables	FA Loadings, Varimax					
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	**.45**					.21
LS 4–5. To what extent does leadership give you useful work-related information?	**.39**	.12	.16	.15		.22
CP 2–25. To what extent do you feel that your department leader is interested in your success?	.13	**.36**	.17	.25	.16	.27
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	.22	**.35**	.22	.17	.16	.27
Factor III: Effective Collaboration						
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	.13	.14	**.64**	.16	.10	.49
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	.13	.25	**.63**	.11		.49
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	.15		**.51**	.16	.17	.34
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	.30		**.46**	.20		.34
Factor IV: Problem Solving						
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?		.22	.23	**.74**		.66
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?		.27	.23	**.58**	.14	.48
Factor V: Motivational Forces						
MF 5–15. What is your general attitude towards your institution?	.20	.24	.10		**.73**	.61
MF 6–16. Overall satisfaction derived by being a part of the institution.	.12	.24	.11		**.69**	.59
Excluded Variables**						
LS 6–8. How often are your ideas sought by your team leaders regarding work-related problems?					.44	.20
MF 8–30. How often do you try to be supportive to your colleagues?	.46	.32			.12	.34

(continued)

Factors and Variables	FA Loadings, Varimax					
MF 3–13. What is your perception of colleagues regarding their attitude towards the institution's goals?	.42		.24	.15	.36	.39
II 1–3. To what extent do you have confidence in your department colleagues?	.41				.16	.20
II 2–7. How comfortable do you feel talking to colleagues about matters related to your work?	.40	.45		.13		.38
MF 4–14. In your perception, what is the working climate among your colleagues?	.35		.39	.14	.25	.36
CP 6–24. Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff).	.33	.17	.42	.17		.35
CP 4–21. Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution.	.32	.26	.36	.11		.32
DM 1–32. To what extent are you involved in major decisions related to your work?	.28		.19	.20	.19	.19
MF 1–11. Who feels responsible for achieving high performance goals in your institution?	.24		.14	.31		.18

	Factors	I	II	III	IV	V	
	Eigenvalues	3.72	2.76	2.62	1.70	1.60	
	Proportion of Variances	.11	.08	.08	.05	.05	
	Cumulative Variances	.11	.20	.28	.33	.38	
	Cronbach's α	.81	.72	.73	.74	.75	

* Commonalities

** Excluded due to low– or cross–loadings, and/or CFA misfit

Factor III, effective collaboration, is a combination of items from the leadership- as well as the communication processes construct. The questions target at achieving objectives, teamwork, effective group meetings, and sharing information. Therefore, the underlying principle is effective collaboration with the goal of improving performance.

Factor IV, problem solving, retained two questions of the leadership processes construct that aim at the encouragement of ideas and improvements to solve current issues, α resulted in .74.

Factor V, motivational forces, loaded only two items of the original motivational forces construct which concern attitude and contentment. The variables MF 5/MF 6

showed the strongest overall correlation (Appendix D) and with only two questions the factor is well reliable with α .75.

Out of the original 33 items, 10 questions did not fit well into any of the factors. For example, although II 1 strongly loaded into Factor I, its r.drop value of .31 indicated a consistency reliability issue (Field et al., 2012); if included α decreases. The commonality value of II 1 is rather insignificant, therefore, albeit an interesting question, item II 1 was excluded. LS 6 posed a similar issue: The variable clearly loaded into Factor III but its r.drop value is critical and retaining the factor would result in a questionable α value at .65. The items II 2, MF 4, CP 6, and CP 4 could be considered regarding their loadings greater than .32 (Tabachnick et al., 2013), but they loaded into other factors almost equally strong, and in terms of CFA measures the overall results improved by excluding those items as well. Finally, DM 1 and MF 2 did not even load to the threshold of .32 and their commonalities are insignificant. Therefore, the overall scope of the survey was reduced to 23 questions. The extracted five factors explain 38% of all variances.

Confirmatory Factor Analysis

For this research design, the primary purpose of confirmatory factor analysis was to examine goodness-of-fit measures and other indicators that confirm the appropriateness of the factors extracted through an exploratory factor analysis as exercised above. For CFA either the sem package (Fox, 2006) or the Lavvaan package (Rosseel, 2012), which includes a *structural equation modeling* library can be used. Both methods yielded basically the same results, Lavaan however, is more convenient for scripting R-code (Appendix D). Table 20 provides an overview of common parameters. The values indicate, the five-factor model excellently meets criteria for good fit. This means, the above model with five factors can only be improved by either rephrasing questions or adding more questions. The second row of Table 20 shows for comparison the calculated values for N = 165

using only complete cases without any data imputation. The third row shows values for the original theoretical constructs as presented in Chapter III.

Table 20

Goodness-of-Fit Indicators

	χ^2	df	χ^2/df	CFI	TLI	RMSEA	GFI	p-value
Five Factors	310.858	220	1.41	.983	.980	.0045	.987	0.000*
Five Factors**	274.440	220	1.25	.989	.987	.0039	.986	0.007*
Constructs	1146.387	485	2.36	.925	.918	.0910	.963	0.000*

* Statistically Significant (p < .05)
** N = 165, complete cases only, no data imputation

According to Tabachnick et al. (2013) models of fit is a lively area of research along with standards on how to report CFA findings (Jackson, Gillaspy Jr, & Purc-Stephenson, 2009). One basic indicator is the ratio of χ^2 to the degree of freedom when it is less than 2 (Tabachnick et al., 2013). Therefore, χ^2/df = 1.41 and 1.25 are great values.

Another indicator is the comparative fit index (CFI) that should be greater than .95 in terms of good-fitting, the value is normed to the 0–1 range (Tabachnick et al., 2013). Therefore, .983/.989 are very good values for the five-factor model.

The root mean square error of approximation (RMSEA) estimates "the lack of fit in a model compared to a perfect saturated model" (Tabachnick et al., 2013, p. 722). Values of larger than .1 suggest poor-fitting, and values of .6 or less suggest a good fitting model (Tabachnick et al., 2013). In fact, "the cutoff point of 0.05 has been widely adopted as the 'gold standard' in applied research settings" (Chen, Curran, Bollen, Kirby, & Paxton, 2008, p. 464). With RMSEA at .0047 (imputed) and .0039 (complete cases) the five-factor model above suggests excellent fit.

The Tucker-Lewis index (TLI) as well as the goodness-of-fit (GFI) value should be greater than .95: The closer the values to 1 the more likely the model fits an ideal estimation (Jackson et al., 2009; Tabachnick et al., 2013). Both, the TLI value as well as the GFI for imputed and for the complete cases only data suggest once again excellent model fit.

Overall, the confirmation factor analysis was useful to optimally group variables and to confirm the latent principles of each extracted factor. In comparison, the goodness-of-fit indicators for the original theoretical constructs, closely following Likert (1967), do not fit together this well. Although a well-done exploratory factor analysis can come close to a good model fit, the CFA process eventually provides a finishing touch, and the calculated indicators leave little doubts about the model's goodness-of-fit.

Scale Reliability

Internal consistency reliability is usually measured by Cronbach's α, but the interpretability of the resulting values depends on the sample size, the number of variables and the constructs to be measured (Field et al., 2012; Nunnally, 1994; Yurdugül, 2008). Groves et al. (2009) remarked, that the survey statistics field prefers not to use the term reliability but instead "simple response variance" (p. 262), which is the opposite of reliability: When a scale has high reliability then it shows low simple response variance. Because Cronbach's α is a measure of internal consistency reliability (Nunnally, 1994) and the only indicator used here, the term reliability in lieu of *simple response variance* will be used.

The α values at the bottom of Table 19 are based on the imputed data. Factor I, showed the strongest correlation values (Appendix D), the strongest factor loadings, and unsurprisingly the highest α value at .81 indicating good internal consistency. The reliability for the constructs II and III computed α .72 and .73. While Factor III has

only four items on the scale, Factor II needed eight questions to reach the same level of reliability, of which none could be dropped without decreasing the α value. Factors IV and V only required two questions each to reach .74 and .75.

In general, any α greater than .7 is considered acceptable (Field et al., 2012; Nunnally, 1994; Yurdugül, 2008). For comparisons, α was run on data without imputation (N = 206, omitting n/a) returning similar values, and with complete cases only (N = 165) whereby all values slightly increased by up to .03.

There is consensus among researchers that the larger the sample size the more accurate estimates of α are obtainable (Field et al., 2012; Nunnally, 1994). Because of the difficulty of collecting data in psychometric research Yurdugül (2008) investigated the relation between (minimum) sample size, Cronbach's α, and the eigenvalues of factors, and concluded, that if the first eigenvalue obtained from a principal component analysis (PCA) is between "3.00 and 6.00, the required minimum n = 100 will be adequate for an unbiased estimator of coefficient alpha" (p. 7). With the given data (N = 206), the PCA eigenvalue of the first component is 7.85, hence out of range. Following Yurdugül (2008), the estimates of coefficient α are probably biased. On the other hand, with a sample size of N = 206 and N = 165, imputed and complete cases only, Cronbach's α returned for the Factors I–V similar results so that internal consistency reliability appears to be stable.

Research Questions

The research questions that guided this study were distinguished into two sections: The primary research question (RQ1) concerned the instrument development itself: To what extent can Likert's management systems be adapted as an instrument for assessing performance characteristics of post-secondary education institutions? Answering the secondary research questions (RQ2) was made dependent on the reliability of the instruments and concerns differences of perceptions of a) faculty towards institutional organization

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across different departments, b) administration towards institutional organization across different departments, c) what individuals believe the characteristics of their institution are, d) what individuals like the characteristics of their institution to be. Further, research questions RQ2–e aimed at differences in perceptions of organizational structures across institutions of higher education. RQ2–f aimed at the perceptions of supportive relationships (professional and personal) with superiors and the organization.

Primary Research Question RQ1.   The results of this study suggest that Likert's (1967) theory of management systems 1–5 as an instrument for assessing performance characteristics can largely be adapted for post-secondary educational institutions. While Likert (1967) used for the original questionnaire 51 questions, the scope of this study included only a selection of 33 questions of which 10 did not align well with the established five-factor model. In fact, only 23 (or fewer) questions are required for a reliable tool to recognize a Likert management system.

Table 21 shows the system scores of all three sampled Institutions A, B, and C. All mean and median values are based on the five-factor model as established by the exploratory–confirmatory factor analysis, i.e., excluding the 10 variables that did not fit the model. Likert (1967) based system score calculations on observed means $\overline{X}$ (averages).

Medians should also be considered as they reflect neutral responses of ordinal scales with uneven numbers better than averages (Barry, 2017). For comparisons, the median value was included, but calculated only for the now *n* state as this data is the most complete. Except for the median of Institution A, all scores are in the lower range of a Consultative System 3 (2.51–3.5). It is noteworthy that the scores calculated based on all 33 variables, as reported in the section Data Essentials before, do not significantly differ from the scores based on the 23 retained questions of the five-factor model.

Table 21

Systems Scores of Sampled Institutions Based on Mean and Median

	Inst. A	Inst. B	Inst. C
Mean			
Past	2.55	2.76	2.69
Now	**2.61**	**2.73**	**2.75**
Future	2.98	3.18	3.22
Median			
Now	**2.37**	**2.57**	**2.53**

Secondary Research Questions RQ2 a–f . The answers to the secondary questions (RQ2 a–f) have been anticipated in much detail in the section Data Essentials and Visualizations above by examining the Tables 12–17 and Figures 5–7 observing all responses prior to the factor analysis. In the following, the secondary questions are being re-examined taking into account only the questions, which were retained due to the previously established five-factor model. The generalization of the findings is subject to the research design limitations as stated in Chapter III.

RQ2–a) Differences in perceptions of faculty towards institutional organization across different departments. For each sampled institution, responses from faculty members were grouped and investigated isolated to examine their perceptions of institutional organization. Perceptions of faculty members in different departments vary significantly: While some opted for the highest ratings, occasionally even throughout all questions, others gave the worst possible rating. In two cases, there were three responses coming from faculty of the same department, but the individual response patterns have little in common. This spectrum is also evident in the comments, which span from utmost satisfaction to alarming resentments. In general, for faculty of each sampled institution, most answers are grouped along the midpoints of Systems 1–3 so that isolated scores tend towards the

lower end of a Consultative System 3. Despite strong variances for individual variables, faculty members in general, have a dominantly pessimistic outlook on their work environment in common. Table 22 provides an overview of the isolated responses from faculty of various departments at Institution C, which returned the most responses. The Table structure is based on the five-factor model as established before.

Table 22

Organizational Characteristics of Institution C, Faculty

Variable / Characteristics	Systems 1–5, N					
Factor I: Interaction–Influence Processes	1	2	3	4	5	N
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	20	40	20	11	9	35
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	14	29	37	11	9	35
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	6	31	23	31	9	35
II 3–26. In your perception, what is the character of interaction between department colleagues?	29	51	11	3	6	35
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	17	31	26	11	14	35
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	34	31	11	6	17	35
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	32	35	16	3	13	31
Factor II: Leadership Processes	1	2	3	4	5	N
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	20	26	23	9	23	35
LS 3–4. Extent to which your department leader displays supportive behavior.	31	33	8	8	19	36
LS 1–1. Extent to which you have confidence in your immediate department leader.	8	31	19	31	11	36
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean)	25	25	11	8	31	36
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	6	58	22	14	0	36

(continued)

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Variable / Characteristics Institution C, Faculty	Systems 1–5, N					
LS 4–5. To what extent does leadership give you useful work-related information?	14	28	33	6	19	36
CP 2–25. To what extent do you feel that your department leader is interested in your success?	31	20	20	9	20	35
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	42	36	6	3	14	36
Factor III: Effective Collaboration	1	2	3	4	5	N
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	14	46	23	6	11	35
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	17	31	20	20	11	35
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	26	20	34	11	9	35
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	19	42	22	11	6	36
Factor IV: Problem Solving	1	2	3	4	5	N
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	17	23	34	14	11	35
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	14	25	25	19	17	36
Factor V: Motivational Forces	1	2	3	4	5	N
MF 5–15. What is your general attitude towards your institution?	42	28	17	6	8	36
MF 6–16. Overall satisfaction derived by being a part of the institution.	39	33	6	8	14	36

As the table shows, there tends to be agreement that colleagues do not encourage each other to give their best efforts (Factor I, II 5–28), there is little teamwork, (Factor I, II 4–27), and very little interaction among colleagues (Factor I, II 3–26). Moreover, there are indications for very poor side-ward communications and an unhealthy competitive climate between peers because 32% of the answers fall into a System 1 and another 35% into System 2 (CP 5–22). The answers for variables grouped to Factor II, support and in particular relationships with leadership, show a broad range of different perceptions.

However, 58% of all faculty members believe their immediate department leader has not much confidence in them. It is also remarkable, that a total of 78% do not care much about achieving the institution's goals (MF 2–12), which is congruent with the answers for Factor V, motivational forces (i.e., contentment). Table 22 shows clearly, that there are significant differences in faculty perceptions of institutional organization across different departments. At the same time, there are also strong tendencies towards the lower systems for several variables. Faculty, isolated, at Institution C, scored only a 2.6 (based on medians), which is still a System 3.

RQ2–b) Differences in perceptions of administration towards institutional organization across different departments. The survey returned responses from administrators in leadership roles and administrative staff. Therefore, two types of administrators were examined:

1) Administrative leadership: Institution C returned up to 49 responses from leadership personnel such as directors, deans, and associate deans from different departments. Less than 10 of whom chose System 5 ratings for almost all variables but occasionally answered with lower ratings. Table 23 gives an overview of the responses from leadership personnel and displays how accurate Likert's system model could work if respondents share similar beliefs about their institutions.

Table 23

Organizational Characteristics of Institution C, Leadership Personnel

Variable / Characteristics	Systems 1–5, N					
Factor I: Interaction–Influence Processes	1	2	3	4	5	N
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	32	30	28	2	9	47
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	40	43	6	0	11	47

Variable / Characteristics Institution C, Leadership Personnel	Systems 1–5, N					
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	19	36	26	17	2	47
II 3–26. In your perception, what is the character of interaction between department colleagues?	34	32	26	0	9	47
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	30	46	11	4	9	46
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	54	33	2	2	9	46
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	28	47	19	2	4	47
Factor II: Leadership Processes	1	2	3	4	5	N
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	37	24	16	6	16	49
LS 3–4. Extent to which your department leader displays supportive behavior.	39	20	12	8	20	49
LS 1–1. Extent to which you have confidence in your immediate department leader.	14	35	31	18	2	49
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean)	35	27	8	8	22	49
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	6	38	46	8	2	48
LS 4–5. To what extent does leadership give you useful work-related information?	33	27	16	6	18	49
CP 2–25. To what extent do you feel that your department leader is interested in your success?	36	17	17	11	19	47
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	55	16	4	2	22	49
Factor III:Effective Collaboration	1	2	3	4	5	N
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	18	39	24	6	12	49
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	33	23	23	6	15	48
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	32	15	19	17	17	47
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	24	29	31	12	4	49

Variable / Characteristics Institution C, Leadership Personnel	Systems 1–5, N					
Factor IV: Problem Solving	1	2	3	4	5	N
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	39	20	12	12	16	49
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	31	21	19	10	19	48
Factor V: Motivational Forces	1	2	3	4	5	N
MF 5–15. What is your general attitude towards your institution?	41	27	10	0	22	49
MF 6–16. Overall satisfaction derived by being a part of the institution.	55	12	10	2	20	49

Surprisingly, also leadership personnel, in general, expressed rather low ratings throughout all questions and the distribution of answers resembles the response patterns of faculty members. The same persons who rated System 5 for some points rated other variables as the worst. In general, it cannot be said that the respondents answered all questions consistently. In fact, there are remarkable outliers within the individuals' responses. The overall moderate correlations among the variables clearly reflect such response inconsistencies.

Comparable with perceptions of faculty, most answers were nonetheless given in the range of System 1 to 3. Despite all favorable ratings towards System 5, leadership administration scored only a 2.41 (based on medians), which suggests an Authoritative Benevolent System 2.

2) Administrative staff: Again, Institution C gave the most results that shall be considered for conclusions. With 32 responses from administrative staff of various departments and positions, the data widely varies across all questions. Nevertheless, regarding question CP 5–2, to what extent side-ward communication is being perceived as satisfactory in terms of quality, it stands out that 55% of all respondents opted for the answering option "Fairly poor, because of competitive climate between peers, important information

is being filtered" (Appendix C), which aligns with a System 2. Remarkable is also the System 2 rating for II 3–26, aiming at the character of interaction between department colleagues (53%), and II 7–31, the extent do which department colleagues exchange ideas for solving job-related problems (44%). In contrast to perceptions of leadership personnel and faculty members the answers of administrative staff are much more evenly distributed across all Systems 1–5, as shown in Table 24. That implies that perceptions of administrative staff towards institutional organization differ much more than the perceptions of administrative leadership.

Table 24

Organizational Characteristics of Institution C, Administrative Staff

Variable / Characteristics	Systems 1–5, N					
Factor I: Interaction–Influence Processes	1	2	3	4	5	N
II 5–28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?	25	25	16	6	28	32
II 4–27. To what extent do your department colleagues encourage each other to work as a team?	26	16	29	3	26	31
II 6–29. To what extent do your colleagues in your team really help you find ways to improve your work performance?	28	13	25	16	19	32
II 3–26. In your perception, what is the character of interaction between department colleagues?	13	53	9	3	22	32
II 7–31. To what extent do your department colleagues exchange ideas for solving job-related problems?	16	44	16	3	22	32
DM 2–33. To what extent do you consider your team members' ideas for decision-making?	32	32	6	6	23	31
CP 5–22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?	24	55	7	0	14	29
Factor II: Leadership Processes	1	2	3	4	5	N
LS 5–6. How comfortable do you feel talking to your team leaders about matters related to your work?	26	19	10	10	35	31
LS 3–4. Extent to which your department leader displays supportive behavior.	29	19	16	6	29	31

(continued)

Variable / Characteristics Institution C, Administrative Staff	Systems 1–5, N					
LS 1–1. Extent to which you have confidence in your immediate department leader.	10	23	23	35	10	31
MF 7–17. Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean)	22	31	6	16	25	32
LS 2–2. Based on your perception: How much confidence does your immediate department leader have in you?	0	33	20	37	10	30
LS 4–5. To what extent does leadership give you useful work-related information?	20	10	23	13	33	30
CP 2–25. To what extent do you feel that your department leader is interested in your success?	22	28	16	13	22	32
MF 2–12. To what extent do you feel a real responsibility for achieving the institution's goals?	28	31	6	6	28	32
Factor III: Effective Collaboration	1	2	3	4	5	N
CP 1–18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives.	22	22	31	9	16	32
LS 10–19. To what extent does leadership encourage faculty or staff to work as a team?	16	22	22	9	31	32
LS 9–23. To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?	35	6	35	10	13	31
CP 3–20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff).	19	19	31	13	19	32
Factor IV: Problem Solving	1	2	3	4	5	N
LS 7–9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?	29	19	10	16	26	31
LS 8–10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?	13	26	23	13	26	31
Factor V: Motivational Forces	1	2	3	4	5	N
MF 5–15. What is your general attitude towards your institution?	25	41	9	3	22	32
MF 6–16. Overall satisfaction derived by being a part of the institution.	32	29	16	0	23	31

Perceptions widely differ, which can be explained by a rather heterogeneous population working in different departments and colleges, all having different views on organizational climate and culture, depending on personal expectations, of course. It is therefore

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interesting that it is still possible to read response trends that point to a specific Likert system. Unfortunately, there are not enough answers from a single department or college to compare employee perceptions and their relationship to local leadership personnel.

RQ2–c) Differences in perceptions of what individuals believe the characteristics of their institution are. The question was answered in the section *Data Essentials and Visualizations* and above by answering RQ2–a) and RQ2–b, 1) and 2).

RQ2–d) Differences in perceptions of what individuals like the characteristics of their institution to be. Data collection for answering this research question was achieved by instructing respondents to enter an *f* for the future anywhere on the scale. The Figures 5, 6 and 7 render the received data as implied lines that shifted towards the higher end of a System 3. The data itself shows ratings throughout the whole 15–point scale, partially with lower-than-now ratings as well as ratings leaning towards System 4 and 5. Following the mean lines across variables, a desire for change and improvement is evident.

RQ2–e) Differences in perceptions of organizational structures across institutions of higher education. The data visualizations in Figures 5–7 and the Tables 12–16 show a high degree of deviations across all variables. The observed means for each institution fluctuates within the range of System 3. This applies to all mean lines that represent the *p*, the present *n* and the future in relation to desired changes. There is not enough data from more than three individuals of at least one single department or college that would allow for interpretations in terms of differences among various departments and/or colleges within one single institution, or in comparison to other institutions. In two cases, three responses from one single department were received, however, the data suggest that even these three individuals see their work environment quite differently.

RQ2–f) Perceptions of supportive relationships (professional and personal) with superiors and the organization. As a result of the factor analysis supportive relationships with leaders emerged as the second strongest latent variable of the survey, labeled as

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Factor II: Leadership Processes. The Tables 22–24 display the distribution of answers for faculty, administrative leadership and administrative staff at Institution C. Figure 9 visualizes the diversity of perceptions comparing the overall results for Institutions A, B, and C. Perceptions vary widely, the observed means $\overline{X}$ fluctuate within the System 3 range.

The diagram of Institution A shows in the bold mean line, which represents the present *n* for the variable LS 3 a significant decrease to lower ratings, i.e., to what extent leaders show supportive behavior. The lines describe a right-ward curve and merge into low ratings for MF 7, which is overall satisfaction with leadership. The solid, thinner line that represents the past *p* spikes towards LS 4, to what extent leadership provides useful information. However, LS 5, how comfortable one feels talking to team leaders about matters related work, and CP 2, a leader's interest in one's personal success, were not as good in the past as they are now. The colored dashed lines in the background represent the present *n* state. The data visualization is best interpreted by looking at the overall density of dots, which obviously falls into the range of System 2. Table 25 confirms this diversity by displaying numeric values; the M–column to the right displays the medians.

The diagrams for Institution A and C show a remarkable outlier for MF 2. As already discussed, this question concerns to what extent one feels a real responsibility for achieving the institution's goals. Based on the above exploratory–confirmatory factor analysis MF 2, originally declared as a variable of motivational processes, fits best here into Factor II, leadership processes. Potential reasons for the low ratings of MF 2 will be further discussed in Chapter V in terms of implications.
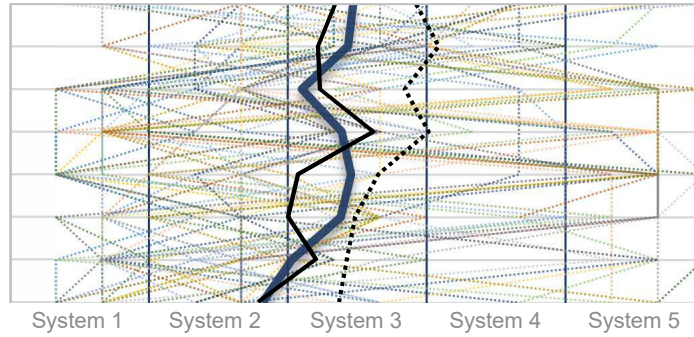
The diversity of perceptions regarding supportive leadership manifests in the visuals of Figure 9 in patterns that mirror inconsistency of leadership styles across different colleges and/or departments. However, the variety of perceptions and the distribution of answers on the 15–point scales are similar to Likert's (1967) diagram shown in Figure 2,
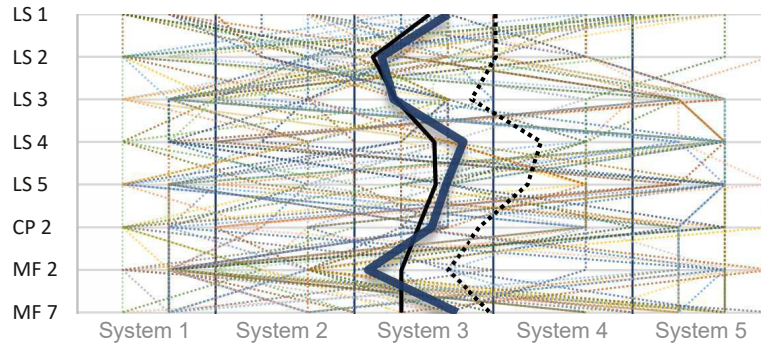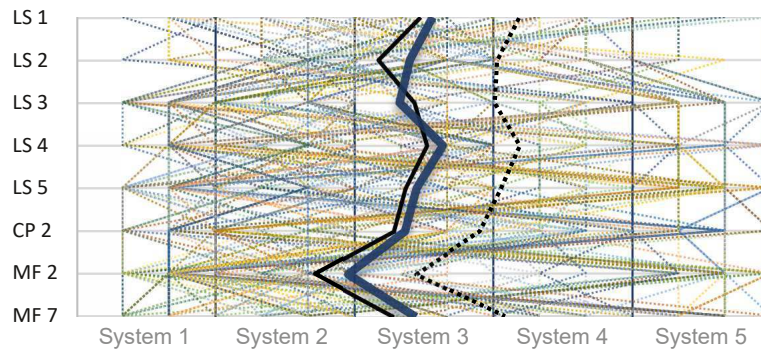
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Figure 9. Perceptions of Supportive Leadership Across Systems and Institutions and observed means $\overline{X}$ for past (solid), present (solid bold), and desired future (dashed).

so such diversity does not pose an issue for detecting management systems. Observed means or medians, and scores, certainly cannot represent such diverse perceptions, but the density of intersecting dotted lines does create a visual value for instant impressions and

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interpretations of how strong opinions on leadership really differ. Nonetheless, as Figure 9 shows, the responses in terms of perceptions of supportive relationships tend towards System 2. And, the dashed mean lines of all institutions signalize, employees do desire improvements for the future.

Table 25

Perceptions of Supportive Leadership Across Systems and Institutions

Leadership Processes	System 1			System 2			System 3			System 4			System 5			M
Institution A																
LS 1–1.	1	7	1	2	14	4	6	7	3	1	9	3		5	1	3
LS 2–2.		4	1	5	12	2	5	17	6	3	3	3	1	2		3
LS 3–4.	5	11	4	5	16	1	1	6	1		3		3	6	3	3
LS 4–5.	3	13	2	7	6		3	7	2	1	3	1	3	10	2	3
LS 5–6.	9	3	4	3	11	2	1	8			2	1	2	12	3	3
CP 2–25.	2	7	2	4	10		1	6	1		2	2	3	6	1	2
MF 2–12.	4	12	2	3	13	3	2	3	1				2	8	1	2
MF 7–17.	7	11	1	3	9	1	1	7			2		2	4		2
Institution B																
LS 1–1.	7	5	2	2	9	2	4	12	3		12	4	7	6	1	4
LS 2–2.	7	5		5	12	5	9	12	8		8	1		1	1	5
LS 3–4.	6	15	7	3	8		2	9	1		4	1	7	10	1	4
LS 4–5.	5	8	3	3	6	1	6	11			6		4	18	2	4
LS 5–6.	6	9	2	2	10	3	4	9			8		3	14	4	4
CP 2–25.	5	8	4	2	5	1	4	9			7	1	5	9	1	4
MF 2–12.	4	19	3	5	12	3	1	2	1		1		4	11	2	3
MF 7–17.	3	12	1	1	8	3	2	6	1		4	3	6	13	2	3
Institution C																
LS 1–1.	1	12	2	5	22	9	11	23	6	8	19	6	4	4	2	6
LS 2–2.	1	4	2	11	30	13	7	29	7	6	12	5	4	1		6
LS 3–4.	10	23	11	5	20	7	3	8	4	4	5	2	11	15	6	7
LS 4–5.	3	19	6	8	15	6	4	18	8	3	5	3	12	17	6	6
LS 5–6.	11	19	9	7	14	7	4	13	5	3	5	2	8	20	6	7
CP 2–25.	7	16	15	7	11	6	1	16	5	6	5	4	7	13	3	7
MF 2–12.	11	36	11	9	19	7	3	2	1	4	2		6	16	5	6
MF 7–17.	14	14	6	10	17	7	4	6	2	5	6	5	10	20	2	6

Summary of Results

The analysis of the data based on responses from three different institutions and a sample size of N = 206 by exploratory factor analysis and subsequent confirmatory factor analysis revealed five factors, some of which correspond to the five theoretical constructs defined in Chapter III. The reliability measured by Cronbach's α for each factor ranges from .72 to .81. Of the original 33 variables, 10 could be discarded. Therefore, a short and reliable questionnaire was successfully developed, that measures institutional characteristics with regards to Likert's theory of management systems 1–5.

Of the original constructs, *interaction-influence processes* re-emerged as Factor I, with a reliability of .81, as the underlying principles appear to deal specifically with perceptions of interactions with close colleagues.

The second strongest factor loaded mostly variables of the *leadership processes* construct, two items from the original *motivational forces* construct, and one from *communication processes*. The retained factors concern mostly supervisory relationships, i.e., mutual confidence, work climate, support, and sharing information. The original label *leadership processes* applies for Factor II as well. Cronbach's α computed .72, suggesting well acceptable reliability. The construct *motivational forces* reloaded as well into the new model, albeit with only two questions, and Cronbach's α of .75. Two more factors emerged differently from the theoretical constructs. That is, Factor III, *effective collaboration*, based on two LS and two CP variables; and Factor IV, *problem solving*, formed of two items originally part of the *leadership processes* construct.

The secondary questions all aimed at differences in the perception of institutional employees towards the work climate, effective interaction with colleagues, general characteristics of the organization, and the perception of supportive relationships with superiors, i.e., immediate department leaders, team leaders, and executive leadership in a broader

sense. Employees' perceptions are quite different, which is to explain by a heterogeneous population in different colleges and departments composed of individuals having a multitude of varying impressions of and perspectives on their work environment. Despite all deviations from means and medians, the instrument is nonetheless very well capable to identify aggregations of similar perceptions that range within any of Likert's Systems 1–5.

The distribution of data from all three sampled institutions tends towards a rather poor rating of organizational characteristics as the means and medians fluctuate within the lower end of System 3. For evaluating the survey results in more detail, the 15–point scales (Tables 12, 14, and 16) and the variable-to-systems relations (Tables 13, 15, and 17) must be carefully reviewed.

CHAPTER V:

SUMMARY, IMPLICATIONS, AND CONCLUSION

Summary

This study concerned the development of an instrument that enables accurate assessment of organizational performance characteristics, i.e., leadership behavior, interaction-influence processes, communication processes, problem solving, and motivational forces in post-secondary education. The instrument adapted Rensis Likert's management systems 1–4: Likert (1961, 1967) categorized four different systems of management: 1) Exploitative Authoritative, 2) Benevolent Authoritative, 3) Consultative, and 4) Participative Group (Likert, 1967). By the mid-70s, Likert extended the four systems through conceptualizing a System 5 to be even more advanced than System 4 (Likert & Araki, 1986; Likert & Likert, 1976; Reilly, 1978). As an innovative variation, Likert's ideas for System 5 characteristics were further defined and included in the upgraded instrument.

Following Likert's (1967) approach, five theoretical constructs were re-built for this study: 1) character of leadership processes, 2) character of motivational forces, 3) character of communication processes, 4) character of interaction-influence processes, and 5) character of decision-making processes.

The variables were grounded in Likert's (1967) original questionnaire–Profile of Organizational Characteristics–containing 51 items, Likert Associates' (1972) –The Likert Profile of a School–and other literary sources, such as Collins (2001), Stringer (2002), Taylor and Bowers (1972). The language of all questions was tailored to match today's cultural diversity of an educational environment and its employees, i.e., faculty, administrative leadership, and staff.

The survey (Appendix C) was disseminated electronically using Qualtrics (2019) and providing anonymous links to over 13,000 email contacts at two public universities and one large community college located in the southwestern United States. The survey returned about 300 records of a diverse population of which up to 274 could be used for preliminary data assessments, but only 206 responses were suitable for an exploratory–confirmatory factor analysis.

The research questions that guided this study were distinguished into two sections: The primary research question (RQ1) concerned the development of an reliable instrument itself: To what extent can Likert's management systems be adapted as an instrument for assessing performance characteristics of post-secondary education institutions? The secondary research questions (RQ2 a–f) aimed at the extent to which employees' perceptions differ in relation to their working environment.

The exploratory–confirmatory factor analysis of the data revealed five latent variables, some of which correspond to the five theoretical constructs defined in Chapter III: Interaction-influence processes re-emerged as Factor I. The second strongest factor loaded mostly variables of the leadership processes construct, two items from the original motivational forces construct, and one from communication processes. The retained factors concern mostly supervisory relationships, i.e., mutual confidence, work climate, support, and sharing information. The construct motivational forces reloaded as well into the new model, albeit with only two of the original questions. Two more Factors emerged differently from the theoretical constructs, i.e., Factor III, effective collaboration, and Factor IV, problem solving, formed of two items originally part of the leadership processes construct.

The reliability measured by Cronbach's α for all factor ranges from .72 to .81. Of the original 33 variables, 23 were retained. Therefore, a short and reliable questionnaire

was successfully developed, that measures institutional characteristics in terms of human interactions according to Likert's theory of management systems.

The secondary questions all aimed at differences in the perception of institutional employees towards the work climate, effective interaction with colleagues, general characteristics of the organization, and the perception of supportive relationships with superiors, i.e., immediate department leaders, team leaders, and executive leadership in a broader sense. The following implications are anchored to the five established factors considering the findings for secondary research questions.

Implications

The applicability of Likert's Systems 1–4 for post-secondary education was anticipated by Likert (1961, 1967) and Likert and Likert (1976), Likert Associates (1972) as discussed in the review of the literature in Chapter II. The potential of System 5 principles is an entirely new outcome of this study. As the results have shown, there are areas for which some respondents opted for the highest possible grades, i.e., 13–15 on the scale, which represent System 5 qualities. The applicability of Systems 1–4 for education had also been confirmed by Roueche and Baker III (1987), albeit with a different approach aiming more at institutional effectiveness than at human interaction like this present study. The implications hereafter outline to what extent a Likert's systems approach can be beneficial for educational leadership administration. The underlying variables for each retained factor are being revisited reflecting findings of the secondary research questions.

Interaction-Influence Processes

Despite the diversity of all perceptions, there is a strong indication of rather poor interaction-influence processes which pose a series of qualitative questions, that can be easily derived from each variable: 1) What could be the obstacles that colleagues

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face within their work environment that discourage them from doing their best? Could this be due to a lack of received appreciation, due to an unhealthy working climate by not having the right people in the right place engaged? 2) What are the reasons why colleagues do not motivate and encourage each other to work as a team? To what extent would teamwork improve performance for different departments at all, is teamwork even necessary? 3) Why are colleagues not helpful to each other? Could this be rooted in a competitive climate? If so, what could be the reasons for an unhealthy and competitive climate, and what factors can be modified to reduce competitive thinking and improve collaboration? 4) Why do employees not exchange ideas and discuss issues?

Likert (1961, 1967) described interaction-influence processes as intervening variables being essential for an organization to function. Interaction-influences depend on communication and lack of thereof is all too often the cause of problems. Poor communication could be rooted in a variety of reasons, e.g., a lack of openness to be influenced and a lack of receptiveness towards information (Hall & Hord, 2015). According to Markman (2017), poor communication could be rooted in obscurity about the structure of the organization and/or job responsibilities. For that matter, it is crucial to examine complaints more closely and taking into account the limitations of people's ability to report what is actually bothering them.

To ensure healthy interaction-influences, managers and leadership must regularly re-evaluate the frequency and quality of information to be communicated among employees, anticipate factors that could be motivational or cause discontentment, and assess if employees understand what they must know, which leads to the next dimension of implications.

Leadership Processes

When Likert (1961, 1967) and Likert and Likert (1976) theorized management systems, the terms manager and management were used indiscriminately and interchangeably for leaders or leadership. Reflecting on the literature discussed in Chapter II, "managers are concerned about how things get done, and they try to get people to perform better. Leaders are concerned with what things mean to people, and they try to get people to agree about the most important things to be done" (Yukl, 2002, p. 5).

The survey was designed to be answerable by <u>all</u> employees of post-secondary education, in contrast to the approach of Likert Associates (1972) who tailored similar surveys to different work environments in schools, e.g., one survey for teachers, another version for principals, superintendents, and staff all separately. Although this might be the most ideal method to survey an organization or institution, it is not the most practical and therefore such research design was moved aside for the scope of this presented study. Given these limitations, the questions for the leadership processes naturally led to data that is reflecting perceptions in averages. While the instrument is well capable to detect leadership issues and place them into a Likert system, the quantitative nature of the survey cannot reveal causal mechanisms that are more deeply rooted. A follow-up qualitative approach is needed that would explore what leadership personnel and managers are thinking and doing differently so that they received high ratings that correspond with System 4–5.

While scholars themselves debate the differences between managers and leaders (Kotter, 1990, 2013; Morrill, 2007; Stringer, 2002; Yukl, 2002), the self-image of individuals in managing or leader roles influences naturally the behavior of team members, colleagues, and subordinates, who may ask themselves whether they are managed or led according to the above definition of leadership; e.g., is *department chair* a managerial or a leadership position, or both? Although the questions were double-checked for clarity,

some respondents still wondered who was meant with *leadership* and commented on their perceptions in more detail.

Taking into account the necessary differentiation for leadership and management, for all three sampled institutions perceptions vary widely and point towards the Benevolent Authoritative System 2 and the Consultative System 3 yet indicating in some areas potentials for shared leadership principles according to Systems 4 and 5. For the extracted leadership sample at Institution C (Table 23), there is a strong tendency towards lower ratings where leadership personnel itself indicated that leadership does rather not share information and leaves questions often unanswered. That poses the following questions: Does leadership not effectively communicate with each other? If so, what are the barriers? Could this be due to a competitive work climate? Moreover, what are the obstacles that employees do not feel free talking to their team leaders about matters related to their work? What are the reasons that leaders of colleges or departments do not display enough supportive behavior or show interest in success of their subordinated colleagues? Employees tend to be dissatisfied with their superiors, which then has unfavorable consequences for motivation, e.g., by not striving for achieving the institution's goals.

The survey design with its answering options gives at least two clues for what outstanding leaders do: Two variables with the strongest factor loadings in the leadership process construct, LS 5–6 and LS 3–4, indicate, that excellent leaders create the best possible atmosphere within all work-groups and work levels, display a high degree of supportive behavior, and frequently check on needs to optimize efficiency and effectiveness (Collins, 2001; Collins & Powell, 2004; Stringer, 2002).

Yukl (2002) provided insight, e.g., on developing leadership skills through job rotating programs in which trainees are assigned to work in a variety of different sub-units of an organization, or action learning in which formal management and leadership training is combined with learning from experience. More hands on, Stringer (2002), of-

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fered a practice resources guide for leadership based on indicators for low-performance scores and ideas for actions. As mentioned above, poor communication and interaction could be rooted in unclear job responsibilities (Markman, 2017). As Stringer (2002) suggested, e.g., leadership could take action by preparing together with employees an authority-responsibility chart identifying who has primary responsibilities for tasks, who is responsible for support, or who has decision-making authority. Further suggestions are about standing up for subordinate's interests, be more approachable and open with colleagues or allow subordinates to deal directly with supervisors at higher levels, i.e., break up hierarchic (and archaic) lines of command. Regarding the improvement of supportive behavior, Stringer (2002) suggested to "examine each of your subordinate's technical competence and emotional makeup; list each of your subordinate's strength and weaknesses, and review his or her general self-confidence, independence, and so on" (p. 279). That approach links back to Chapter II, Learning Organizations, to recall: Garvin et al. (2008) suggests that executives assess how well their teams, units, or companies are working by evaluating three critical areas within the organization, the "building blocks of a learning organization" (Garvin et al., 2008, p. 109): For the organization to be considered a learning organization, it must 1) have a supportive learning environment, 2) maintain specific learning processes and practices, and 3) have leadership that consistently strengthens learning. The first component, a supportive learning environment, has four distinguishing features: First, the employees feel psychologically safe. They feel encouraged to express their opinions without fear of being retaliated, belittled, or marginalized if they disagree with their superiors. Second, strong learning organizations have a culture of appreciating differences. Learning takes place when people become aware of conflicting differences and have a constructive dialogue about them. Third, take risks and explore the unknown. After all, managers and leaders in learning organizations are open to innovative ideas and invest time for reflection (Garvin et al., 2008; Tortorella et al., 2015).

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Effective Collaboration

Factor III loaded items that concern the amount of interaction between leadership and employees regarding achieving institutional and organizational objectives, encouraging faculty or staff to work as a team, holding effective group meetings, and the extent to which leadership shares information for creating transparency. Implications discussed for interaction-influence and leadership processes apply for this factor as well.

Lower ratings for items in this factor do not necessarily indicate institutional and/or organizational weaknesses, e.g., teamwork and group meetings for faculty could be less important than for administrative staff to maintain and improve job performance. Most rankings fall into the range of System 2 and System 3 based on answering choices indicating occasional more or less effective meetings and considerably frequent meetings (up to 6 times per year) with profound discussions about current matters (LS 9–23). On the other hand, one of the commentators complained about too many meetings that hindered employees from doing their jobs. In fact, in recent years supervisors, managers, and leadership have increasingly overestimated the use and purpose of meetings (Perlow, Hadley, & Eun, 2017). Rogelberg, Scott, and Kello (2007) researched what it takes to improve effectiveness of meetings, i.e., "companies need to focus on three fronts: improving employees' skills in meetings; improving managers' skills in meetings; and implementing best and innovative practices for running particular types of meetings" (p. 20), it is advisable to plan in advance and meetings must be structured to encourage participation, focus and results. All that is certainly applicable for educational environments, too.

The variable CP 3–20, to which extent leadership is willing to share information with employees, received overall quite evenly distributed responses. For the leadership sample at Institution C, there is a strong tendency towards lower ratings where leadership personnel indicated that leadership itself does rather not share information and leaves

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questions often unanswered. Given the relatively low percentage of executives who contributed to the data, the results nevertheless suggest that executives, and probably managers, tend to withhold valuable information and do not respond to inquiries. This is certainly not beneficial for the general working atmosphere since no employee likes to feel ignored.

Problem Solving

Of the original leadership processes construct, two variables emerged as a factor on its own which is about solving problems and exchanging ideas to develop better educational practices. All implications of interaction-influence processes, leadership processes, and effective collaboration apply for problem solving equally well. For improving problem-solving practices, Stringer (2002) recommended that leaders, or managers, 1) should identify and review together with subordinates areas where the risks of experimenting with innovative ideas and creative approaches are acceptable, 2) specify areas in which employees may act freely to try new ideas or resolve performance issues, 3) emphasize the need for innovation and risk-taking, 4) identify areas where innovations would add the most value, and 5) publicly reward best ideas so that colleagues understand that innovative ideas and creative problem solving are encouraged and appreciated.

Motivational Forces

The fifth factor extracted comes from the original theoretical construct Motivational Forces. For that matter, the label was kept and focuses on the general attitude of employees towards their institutions and overall job satisfaction. As discussed in Chapter IV, perceptions differ widely between various departments, the observed means $\overline{X}$ range between Systems 2 and System 3; and respondents from Institutions A are noticeable less satisfied with their work environments than respondents from Institutions B and C.

The two variables could only ask for attitudes and satisfaction as they are but could not reach deeper to explore possible causes. When considering the overall responses to all questions, the tendencies towards lower ratings and the mean or median values, it is not surprising that motivational aspects basically fall into the same system as all other variables. Poor interaction among colleagues, ineffective communication, a competitive work environment, and lack of support by leadership or managers, are just a few reasons that lead to negative attitudes. The comments also pointed at low wages, age discrimination and unacceptable workloads. All the implications for each of the factors discussed above, when considered and implemented, will lead to positive change, and will certainly increase attitudes and employee satisfaction.

Motivation is a key factor for an organizational structure to function effectively and was declared as a theoretical construct of this study. Latham and Ernst (2006) explored the history of research and theory on work motivation in the 20th century to identify principles that are likely to be timeless and made predictions regarding the design of organizations in the 21st century and ways to motivate employees. For example, 1) taking into account a person's needs following Maslow's (1943) need hierarchy theory, 2) consider job characteristics theory which emphasizes on the experience of meaningfulness work, the experiences of responsibilities for the outcomes of the work, and knowledge of the actual results of the work activities (Hackman & Oldham, 1976), 3) creating a job environment that is likely to facilitate self-motivation congruent with Herzberg's (1959) job enrichment theory, 4) setting specific high goals that are judged by employees to be attainable, i.e., goal setting theory by Locke and Latham (1990), and 5) expectancy theory (Vroom, 1964) that ensures that the attainment is tied to outcomes that are valued.

According to Lunenburg (2011), in particular, expectancy theory has three important implications that can help to elevate employee motivation by altering the person's effort-to-performance expectancy, performance-to-reward expectancy, and reward va-

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lence. 1) *Effort-to-Performance Expectancy* implies that leaders and managers should try to strengthen the belief that employees are able to do the job successfully; that can be achieved, e.g, by selecting the right people for the right task (Collins, 2001), by providing any necessary and required training, and by clarifying job requirements, as discussed above. 2) *Performance-to-Reward Expectancy* implies that "Leaders should try to increase the belief that excellent performance will result in valued rewards. Ways of doing so include: measure job performance accurately; describe clearly the rewards that will result from successful performance" (p. 4). 3) *Valences of Rewards* implies that executives should try to increase the expected value of rewards based on the desired performance, i.e., distribute the rewards valued by employees and individualize the rewards. The least that leaders should do is show appreciation for a job well done or for achieving a professional accomplishment.

Cartwright and Holmes (2006) also examined the need to recognize the meaning and emotional aspects of work and elaborated on *employee cynicism* that is rooted in three distinct categories: 1) issues of the work environment, 2) organizational flaws, and 3) the nature of work. They concluded, individuals become increasingly dissatisfied with a permanent demand to adapt to organizational needs, thus employers now must rethink their leadership roles and create more energized, enriched, and engaging environments for meaningful work that aligns with employees' personal values.

Implications of a Systems Approach

In connection with the literature review, it should be recalled that Likert (1961, 1967) justified the need for a systematic approach in terms of a need for internal consistency which has far-reaching consequences for the health, research and development of the organization and the resulting improvements. Reliable information about the internal condition of an organization is a prerequisite for success and survival. In addition, the

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internal consistency of organizational structures, the consistency of employees' percep-

tions of the work environment and endeavors to resolve internal conflicts are an important

basis for all efforts to implement, e.g., Lean in Higher Education, and/or to create a true

learning organization.

Likert and Likert (1976) stated that the structures of large universities and mid-

sized colleges could benefit by linking small groups or representatives of different depart-

ments who interact and communicate creative problem-solving acceptable solutions to

avoid institutional and/or organizational conflicts. An organization takes a serious risk

when it relies only on one single communicator or process as a single linking pin to tie all

parts of a system together (Likert & Likert, 1976).

Figure 3 shows a diagram representing an interaction-influence network of linked

pins, and linked groups: The key idea is, to improve the down and up linkages between

the president, the vice-presidents, deans and college/department chairs by adding diagonal

and lateral linkages in a manner, so that all are more aware about each other's goals and

performances. The concept is certainly worth an experiment to explore benefits, e.g., can

such linkages be helpful to reduce internal inconsistencies? Generally, different colleges

and departments in post-secondary education are primarily linked hierarchically with

higher-level leadership, without much lateral communication, if any at all.

For the three institutions examined for this study, the observed variances in per-

ceptions do indicate inconsistent leadership styles and management practices. The scores

for each institution translate to a Consultative System 3, which appears to be a satisfying

result, but it does represent only an average between the great and the not so great parts.

If most of the answers, as shown in all of the tables, were given to the middle field of the

scale, the result would still be a System 3, which is a weakness in Likert's systems theory

and by looking at Figure 2 it is safe to assume he was aware of that. A system score alone,

or the visual mean line in a systems diagram, cannot display the real distribution of an-

swers across the entire 15–point scale but the Tables 12–24 can show just that. Looking at the distribution of the answers, the goal must be, to reduce strong deviations from the mean or medians to achieve better consistency in employees perceptions, i.e., improved consistency within the organization's internal structure that is less prone to internal conflicts, ideally moving in the direction of a System 5, and organize an institution in the sense of systems theory and systems thinking which will ultimately lead to improvements of institutional climate and performance (Caldwell, 2012; Katz & Kahn, 1978; Kim, 1999; Senge, 1990a, 1990b; Senge & Sterman, 1992).

Recommendations for Future Studies

For future research, the survey could be improved by adding additional questions to increase the internal consistency of each factor. Low ratings of single questions could be further investigated by qualitative research, for example by forming focus groups to use the questions extracted above and discuss issues and solutions whereby anonymity or at least confidentiality must be ensured to retrieve honest and valid information. A larger sample size, especially from a single department guide by few supervisors is desirable for examining to what extent here variances in perceptions of institutional characteristics and leadership influences occur, and if so, what the reasons might be.

The instrument is intended to work for any type of employee at post-secondary education. However, it appears that not everyone could answer each question and offering an n/a option to answer results only in missing data for reasons that are eventually unfathomable. That remains a survey design issue to be solved. Moreover, it might be interesting to explore the results of a survey that is more tailored to a specific population, for example, to faculty only, managers, or executive leadership only, following the approach of Likert Associates (1972).

Limitations

The external validity and generalizability are limited due to the number of re-sponses received, and limited due to the number of participating universities and colleges, two universities and one community college. The reliability of this research is limited to observations based on a sample size of N = 206. Although the sample size met the cri-teria for an analysis of stable factors, a much larger sample from a single institution and especially from specific colleges or departments would be desirable. The internal validity was limited by occasional response errors (typos), incomplete responses, response set, subjective self-perception and bias of participants, and the honesty of all participants. The limited generalizability of this survey does not contrast with the research design since the primary goal of this study was the validation of an instrument. Reviewing the data towards employees' perception of their work environment was declared to be of secondary interest.

Concluding Remarks

The primary goal of this study was to develop a reliable quantitative instrument that measures organizational and institutional performance characteristics based on Likert's theory of management systems. An essential requirement for this research was the anonymity of all participants to receive truly honest answers, and this condition must be granted in any case for the use of the survey. The study contributes the following new findings to educational research:

1) Likert's theory of management system can be applied to post-secondary education. Exploratory–confirmatory factor analysis showed, the original five con-structs extracted from Likert's (1967) questionnaire translated well to educational work-environments. The original language was successfully updated to match today's political correctness, especially of educational environments. Of 51 original questions, 23 were

retained and Cronbach's α reliability ranges between five extracted factors from .72 to .81. The survey is renewing the concept of a high resolution 15–point scale, using text boxes, in which respondents could enter characters representing past and present perceptions, and desired changes for the future.

2) Likert's Systems 1–4 where expanded by a System 5, that Likert conceptualized but did not live to apply the idea for higher education. This study defined a System 5 for all variables. It should be noted that System 5 is idealistic and may only work fully for private or small campuses with less hierarchical structures. Nevertheless, the data clearly showed there were many respondents who opted for System 5 for some areas of the survey. Hence, there is a chance that leadership and management can develop into the highest possible potential in some areas and be a role model for other departments and colleges.

Based on the given data and taking into account the relevant literature, it must be concluded that in post-secondary educational institutions the perception of employees in relation to management and leadership behavior, organizational structure and climate, in relation to interaction with colleagues and superiors and in terms of motivation differ considerable, which, given today's individualism, let alone multicultural diversity, may not come as a surprise.

For leadership to be successful and effective, for optimally implementing change and achieving better overall performance, e.g., for building a lean learning organization based on systems theory and systems thinking, it is crucial to examine the underlying inconvenient obstacles and prevent weaknesses from becoming serious threats.

Addressing or even solving internal political and structural conflicts, inconsistent leadership behavior, poor communication, improving collaboration and motivation depends fundamentally on the alacrity, ability, and courage of executive leadership to take responsibility for the institution's future. And ultimately, change depends on the willingness of the individual to be open-minded and to respond to leadership.

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FORMATIVE SOURCES

<u>Abbreviations</u>

The following abbreviations are referring to: Likert Associates. (1972). *The Likert profile of a school: New survey instruments for public schools to improve organizational effectiveness.* Ann Arbor, MI: Rensis Likert Associates, Inc.
TQ: A-3, Teacher's Questionnaire (Form 3, pp. 1-8)
TQ+: A-3, Teacher's Questionnaire Supplement (Form 3DS, pp. 9-10). For Department Heads
PRQ: A-3, Principals' Questionnaire (Form 4, pp. 1-10)
SUQ: A-3, Superintendent's Questionnaire (Form 5, pp.1-8)
CSQ: A-3, Central Staff Questionnaire (Form 6, pp. 1-8)

1. Extent to which you have confidence in your immediate department leader.

Likert (1967) "Extent to which subordinates, in turn, have confidence and trust in superiors" (p. 197, No. 1.b.). Likert Associates (1972) "How much confidence and trust do you have in your principal?" (TQ, p. 3, No. 28); "How much confidence and trust do you have in your superintendent?" (PRQ, p. 7, No. 52); "How much confidence and trust do you have in your principal? (CSQ, p. 1, No. 7); "How much confidence and trust do you have in your superintendent? (CSQ, p. 4, No. 30); "How much confidence and trust do you have in him [supervisor]? (CSQ, p. 7, No. 56). Taylor and Bowers (1972) "To what extent do you have confidence and trust in your foreman?" (p. 134, No. 56).

2. Based on your perception: How much confidence does your immediate department leader have in you?

Likert Associates (1972) "How much confidence and trust does your principle have in you?" (TQ, p. 3, No. 27). Taylor and Bowers (1972) "To what extent do you feel your foreman has confidence and trust in you?" (p. 134, No. 55).

3. To what extent do you have confidence in your department colleagues?

Taylor and Bowers (1972) "To what extent do you have confidence and trust in the persons in your work group?" (p. 135, No. 90). Likert Associates (1972) "How much confidence and trust do you have in: a. your school board? b. your staff? c. your principles?" (SUQ, p. 1, No. 7 [a], No. 8 [b], No. 9 [c]. Stringer (2002) "People in this organization don't really trust each other enough" (p. 230, No. 8).

4. Extent to which your department leader displays supportive behavior:

Likert (1967) "Extent to which superiors display supportive behavior towards others" (p. 197, No. 1.c.). Likert Associates (1972) "How often do you see your principal's

behavior as friendly and supportive?" (TQ, p. 3, No. 26); "How often is your behavior seen as friendly and supportive by teachers?" (TQ+, p. 9, No. 66); "How often do you see your superintendent's behavior as friendly and supportive?" (PRQ, p. 6, No. 50); "How often do you see the board's behavior as friendly and supportive?" (SUQ, p. 7, No. 57); "How often do you see your superintendent of schools as friendly and supportive? (CSQ, p. 4, No. 28). Taylor and Bowers (1972) "To what extent does this plant have a real interest in the welfare and happiness of those who work here?" (p. 131, No. 7). Stringer (2002) "Being supportive and helpful in my day-to-day activities." (p. 172, No. 21).

5. To what extent does leadership give you useful work-related information?

Likert Associates (1972) "To what extent does your principal give you useful information and ideas?" (TQ, p. 5, No. 46); "To what extent does your superintendent give you useful information and ideas?" (PRQ, p. 8, No. 63); "To what extent does your supervisor give you useful information and ideas?" (CSQ, p. 7, No. 59). Taylor and Bowers (1972) "To what extent does your foreman offer new ideas for solving job-related problems?" (p. 134, No. 49).

6. How comfortable do you feel talking to your team leaders about matters related to your work?

Likert (1967) "Extent to which superiors behave so that subordinates feel free to discuss important things about their jobs with their immediate superior" (p. 198, No. 1.d.). Likert Associates (1972) "How free do you feel to talk to your principal about academic and non-academic matters?" (TQ, p. 3, No. 29); "How free do the teachers in your department feel to talk about matters related to their work?" (TQ+, p. 9, No. 69); "How free do you feel to talk to your superintendent about academic matters, such as textbook selection, instructional policies?" (PRQ, p. 7, No. 53a.); "How free do you feel to talk to your superintendent about administrative matters, such as budget, hiring of teachers?" (PRQ, p. 7, No. 54b.); "other non-academic matters?" (PRQ, p. 7, No. 55c.); "How free do you feel to talk to your principal about your area of specialization?" (CSQ, p. 1, No. 9); "How free do you feel to talk to your superintendent about matters related to your work?" (CSQ, p. 4, No. 31); "How free do you feel to talk to your supervisor about matters related to your work?" (CSQ, p. 7, No. 57). Taylor and Bowers (1972) "How friendly and easy to approach is your foreman?" (p. 133, No. 37).

7. How comfortable do you feel talking to colleagues about matters related to your work?

Question 7 represents an interaction influence variable and is based on the corresponding causal variable underlying question No. 6. and its formative sources.

8. How often are your ideas sought by your team leaders regarding work-related problems?

Likert (1967) "Extent to which immediate superior in solving problems generally tries to get subordinates' ideas and opinions and make constructive use of them" (p. 198, No.

1.e.). Likert Associates (1972) "How often do you seek the ideas of teachers in your department about academic and non-academic matters?" (TQ+, p. 9, No. 70); "How often do you seek and use your staff's ideas and opinions?" (SUQ, p. 2, No. 13); "How often do you seek and use your principals' ideas and opinions as to: a. (…) academic matters (…)? b. (…) administrative matters (…) c. other non-academic school matters?" (SUQ, p. 2, No. 14 [a], No. 15 [b], No. 16 [c]); "How often do you seek and use principals' ideas about your area of specialization?" (CSQ, p. 2, No. 10.); "How often do you seek and use other staff members' ideas about your area of specialization?" (CSQ, p. 2, No. 11.). Taylor and Bowers (1972) "How receptive are those above you to your ideas and suggestions?" (p. 131, No. 11).

9. To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?

Likert Associates (1972) "To what extent are you encouraged to be innovative in developing better educational practices and course content?" (TQ, p. 5, No. 47; PRQ, p. 9, No. 76). Taylor and Bowers (1972) "How much does your foreman encourage people to give their best effort?" (p. 133, No. 48).

10. To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?

Taylor and Bowers (1972) "To what extent does your foreman encourage people who work for him to exchange opinions and ideas?" (p. 134, No. 53).

11. Who feels responsible for achieving high performance goals in your institution?

Likert (1967) "Amount of responsibility felt by each member for achieving the institution's goals" (p. 200, No. 2.e.). Likert Associates (1972) "Who feels responsible for achieving high performance goals in your school [system]?" (TQ, p. 8, No. 64; TQ+, p. 10, No. 84; PRQ, p. 5, No. 40; SUQ, p. 8, No. 63; CSQ, p. 7, No. 52).

12. To what extent do you feel a real responsibility for achieving the institution's goals?

Taylor and Bowers (1972) "To what extent do you feel a real responsibility to help the company to be successful?" (p. 135, No. 92). Stringer (2002) "Generally, I am highly committed to the goals of this organization." (p. 129, No. 11).

13. What is your perception of colleagues regarding their attitude towards the institution's goals?

Likert (1967) "Kinds of attitudes developed toward organization and its goals" (p. 199, No. 2.c.); "Amount of responsibility felt by each member for achieving the institution's goals" (p. 200, No. 2.e.). Stringer (2002) "In this organization, we set very high standards for performance" (p. 133, No. 7).

14. In your perception, what is the working climate among your colleagues?

Likert (1967) "Attitude towards other members of the organization" (p. 200, No. 2.f.). Likert Associates (1972) "What is the general attitude of principles toward your school system as a place to work?" (SUQ, p. 2, No. 17); "What is the general attitude of central office professional staff toward your school system as a place to work?" (SUQ, p. 2, No. 18).

15. What is your general attitude towards your institution?

Likert (1967) "Kinds of attitudes developed toward organization and its goals" (p. 199, No. 2.c.); Likert Associates (1972) "What is your general attitude toward your school?" (TQ, p. 5, No. 48; PRQ, p. 9, No. 70).

16. Overall satisfaction derived with being a part of the institution:

Likert (1967) "Satisfaction derived" (p. 201, No. 2.g.). Taylor and Bowers (1972) "All in all, how satisfied are you with the persons in your work group?" (p. 131, No. 15); "All in all, how satisfied are you with your job?" (p. 131, No. 17); "All in all, how satisfied are you with this plant, compared to others? (p. 131, No. 18); "How satisfied do you fell with the progress you have made in this plant up to now? (p. 131, No. 19); "How satisfied do you feel with your chances of getting ahead in this plant in the future?" (p. 131, No. 19).

17. Overall satisfaction with the leadership for your department (i.e., Department Director, Chair, Dean):

Likert (1967) "Satisfaction derived" (p. 201, No. 2.g.). Taylor and Bowers (1972) "All in all, how satisfied are you with your foreman?" (p. 131, No. 17). Likert Associates (1972) did not include this question.

18. Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives:

Likert (1967) "Amount of interaction and communication aimed at achieving organizational objectives" (p. 201, No. 3.a.). Likert Associates (1972) "What is the character and amount of interaction in your school between the principal and the teachers?" (TQ, p. 6, No. 53); "What is the character and amount of interaction in your school system: a. among principles? b. between you and your principals? c. among members of the central staff? d. between you and your school board? e. among school members?" (SUQ, p. 5, No. 36 [a]. No. 37 [b], No. 38 [c], No. 39 [e]); "What is the character and amount of interaction in your school between you and the teachers?" (PRQ, p. 4, No. 33).

19. To what extent does leadership encourage faculty or staff to work as a team?

Taylor and Bowers (1972) "To what extent does your foreman encourage the person who work for him to work as a team? (p. 130, No. 51). Likert Associates (1972) phrased this question indirectly. The response choices aimed at the extent team work was present

measuring whether it had been previously encouraged or not: and "In your school, is it "every man for himself" or do principal, teachers, and students work as a team?" (TQ, p. 6, No. 55); "In your school system is it "every man for himself" or do the superintendent, principals, and teachers work as a team?" (PRQ, p. 9, No. 69); "In your school system, is it "every man for himself" or do you, your principals, members of your staff, and members of the school board work as a team?" (SUQ, p. 5, No. 41).

20. Extent to which leadership is willing to share information with employees (i.e., faculty or staff):

Likert (1967) "Downward communication. (2) Extent to which superiors willingly share information with subordinates" (p. 201, No. 3.c.2).

21. Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution:

Likert (1967) "Downward communication. (3) Extent to which communications are accepted by subordinates" (p. 201, No. 3.c.3). Likert Associates (1972) "How do you view communications from your principal?" (TQ, p. 6, No. 50); "How do the teachers in your department view communications from you as a department head?" (TQ+, p. 10, No. 77); "How do teachers view communication from you and the administration?" (PRQ, p. 3, No. 27); "How do you view communications from the superintendent?" (PRQ, p. 8, No. 64); "How do principals view communications from the central staff? (CSQ, p. 3, No. 24); "How do teachers view communications from the central staff?" (CSQ, p. 3, No. 25); "How do you view communications from the superintendent?" (CSQ, p. 5, No. 42); "How do you view communications from the school board?" (CSQ, p. 6, No. 43). Taylor and Bowers (1972) "When you talk with persons in your workgroup, to what extent do they pay attention to what you're saying?" (p. 134, No. 68).

22. To what extent do you perceive side-ward communication as satisfactory in terms of quality?

Likert (1967) "Sideward communication, its adequacy and accuracy" (p. 203, No. 3.e.). Taylor and Bowers (1972) "How adequate for your needs is the amount of information you get about what is going on in other departments or shifts?" (p. 131, No. 10); "To what extent do persons in your work group share information about important events in this plant?" (p. 135, No. 88).

23. To what extent does leadership (i.e., leader of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?

Taylor and Bowers (1972) "How often does your foreman hold group meetings where he and the people who work for him can really discuss things together?" (p. 134, No. 57). Likert Associates (1972) "How often do you use group meetings to solve school problems?" (SUQ, p. 7, No. 55). Stringer (2002) "Conducting team meetings in a way that builds trust and mutual respect" (p. 172. No. 23).

24. Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff):

Likert (1967) "Psychological closeness of superiors to subordinates (i.e., friendliness between superiors and subordinates. (1) How well does superior know and understand problems faced by subordinates" (p. 203, No. 3.f.1.). Likert Associates (1972) "How well does your principal know the problems faced by teachers?" (TQ, p. 6, No. 52); "How well does your superintendent know the problems you face?" (PRQ, p. 8, No. 66; CSQ, p. 7, No. 60); "How well do you know the problems faced by: a. your principals? b. your staff?" (SUQ, p. 4, No. 33 [a], No. 34 [b]); "To what extent are decision-makers aware of problems, particularly at lower levels in the organization?" (SUQ, p. 6, No. 43). Taylor and Bowers (1972) "To what extent is your foreman willing to listen to your problems?" (p. 133, No. 41).

25. To what extent do you feel that your department leader is interested in your success?

Likert Associates (1972) "How much do you feel that your principal is interested in your success?" (TQ, p. 5, No. 42); "How much do the teachers in your department feel that you are interested in their success as a teacher?" (TQ+, p. 9, No. 72); "How much do you feel that your superintendent is interested in your success?" (PRQ, p. 8, No. 67); "How much do you feel that your superintendent is interested in your success?" (CSQ, p. 5, No. 36); "How much do you feel that your supervisor is interested in your success?" (CSQ, p. 8, No. 61). Taylor and Bowers (1972) "To what extent is your foreman willing to listen to your problems?" (p. 133, No. 41).

26. In your perception, what is the character of interaction between department colleagues?

Likert (1967) "Amount and Character of Interaction-Influence" (p. 204, No. 4.a.). Likert Associates (1972) "What is the character and amount of interaction between you and the teachers in your department?" (TQ+, p. 10, No. 79); "What is the character and amount of interaction between the superintendent and principals?" (PRQ, p. 8, No. 68); "What is the character and amount of interaction in your school system: a. between principals and staff?" b. among members of the staff? c. between central staff and the school board? (CSQ, p. 8, No. 37 [a], No. 38 [b], No. 39 [c]).

27. To what extent do your department colleagues encourage each other to work as a team?

Likert (1967) "Amount of cooperative teamwork present" (p. 204, No. 4.b.). Taylor and Bowers (1972) "How much do persons in your work group encourage each other to work as a team?" (p. 135, No. 80). Stringer (2002) "I feel that I am a member of a well-functioning team" (p. 128 [Climate Items]); "Conducting team meetings in a way that builds trust and mutual respect" (p. 128, No. 15 [Target Practices]).

28. In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?

Taylor and Bowers (1972) "To what extent do persons in your work group encourage each other to give their best effort?" (p. 135, No. 76). The question poses an interaction influence variable and is based on the corresponding causal variable asked by Likert Associates (1972) "To what extent are you encouraged to be innovative in developing better educational practices and course content?" (TQ, p. 5, No. 47; PRQ, p. 9, No. 76; SUQ, p. 7, No. 60), and by Taylor and Bowers (1972) "How much does your foreman encourage people to give their best effort?" (p. 133, No. 48).

29. To what extent do your colleagues in your team really help you find ways to improve your work performance?

Taylor and Bowers (1972) "To what extent do persons in your work group help you find ways to do a better job?" (p. 135, No. 76).

30. How often do you try to be supportive to your colleagues?

Likert (1967) "Attitude towards other members of the organization" (p. 200, No. 2.f.). Likert Associates (1972) "How often do you try to be friendly and supportive to: a. your principal? b. other teachers" (TQ, p. 4, No. 30 [a], No. 31 [b]); TQP, p. 1, No. 3 [a], No. 4 [b]; SUQ, p. 4, No. 4 [to the school board], No. 5 [staff] , No. 6 [principals]; CSQ, p. 1, No. 4–6). Taylor and Bowers (1972) "How friendly and easy to approach are the person in your work group?" (p. 134, No. 66).

31. To what extent do your department colleagues exchange ideas for solving job-related problems?

Taylor and Bowers (1972) "To what extent do persons in your work group offer each other new ideas for solving job-related problems?" (p. 135, No. 78).

32. To what extent are you involved in major decisions related to your work?

Likert (1967) "To what extent are subordinates involved in decision related to their work?" (p. 207, No. 5.f.). Likert Associates (1972) "To what extent are you involved in major decisions related to your work?" (TQ, p. 7, No. 58); "To what extent are teachers involved in major decisions related to their work?" (PRQ, p. 5, No. 37); "To what extent are you [principal] involved in major decisions related to your work?" (PRQ, p. 9, No. 72); "To what extent are principals involved in major decisions related to their work?" (SUQ, p. 6, No. 44; CSQ, p. 3, No. 27); "To what extent are you involved in major decisions related to your work?" (CSQ, p. 6, No. 47; SUQ, p. 6, No. 45). Taylor and Bowers (1972) "When decisions are being made, to what extent are the persons affected asked for their ideas?" (p. 132, No. 33). Stringer (2002) "Empowering people at all levels to make decisions" (p. 171, No. 15).

33. To what extent do you consider your team members' ideas for decision-making?

Likert (1967) "Extent to which immediate superior in solving problems generally tries to get subordinates' ideas and opinions and make constructive use of them." (p. 198, No. 1.e.); Likert Associates (1972) "How often are your ideas sought and used by the principal about academic and non-academic school matters? (TQ, p. 4, No. 32), "How often are your ideas sought and used by your superintendent about: a. academic matters? b. administrative matters? c. other non-academic matters?" (PRQ, p. 7, No. 58 [a], No. 57 [b], No. 60 [c]); "How often are your ideas sought and used by your superintendent?" (CSQ, p. 4, No. 32, No. 33 [by principals], No. 34 [by teachers]); Taylor and Bowers (1972) "How receptive are those above you to your ideas and suggestions?" (p. 131, No. 11).

Cover Letter

Invitations were emailed to all contacts in the following wording and format:

Dear Member of [name of institution],

You are invited to participate in the development of a survey: I am a doctoral candidate of the College of Education at the University of Houston–Clear Lake. For my EdD dissertation, I am developing a new type of survey that will allow assessing leadership styles and institutional characteristics of your working environment. Your responses will be highly valuable to detect strengths, weaknesses, and opportunities for change. All your responses will be handled confidentially; the survey is strictly anonymous. No data that allows identifying you will be shared with your institution or any 3rd parties.

Please follow this link to the Survey:
${l://SurveyLink?d=Take the Survey}
Or copy and paste the URL below into your internet browser:
${l://SurveyURL}
Follow the link to opt out of future emails:
${l://OptOutLink?d=Click here to unsubscribe}

The survey is not specifically tailored to [name of institution], it includes 33 questions with response choices, there is a progress bar at the bottom of the page, you can pause and continue as you wish. At the end of the survey, you will have the option to leave comments about the survey and/or about your institution if you wish to share more insight.

I appreciate in advance your participation,
Thomas G. Dorsch

Informed Consent to Participate in Research

You are being asked to participate in the research project described below. Your participation in this study is entirely voluntary and you may refuse to participate, or you may decide to stop your participation at any time. Should you refuse to participate in the study, or should you withdraw your consent and stop participation in the study, your decision will involve no penalty or loss of benefits to which you may be otherwise entitled. You are being asked to read the information below carefully and ask questions about anything you don't understand before deciding whether to participate.

Dissertation Title: Development of an Effective Organizational Performance Instrument to Facilitate Post-Secondary Institutional Change.

Principal Investigator(s): Thomas G. Dorsch, PhD
Faculty Sponsors: Renée Lastrapes, PhD (Methodologist); John Decman, EdD (Chair)

PURPOSE OF THE STUDY
The purpose of this study is to develop an instrument that allows for accurate assessment of organizational characteristics, e.g., leadership-, communication- and employee interaction in higher education environments.

EXPECTED DURATION
The total anticipated time-commitment will be ca. 15 minutes to complete the survey.

RISKS OF PARTICIPATION
There are no anticipated risks associated with participation in this project. No participants under-age will be involved in this study.

BENEFITS TO THE SUBJECT
There is no direct benefit received from your participation in this study, but your participation will help the investigator(s) better understand organizational characteristics and climate, issues related to leadership styles, communication, decision-making, motivation and performance.

CONFIDENTIALITY OF RECORDS
Every effort will be made to maintain the anonymity and confidentiality of your study records. The data collected from the study will be used for educational and publication purposes, you will not be identified by name nor identifiable by any other information you provide. For federal audit purposes, the participant's documentation for this research project will be maintained and safeguarded by the Faculty Sponsor Renée E. Lastrapes, Ph.D. for a minimum of three years after completion of the study. After that time, the participant's documentation may be destroyed.

FINANCIAL COMPENSATION
There is no financial compensation to be offered for participation in the study.

INVESTIGATOR'S RIGHT TO WITHDRAW PARTICIPANT
The investigator has the right to withdraw you from this study at any time.

CONTACT INFORMATION FOR QUESTIONS OR PROBLEMS
If you have additional questions during the course of this study about the research or any related problem, you may contact the researcher, Thomas G. Dorsch, Ph.D. by email at dorscht9322@uhcl.edu. The Faculty Sponsor Renée E. Lastrapes, Ph.D., may be contacted at 281-283-3566 or by email at lastrapes@uhcl.edu.

APPENDIX C:

SURVEY

Profile of Institutional Characteristics

The following pages show how the survey was displayed online using Qualtrics (2019) Software. The survey was exported from Qualtrics and the items were adjusted for this document format. This is not a paper version of the instrument. The survey was disseminated electronically only.

Instructions

SURVEY: PROFILE OF INSTITUTIONAL CHARACTERISTICS

You are invited to participate in a new type of survey that is part of a dissertation project at the University of Houston Clear-Lake College of Education. The main research interest is to assess the leadership style and institutional characteristics of your working environment.

All your responses will be handled confidentially, the survey is strictly anonymous. No data that allows to identify you will be shared with your institution or any 3rd parties.

Thank you for participating!
Thomas G. Dorsch, PhD

Instructions   when ready click on the yellow next button

1. On the scale below each statement or question, please place an **n** at the point which, in your experience, describes your organization at the present time (n = now). Treat each item as a continuous 15-point Likert scale from lowest to highest rating options. Align your thoughts with the response options.

2. If you have been at your organization one or more years, please also place a **p** on each line at the point which, in your experience, describes your organization as it was from one to six years ago (p = past).

3. Place an **f** into the segment for how you would like your institution to be in the future.

4. You can enter more than one character per box, for example, "p, n" or "n, f." If you feel you cannot respond at all to a statement or question, please write "n/a" anywhere on the scale.

5. The survey is not timed, you can stop and continue whenever you wish until you have completed the survey. You can also move back and forward anytime using the yellow buttons at the bottom of the page.

6. The survey questions aim at large population at universities and colleges in general. If in doubt about some terminology, try to translate it in terms of best fit to your work environment, e.g., Leadership, can be the individuals(s) you report to, or department can be college in your situation.

Example

The fields are not check boxes, you read the whole scale continuously from worst (left) to best (right).
For faster entries, click on the fields with your pointer (e.g., a mouse) and type your responses with your other hand.

To what extent do you consider your team members' ideas for decision-making?

Not involved in decisions, and not consulted	Never involved in decisions, occasionally consulted	Usually consulted, but ordinarily not involved in decision-making	To a very great deal involved in decision-making	Fully involved and included in all decision-processes
	p	n	f	

Survey

Answer Key: p = past, n = now, f = future

Extent to which you have confidence in your immediate department leader:

Have no or very little confidence in leadership	Have little confidence	Considerably	Complete confidence	Highest possible degree of confidence in leadership

Based on your perception: How much confidence does your immediate department leader have in you?

Very little	Have little confidence	Considerably	Complete Confidence	Highest possible degree of confidence

To what extent do you have confidence in your department colleagues?

Have no or very little confidence in colleagues	Have little confidence	Considerably	Complete confidence	Highest possible degree of confidence in colleagues

Extent to which your department leader displays supportive behavior:

Very little supportive behavior in any situation	Displays supportive behavior in some situations only	Generally displays supportive behavior and helps solving problems	Fully supportive in almost any situation, frequently solves problems	Highest degree of supportive behavior, frequently checks on needs to optimize efficiency and effectiveness

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To what extent does leadership give you useful work-related information?

Very little	Some	Considerably	Very often	As often as possible or reasonable

Answer Key: p = past, n = now, f = future

How comfortable do you feel talking to your team leaders about matters related to your work?

Not comfortable at all discussing work-related issues with my team leader	Feel somewhat comfortable talking about work-related problems	Feeling rather free to discuss work-related problems	Feel completely free to discuss any work-related issues	Leadership creates the best possible atmosphere of openness within all work-groups and work levels

How comfortable do you feel talking to colleagues about matters related to your work?

Not comfortable at all	Somewhat comfortable talking about my job	Rather free to discuss work-related problems	Completely free to discuss any work-related issues	Leadership creates the best possible atmosphere of openness

How often are your ideas sought by your team leaders regarding work-related problems?

Team Leaders seldom ask for ideas and opinions to solve problems	Leaders sometimes ask for ideas and opinions of faculty and/or staff in solving job problems	Leaders usually ask for ideas and opinions and try to make constructive use of them	Always ask for ideas and opinions and always try to make use of them to solve problems	Problem-solving is achieved through group tasks supervised by higher-level groups who provide all training needed for creative and effective problem solving

To what extent does leadership encourage you to be innovative in developing better educational or administrative practices?

Never, or seldom	Occasionally	Considerably	Very frequently	Highly encouraged; colleagues almost always exchange their ideas

To what extent does leadership encourage you to exchange ideas with your colleagues about better educational or administrative practices?

Never, or seldom	Occasionally	Considerably	Very frequently	Highly encouraged; colleagues almost always exchange their ideas
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

Answer Key: p = past, n = now, f = future

Who feels responsible for achieving high performance goals in your institution?

Leadership feels responsibility, lower levels (faculty or staff) feel little to no responsibility towards the institution's goals and often behave non-cooperative	Usually, leaderships feels a responsibility, while faculty or staff only occasionally support institutional goals	Leadership and a substantial portion of personnel feel responsible for the institution's goals and generally support in their implementation	Leaders, faculty and staff feel real responsibility for the institution's goals and behave in ways to implement them	Leaders, faculty and staff feel absolute responsibility as if the institution were their own business, and always strive for what's best for the institution
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

To what extent do you feel a real responsibility for achieving the institution's goals?

To a very little extent	To a little extent	To some extent	To a great extent	To a very great extent
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

What is your perception of colleagues regarding their attitude towards the institution's goals?

Attitudes usually are unfavorable and counter to the institution's goals	Sometimes counter, and sometimes favorable to the institution's goals	In general favorable and supportive behavior towards implementing the institution's goals	Attitudes are strongly favorable and provide powerful stimulation for implementing the institution's goals	Strong attitudes of working with each other to achieve a shared goal instead of working for a superior and an institution
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

In your perception, what is the working climate among your colleagues?

Disadvantageous attitudes towards leadership, and unfriendly toward peers and colleagues	Attitudes towards leadership, competing for status with peers, resulting in an unfavorable working climate	Cooperative attitudes, some competition between peers	Favorable, cooperative attitudes throughout the institution, good leadership motivates a good working climate	Great leadership, excellent working climate, no competition between peers
☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐

What is your general attitude towards your institution?

Dislike it	Sometimes dislike it, sometimes like it	In general, I like it	Like it very much	I cannot image a better place to work for

Overall satisfaction derived by being a part of the institution:

Usually dissatisfied with the institution	Moderate satisfaction, but rather dissatisfied with the institution as a place to work	Some dissatisfaction to moderately high satisfaction	Relatively high satisfaction	Very high satisfaction with being a part of the institution

Overall satisfaction with leadership for your department (i.e., Department Director, Chair, Dean):

Usually dissatisfied with leadership of my department	Moderate satisfaction, but rather dissatisfied with leadership	Some dissatisfaction to moderately high satisfaction with leadership	Relatively high satisfaction with leadership	Very high satisfaction with leadership

Amount of interaction (between leadership and employees) aimed at achieving institutional/organizational objectives:

Very little, institutional/organizational objectives are rarely a topic	Little, occasionally touched in conversations	Considerable interaction	Much interaction with both individuals and groups	Excellent interaction with both individuals and groups

To what extent does leadership encourage faculty or staff to work as a team?

Rarely	Sometimes	Frequently	Almost always	Always, as teamwork is essential to achieve the institution's overall goals

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Extent to which leadership is willing to share information with employees (i.e., faculty or staff):

Provides a minimum of information, never responses to questions that may arise due to unclear writing, e.g., in emails or any other written communication	Shares only information faculty and staff supposedly need, questions remain often unanswered	Delivers information needed, e.g., instructions, and answers most questions	Seeks to share all relevant information and always answers all questions satisfyingly	Any information is accessible to anyone within the institution due to high level of mutual trust.

Extent to which communications (i.e., emails, phone calls) are accepted by employees of your institution:

Communications remain generally ignored	Communications remain often ignored	Communications are often accepted	Generally accepted, but if not, openly and candidly questioned	Communications are always accepted as contents were established upon consensus

Answer Key: p = past, n = now, f = future

To what extent do you perceive side-ward communication as satisfactory in terms of quality?

Usually very poor because of competitive climate between peers	Fairly poor, because of competitive climate between peers, important information is being filtered	Fair to good communication about all matters	Good to excellent side-ward communication, peers support each other in achieving their goals	Information is shared by using modern communication tools and accessible any time for anyone

To what extent does leadership (i.e., the Director of your department, Chair, Dean) hold effective group meetings where colleagues can discuss work-related matters?

Never, or seldom	Occasionally, more or less effective meetings	Considerably often (up to 6x per year) with profound discussions about current matters	Very frequently, at least once per month leadership seeks feedback from team members	Leadership utilizes weekly effective meetings to discuss work-related matters

Extent to which leaders know of job-related problems faced by employees (i.e., faculty, staff):

Have no awareness of work-related problems faced by employees	Some awareness of problems faced by employees	Understand problems of employees quite well	Understand work-related problems of employees very well	Job-related problems are instantly discussed when they occur

To what extent do you feel that your department leader is interested in your success?

Very little	To some extent	Considerably	A very great deal	Could not ask for more

In your perception, what is the character of interaction between department colleagues?

No or little interaction	Little interaction, and usually with some reservation	Moderate interaction among colleagues, often with fair amount of mutual trust	Extensive, friendly interaction with high degree of mutual trust	Absolute supportive interaction with highest degree of mutual trust

To what extent do your department colleagues encourage each other to work as a team?

None, not encouraged	Relatively little teamwork	Considerable amount of teamwork	Good to very good amount of teamwork throughout my department	Exceptional amount of teamwork throughout my department

In your perception, to what extent do colleagues in your team or department encourage each other to give their best effort?

To a very little extent	To a little extent	To some extent	To a great extent	To a very great extent

To what extent do your colleagues in your team really help you find ways to improve your work performance?

Rarely	Sometimes	Frequently	Almost always	Could not ask for more help!

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How often do you try to be supportive to your colleagues?

Rarely	Sometimes	Frequently	Almost always	Always
☐	☐	☐	☐	☐

To what extent do your department colleagues exchange ideas for solving job-related problems?

To a very little extent	To a little extent	To some extent	To a great extent	To a very great extent
☐	☐	☐	☐	☐

To what extent are you involved in major decisions related to your work?

Not involved in decisions, and not consulted	Never involved in decisions, occasionally consulted	Usually consulted, but ordinarily not involved in decision-making	To a very great deal involved in decision-making	Fully involved and included in all decision-processes
☐	☐	☐	☐	☐

To what extent do you consider your team members' ideas for decision-making?

Not involved in decisions, and not consulted	Never involved in decisions, occasionally consulted	Usually consulted, but ordinarily not involved in decision-making	To a very great deal involved in decision-making	Fully involved and included in all decision-processes
☐	☐	☐	☐	☐

Demographic Information

Almost done! Please complete the following section as well, thank you!

Your position

Important

- ○ Executive Leadership Level
- ○ Dean
- ○ Associate Dean
- ○ Chair
- ○ Associate Chair
- ○ Program Director
- ○ Program Coordinator
- ○ Administrative Staff Director/Leader
- ○ Administrative Staff Team
- ○ Full Time Faculty
- ○ Part Time Faculty
- ○ Other

If you selected "other" please specify your position:

Academic discipline or mission of your department
Important

2 or 4 year institution

○ 2 Years
○ 4 Years

Years of experience at your current institution

○ < 1 year   ○ 1 - 2 years   ○ 3 - 6 years   ○ 7 - 10 years   ○ 11 - 14 years   ○ > 15 years

Number of years of experience at your current position

○ < 1 year   ○ 1 - 2 years   ○ 3 - 6 years   ○ 7 - 10 years   ○ 11 - 14 years   ○ > 15 years

Gender

○ female   ○ male   ○ prefer not to answer

Comments

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CORRELATION MATRIX, PEARSON'S R, N = 206

	LS2	LS3	LS4	LS5	LS6	LS7	LS8	LS9	LS10	MF1	MF2	MF3	MF4	MF5	MF6	MF7	MF8	CP1	CP2	CP3	CP4	CP5	CP6	II1	II2	II3	II4	II5	II6	II7	DM1	DM2
LS1	.33	.28	.22	.32	-.08	.08	.08	.01	.12	-.01	.12	.02	.12	.06	.13	.26	.18	.07	.17	-.03	.17	.14	.02	.08	.21	.16	.07	.20	-.05	.15	.05	.02
LS2		.25	.07	.26	-.07	.12	.15	-.04	.13	.03	.14	-.01	.08	.17	.14	.27	.11	.08	.16	.03	.15	.12	.08	.07	.20	.13	.02	.17	-.07	.10	.05	.08
LS3			.34	.33	.04	.29	.11	.08	.25	.00	.22	.08	.18	.26	.29	.38	.25	.21	.33	.09	.15	.20	.23	.10	.17	.17	.17	.22	-.01	.16	.14	.06
LS4				.32	.00	.26	.25	.08	.28	.08	.25	.17	.18	.19	.25	.22	.25	.15	.30	.13	.09	.16	.13	.10	.14	.11	.08	.18	.04	.25	.12	.17
LS5					.09	.26	.29	.05	.22	.08	.36	.10	.15	.21	.15	.35	.23	.12	.33	.14	.22	.24	.22	.12	.51	.20	.13	.27	.14	.30	.08	.19
LS6						.26	.30	.08	.03	.20	-.01	.14	.10	-.03	.02	.09	.00	.13	.18	.03	.06	.14	.20	.01	.04	.06	-.07	.04	.17	.14	.23	.05
LS7							.58	.24	.23	.22	.23	.12	.20	.25	.20	.25	.17	.31	.31	.22	.20	.09	.21	.01	.12	.19	.12	.19	.11	.26	.16	.15
LS8								.24	.30	.24	.32	.19	.29	.19	.16	.19	.18	.30	.29	.28	.25	.12	.28	-.03	.20	.18	.17	.21	.22	.22	.20	.13
LS9									.28	.12	.20	.19	.29	.22	.19	.20	.04	.47	.23	.42	.17	.19	.28	.11	.07	.22	.35	.24	.12	.15	.22	.16
LS10										.19	.34	.25	.29	.16	.18	.30	.15	.48	.19	.40	.40	.21	.44	.04	.12	.26	.30	.17	.15	.33	.18	.24
MF1											.18	.35	.15	.09	.09	.00	.07	.11	.11	.23	.15	.15	.22	.15	.13	.15	.19	.12	.21	.17	.23	.17
MF2												.22	.29	.26	.26	.32	.34	.21	.21	.16	.21	.21	.26	.13	.23	.23	.26	.20	.15	.32	.14	.31
MF3													.47	.37	.33	.10	.18	.26	.14	.31	.20	.23	.29	.29	.18	.33	.38	.31	.24	.27	.26	.22
MF4														.35	.23	.22	.18	.37	.16	.29	.30	.19	.28	.28	.12	.42	.41	.25	.20	.38	.18	.30
MF5															.60	.30	.28	.22	.26	.20	.15	.25	.17	.21	.23	.23	.26	.20	.05	.21	.22	.14
MF6																.31	.23	.20	.25	.09	.04	.26	.18	.11	.11	.19	.22	.19	-.04	.22	.22	.25
MF7																	.14	.33	.34	.15	.21	.14	.22	.07	.18	.21	.17	.10	-.02	.25	.09	.18
MF8																		.15	.23	.18	.29	.28	.27	.15	.37	.33	.31	.42	.24	.37	.18	.32
CP1																			.28	.35	.19	.23	.34	.03	.13	.35	.30	.26	.11	.29	.16	.20
CP2																				.19	.19	.13	.13	.02	.16	.32	.17	.21	.22	.13	.22	.15
CP3																					.29	.18	.30	.17	.15	.31	.32	.29	.24	.23	.21	.31
CP4																						.32	.34	.03	.30	.38	.27	.29	.15	.36	.25	.20
CP5																							.44	.13	.28	.36	.29	.29	.24	.34	.23	.31
CP6																								.17	.22	.27	.32	.31	.18	.43	.29	.27
II1																									.22	.26	.29	.31	.14	.21	.17	.14
II2																										.37	.15	.32	.25	.27	.06	.12
II3																											.51	.46	.38	.40	.20	.36
II4																												.53	.36	.44	.23	.42
II5																													.46	.49	.20	.32
II6																														.37	.21	.20
II7																															.29	.42
DM1																																.31
DM2																																

R CODE USED FOR THE STATISTICAL ANALYSIS

```
# Amelia II: A Program for Missing Data
library(Amelia)
AmeliaView() # opens GUI
# import data, select all, right-click 'Transformation', select from '
   Add Transformation', 'Ordinal'
# default is M5 imputation, set output options, saves, e.g., 5 *.csv
   files in R's work directory.

data <- Inst_ABC_data_CMAR_N_206_imp5[,1:33]
data_227 <- Inst_ABC_data_CMAR_N_227[,1:33]
data <- data_227
data <- data_227[complete.cases(data_227),]

raqMatrix<-cor(data)
round(raqMatrix, 2)

# Kaiser-Meyer-Olkin sampling adequacy
# use na.omit "KMO(na.omit(data))" if data is missing
library(psych)
KMO(data)

# Bartlett's Test of Homogeneity of Variances
bartlett.test(data)
# Bartlett's Test of Sphericity
library(REdaS)
bart_spher(data)
# Bartlett's Correlation Test
cortest.bartlett(data)

# Correlation, Pearson's r
cor(data, method = c("pearson"))
options(max.print = 10000) # otherwise long lists are cut off
data_upper<-round(cor(data, method = c("pearson")),2)
data_upper[lower.tri(data_upper, diag=TRUE)]<-""
data_upper<-as.data.frame(data_upper)
data_upper
write.csv(data_upper, file = "data206_pearson__upper.csv")

# Determinant
det(cor(data))

# Principal Component Analysis
library(GPArotation)
# To examine Eigenvalues run principal with all variables
pc1 <- principal(data, nfactors = 33, rotate = "none")
pc1
```

```
# To investigate loadings run principal with different numbers of
    factors
pc2 <- principal(data, nfactors = 5, rotate = "varimax")
pc2 <- principal(data, nfactors = 5, rotate = "oblimin")
print.psych(pc2, cut = 0.3, sort = FALSE)
print.psych(pc2, cut = 0.3, sort = TRUE)

# caluclating residuals based on PCA
factor.model(pc2$loadings)
factor.residuals(raqMatrix, pc2$loadings)
residuals<-factor.residuals(raqMatrix, pc2$loadings)
residuals<-as.matrix(residuals[upper.tri(residuals)])
large.resid<-abs(residuals) > 0.05
sum(large.resid)
sum(large.resid)/nrow(residuals)
sqrt(mean(residuals^2))
hist(residuals)

# Non Graphical Solutions to Scree Test, run multiple times, results
    vary!
library(nFactors)
ev <- eigen(cor(data)) # get eigenvalues
ap <- parallel(subject=nrow(data),var=ncol(data),
            rep=100,cent=.05)
nS <- nScree(x=ev$values, aparallel=ap$eigen$qevpea)
plotnScree(nS)

# MAP TEST
nfactors(data, rotate = "varimax", fm="mle", n.obs = 206)

# Factor Analysis
fa5comp <- factanal(data, factor=5, rotation="varimax")
print(fa5comp)

# Communalities
1- fa5comp$uniquenesses

# Print and Export FA
print(fa5comp, digits=2, cutoff=.3, sort=TRUE)
write.csv(loadings(fa5comp), 'fa5comp-loadings.csv')

# Confirmatory Factor Analysis (Lavaan)
library(lavaan) # to not load toghether with library(SEM)
library(foreign)
model_lav_5A <-'
# measurement model_lav_5A
  F1 =~ II3 + II4 + II5 + II6 + II7 + CP5 + DM2
  F2 =~ LS1 + LS3 + LS5 + LS2 + LS4 + MF2 + MF7 + CP2
  F3 =~ LS9 + LS10 + CP1 + CP3
  F4 =~ LS7 + LS8
  F5 =~ MF5 + MF6
```

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```
# regressions
 F1 ~~ F1
 F2 ~~ F2
 F3 ~~ F3
 F4 ~~ F4
 F5 ~~ F5'

fit.5_Factor_Model_5A <- cfa(model_lav_5A, ordered = c('LS1','LS2',
         'LS3','LS4','LS5','LS7','LS8','LS9','LS10',
         'II1','II3','II4','II5','II6','II7',
         'MF2','MF4','MF5','MF7',
         'CP1','CP2','CP3','CP5',
         'DM2'), data, sample.nobs = 206,
              parameterization = "theta",
              estimator = "DWLS")

fitMeasures(fit.5_Factor_Model_5A, c("chisq","df","pvalue","cfi","rmsea
   ","srmr","nnfi","tli","gfi"))

summary(fit.5_Factor_Model_5A, fit.measures=TRUE, standardized=TRUE,)

parameterEstimates(fit.5_Factor_Model_5A, standardized=TRUE)

# Extract factor loadings
factor.loadings <- inspect(fit.5_Factor_Model_5A, what="std")$lambda
factor.loadings
print(factor.loadings, digits=2, cutoff=.3, sort=TRUE)

# Possible modification
mi <- modindices(fit.5_Factor_Model_5A)
mi
str(data)

# Cronbach's
alpha(data[c('II3','II4','II5','II6','II7','CP5','DM2')],check.keys=TRUE
   )
alpha(data[c('LS1','LS3','LS5','LS2','LS4','MF7','CP2')],check.keys=TRUE
   )
alpha(data[c('LS9','LS10','CP1','CP3')],check.keys=TRUE)
alpha(data[c('LS7','LS8')],check.keys=TRUE)
alpha(data[c('MF5','MF6')],check.keys=TRUE)
```

ORCID iD

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