IDENTIFYING FACTORS INFLUENCING THE ACCEPTANCE OF PROCESSES: AN EMPIRICAL INVESTIGATION USING THE STRUCTURAL EQUATION MODELING APPROACH

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ABSTRACT

IDENTIFYING FACTORS INFLUENCING THE ACCEPTANCE OF PROCESSES: AN EMPIRICAL INVESTIGATION USING THE STRUCTURAL EQUATION MODELING APPROACH

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In this research, it was mainly aimed to develop an acceptance model for processes, namely the process acceptance model (PAM). For this purpose, a questionnaire, comprising 3-part and 81-question, was developed to collect quantitative and qualitative data from people having relationships with certain process-focused models and/or standards (CMMI, ISO 15504, ISO 9001, ISO 27001, AQAP-160, AQAP-2110, and/or AS 9100). To revise and refine the questionnaire, expert reviews were ensured, and a pilot study was conducted with 60 usable responses. After reviews, refinements and piloting, the questionnaire

was deployed to collect data and in-total 368 usable responses were collected from the people. Here, collected data were screened concerning incorrectly entered data, missing data, outliers and normality, and reliability and validity of the questionnaire were ensured. Partial least squares structural equation modeling (PLS SEM) was applied to develop the PAM. In this context, exploratory and confirmatory factor analyses were applied, and the initial model was estimated and evaluated. The initial model was modified as required by PLS SEM, and confirmatory factor analysis was repeated, and the modified final model was estimated and evaluated. Consequently, the PAM, with 18 factors and their statistically significant relationships, was developed. Furthermore, descriptive statistics and t-tests were applied to discover some interesting, meaningful, and important points to be taken into account regarding the acceptance of processes. Moreover, collected quantitative data were analyzed, and three additional factors were discovered regarding the acceptance of processes. Besides, a checklist to test and/or promote the acceptance of processes was established.

Keywords: Process Acceptance Model (PAM), Capability Maturity Model Integration (CMMI), Partial Least Squares Structural Equation Modeling (PLS SEM), International Organization for Standardization (ISO), and Technology Acceptance Model (TAM).

ÖZ

SÜREÇLERİN BENİMSENMESİNİ ETKİLEYEN FAKTÖRLERİN BELİRLENMESİ: YAPISAL EŞİTLİK MODELİ YAKLAŞIMINI KULLANAN GÖRGÜL BİR ÇALIŞMA

DEĞERLİ, Mustafa

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Tez Yöneticisi: Doç. Dr. Sevgi ÖZKAN

Mayıs 2012, 260 sayfa

Bu araştırmada süreç benimseme modeli (SBM) adı verilen bir benimseme modelinin geliştirilmesi temel olarak amaçlanmıştır. Bu amaçla süreç temelli bazı model ve/veya standartlarla (CMMI, ISO 15504, ISO 9001, ISO 27001, AQAP-160, AQAP-2110 ve/veya AS 9100) ilişkisi olan bireylerden nicel ve nitel veri toplamak üzere 3 bölüm ve 81 sorudan oluşan bir anket geliştirilmiştir. Anketi gözden geçirmek ve iyileştirmek amacıyla uzman gözden geçirmeleri sağlanmış ve 60 ayrı kullanılabilir veri ile bir pilot uygulama yapılmıştır. Gözden geçirmeler, iyileştirmeler ve pilot çalışma sonrasında, veri toplamak üzere anket uygulanmış

ve toplamda 368 kişiden kullanılabilir veri toplanmıştır. Bu aşamada toplanan veriler yanlış veri girişi, eksik veri, aykırı değerler ve normal dağılım açısından gözden geçirilmiş ve değerlendirilmiş, ayrıca anketin güvenilirlik ve geçerliliği sağlanmıştır. Süreç benimseme modelini geliştirilmek için parçalı en küçük kareler yapısal eşitlik modeli (PLS SEM) uygulanmıştır. Bu bağlamda açıklayıcı ve doğrulayıcı faktör analizleri uygulanmış ve başlangıç model tahmin edilmiş ve değerlendirilmiştir. PLS SEM de gerektirdiği için, başlangıç model değiştirilmiş ve iyileştirilmiş, doğrulayıcı faktör analizi tekrarlanmış ve değiştirilmiş ve iyileştirilmiş nihai model tahmin edilmiş ve değerlendirilmiştir. Sonuç olarak 18 faktör ve bunlar arasındaki istatistiksel olarak anlamlı ilişkilerden oluşan SBM geliştirilmiştir. Ayrıca betimsel istatistik ve t-test uygulanarak süreçlerin benimsenmesi hakkında dikkate alınması gereken bazı ilginç, anlamlı ve önemli noktalar açığa çıkarılmıştır. Ayrıca toplanan nitel veriler analiz edilmiş ve bunun sonucunda süreçlerin benimsenmesi ile ilişkili üç faktör daha belirlenmiştir. Bunlara ek olarak, süreçlerin benimsenmesinin test edilmesi ve/veya sağlanması için bir kontrol listesi oluşturulmuştur.

Anahtar Kelimeler: Süreç Benimseme Modeli (SBM), Entegre Yetenek Olgunluk Modeli (CMMI), Parçalı En Küçük Kareler Yapısal Eşitlik Modeli (PLS SEM), Uluslararası Standardizasyon Kuruluşu (ISO) ve Teknoloji Benimseme Modeli (TAM).

To a better world for all…

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LIST OF ABBREVIATIONS

Abbreviations used in the documentation of the subject research and long forms of these are alphabetically listed below.

AIC	Anti-image Correlation Matrix
AQAP	Allied Quality Assurance Publication
AS	Aerospace Standard
AUD	Audit
AVE	Average Variance Extracted
AVR	Average
AWC	Academic Writing Center
BI	Behavioral Intention
CFA	Confirmatory Factor Analysis
CMM	Capability Maturity Model
CMMI	Capability Maturity Model Integration
CMU	Carnegie Mellon University
CONT	Continent
CP	Certifications Participated in
CR	Composite Reliabilities
CW	Certifications of Worked Organization
df	Degrees of Freedom
DoD	Department of Defense
EFA	Exploratory Factor Analysis

EL	Education Level
EV	Eigenvalue
EXP	Experience
FC	Facilitating Conditions
FG	Field from which Graduated
FW	Field in which Working
GEN	Gender
GRN	Granularity
H	Hypothesis
IBM	International Business Machines Corporation
ID	Identifier
IDT	Innovation Diffusion Theory
IEC	International Electrotechnical Commission
II	Informatics Institute
IS	Information System
ISMS	Information Security Management Systems
ISO	International Organization for Standardization
IT	Information Technology
JR	Job Relevance
KMO	Kaiser-Meyer-Olkin
M	Mean
MCS	Management Commitment and Sponsorship
MDL	Modeling
MDLA	Modeling (Descriptive)
MDLB	Modeling (Prescriptive)
MEAS	Measurement
MED	Medium
METU	Middle East Technical University
ML	Maximum Likelihood
MM	Motivational Model

MPCU	Model of Personal Computer Utilization
MSA	Measuring of Sampling Adequacy
N	Number
N/A	Not Applicable
NATO	North Atlantic Treaty Organization
OC	Organizational Culture
OM	Operations and Maintenance
OQ	Output Quality
OR	Outputs & Results
OT	Organization Type
OU	Objective Usability
PAF	Principal Axis Factoring
PAM	Process Acceptance Model
PC	Principal Components Method
PCI	Perceived Characteristics of Innovating
PD	Participation in Development
PEOU	Perceived Ease of Use
PFA	Principal Factor Analysis
PLS	Partial Least Square
PU	Perceived Usefulness
QA	Quality Assurance
QMMG	Quality Management Maturity Grid
QMS	Quality Management Systems
RaR	Review and Refinement
RD	Results Demonstrability
RPE	Role in Performance Evaluation
SBM	Süreç Benimseme Modeli
SD	Standard Deviation
SDI	Strategic Defense Initiative
SEI	Software Engineering Institute

SEM	Structural Equation Modeling
Sig.	Significance
SN	Subjective Norm
SPI	Software Process Improvement
SPICE	Software Process Improvement and Capability dEtermination
SPSS	Statistical Package for the Social Sciences
SSSP	Six Software Subcultural Patterns
STB	Stability
Std.	Standard
TA	Technology Acceptance
TAM	Technology Acceptance Model
TLR	Tailoring
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TRN	Training
UTAUT	Unified Theory of Acceptance and Use of Technology
Var.	Variances

CHAPTER I

INTRODUCTION

In this chapter, the introductory information with respect to this study is provided. In this context,

- Section 1.1 provides the background and statement of the problem for the subject study,
- Section 1.2 supplies the research question and addressed issues for the content and context of the subject study, and
- Section 1.3 presents the overall evolution and progress of the subject study.

1.1 Background and Statement of the Problem

There are researches and studies to explain the factors that influence the adoption and/or acceptance of variety of subjects or technologies by means of variety of models and/or theories concerning the individual's adoption and/or acceptance. For instance, Rogers's (2003) innovation diffusion theory (IDT), Fishbein and Ajzen's (1975) theory of reasoned action (TRA), Davis, Bagozzi, and Warshaw's (1989) technology acceptance model (TAM), Thompson, Higgins, and Howell's (1991) model of personal computer utilization (MPCU), Davis, Bagozzi, and Warshaw's (1992) motivational model (MM), Ajzen's (1991) theory of planned behavior (TPB), Taylor and Todd's (1995) combined TAM-TPB, Campeau and Higgins's (1995) social cognitive theory (SCT) application, Venkatesh and

Davis's (2000) technology acceptance model 2 (TAM 2), Venkatesh, Morris, Davis, F., and Davis, G.'s (2003) unified theory of acceptance and use of technology (UTAUT), and Venkatesh and Bala's (2008) technology acceptance model 3 (TAM 3) are the certain major models and/or theories exploited and employed to explain the acceptance for certain contents and contexts.

As pointed out by Dillon and Morris (1996), technology acceptance is the user acceptance. It can be expressed as the perceptible inclination of the users for using information technologies designed for the tasks that they are anticipated to support. Demonstrable willingness of the users to use related systems must be achieved and ensured for the acceptance, as Dillon and Morris claim. Furthermore, Dillon and Morris note that every acceptance process for envisioned purposes can be modeled and predicted. What is more, in this context, Davis (1993) suggests that acceptance is the key factor that determines whether a project or system is to be successful or not.

Undoubtedly, projects or systems are going to be useless or meaningless unless they are accepted by intended users for intended purposes. Managerial decision making and effective enactment policies can be supported via identifying interferences influencing the acceptance and use of new projects or systems (Jasperson, Carter, & Zmud, 2005). Therefore, managers or responsible people must develop and implement effective interventions with the aim of taking full advantage of employees' acceptance and use for the designated systems or contexts. Accordingly, acceptance matters, since it is to govern the success of the systems directly.

Today, organizations are constantly interested in standards and models based on processes with the purpose of achieving their strategic goals and objectives, and in order to ensure their projected performance objectives, quality objectives, return on investment objectives.

Having a lot of technological and infrastructural facilities, organizations, in this century, are required to build and deliver ever more complex products and services ever improved, quicker, and economical for the customers. Nowadays, generally, components of a product or service are not developed by a single unit of an organization or by a single company; rather some parts are built internally and some other parts are acquired from different units or companies, and then integrations are executed to achieve the ultimate and absolute products and/or services. In such settings and circumstances, organizations are required to cope with and regulate these multifarious processes to survive and provide products and/or services for their customers (Chrissis, Konrad, & Shrum, 2006).

To get the best out of the personnel's productivity and throughputs, and to make best use of the use of technology and systems with the aim of being more competitive in order to deal with an ever-changing world and sector realities, a focus on process (process-focus) delivers the expected groundwork. Manufacturing industry acknowledged the importance of process effectiveness and efficiency, and the benefits of process-focus for many years (Chrissis, et al., 2006).

An integrated approach is needed for the organizations providing enterprise-wide solutions. Therefore, organizational assets shall be commendably managed via an integrated approach for business success. Happily, maturity models, standards, methodologies, and guidelines are there for these organizations to improve the way they do business in such settings. The Carnegie Mellon University (CMU)'s Software Engineering Institute (SEI) utters that there are three critical dimensions that organizations typically come to grips with to improve their businesses with the purpose of developing and/or maintaining quality products and services. These are simply procedures and methods, people, and tools and equipment. However, these three core and critical dimensions are kept together by means of processes. Processes are there in order to align the manner for doing business, to provide and ensure scalability, to ensure a method to incorporate the understanding of how to do things better-quality and value-added, to weight staff, infrastructure and other

resources, and to observe business and understand trends regarding the businesses (Garcia & Turner, 2006; Chrissis, et al., 2006).

The principle for process management "the quality of a system or product is highly influenced by the quality of the process used to develop and maintain it," has been taken by the SEI of CMU, and the confidence in this substantiation is appreciated internationally in quality engagements, as demonstrated by a variety of body of standards, models, guidelines, and etc. (Chrissis, et al, 2006).

Consequently, individuals' acceptance of processes is invaluable and vital. Clearly, there is a need to determine the factors influencing the acceptance of processes.

1.2 Research Question and Addressed Issues

The principal research question meant for this research:

- "***What are the factors influencing the acceptance of processes***?"

In this context, specifically below listed issues were addressed in the scope of the subject study:

- What are the factors influencing the acceptance of processes?
- What are the accompanying items ensuring the factors influencing the acceptance of processes?
- What are the interactions of the factors influencing the acceptance of processes?
- What is the inclusive appearance of the acceptance model comprising the factors influencing the acceptance of processes?
- What are the statistically significant relationships, and descriptive and inferential findings to be discovered in the course of the development of an acceptance model aimed at determining factors influencing the acceptance of processes?
- What are the outcomes of quantitative and qualitative analyses aimed at determining the factors influencing the acceptance of processes?

1.3 Evolution of the Study

The first steps started with the literature review on the subjects of acceptance and process. After reviewing relatable literature, constructs were defined and hypotheses were formed on behalf of the acceptance of processes content and context. This step was tailed by model development and proposal. After model proposal, the instrument was developed. Throughout and after development of the instrument (questionnaire), content validity of the instrument was assured. This step was followed by granting ethical permission to deploy the questionnaire. Once obtaining the ethical permission for the deployment, the instrument was deployed and some data were collected for the pilot study. Subsequent to this step, collected data for the pilot study were analyzed and evaluated. Subsequently, the questionnaire was deployed and data were collected for the main study. Successively, collected data for the whole study were analyzed regarding descriptive statistics. After descriptive statistics analyses, the whole collected data were screened with respect to incorrect entry, missing data, outliers, and normality. Then, reliability of the instrument was tested based on the whole collected data. After ensuring the reliability, an exploratory factor analysis (EFA) was applied. After this, a confirmatory factor analysis (CFA) was applied. Subsequent to the applied CFA, a model (initial) was estimated and evaluated. After first estimation and evaluation, the model was modified. Then, the modified model was again subjected to CFA. After this CFA, the model (modified final) was again estimated and evaluated. Following this, descriptive statistics and t-tests were used for additional findings based on the collected data. In addition to those, the collected qualitative data were also analyzed qualitatively. After all, conclusions were documented.

The overall evolution of the subject study is illustrated and provided in Figure 1.1.

Comprehensive details for each of the applied steps during the whole progress of this research are given in the following chapters.

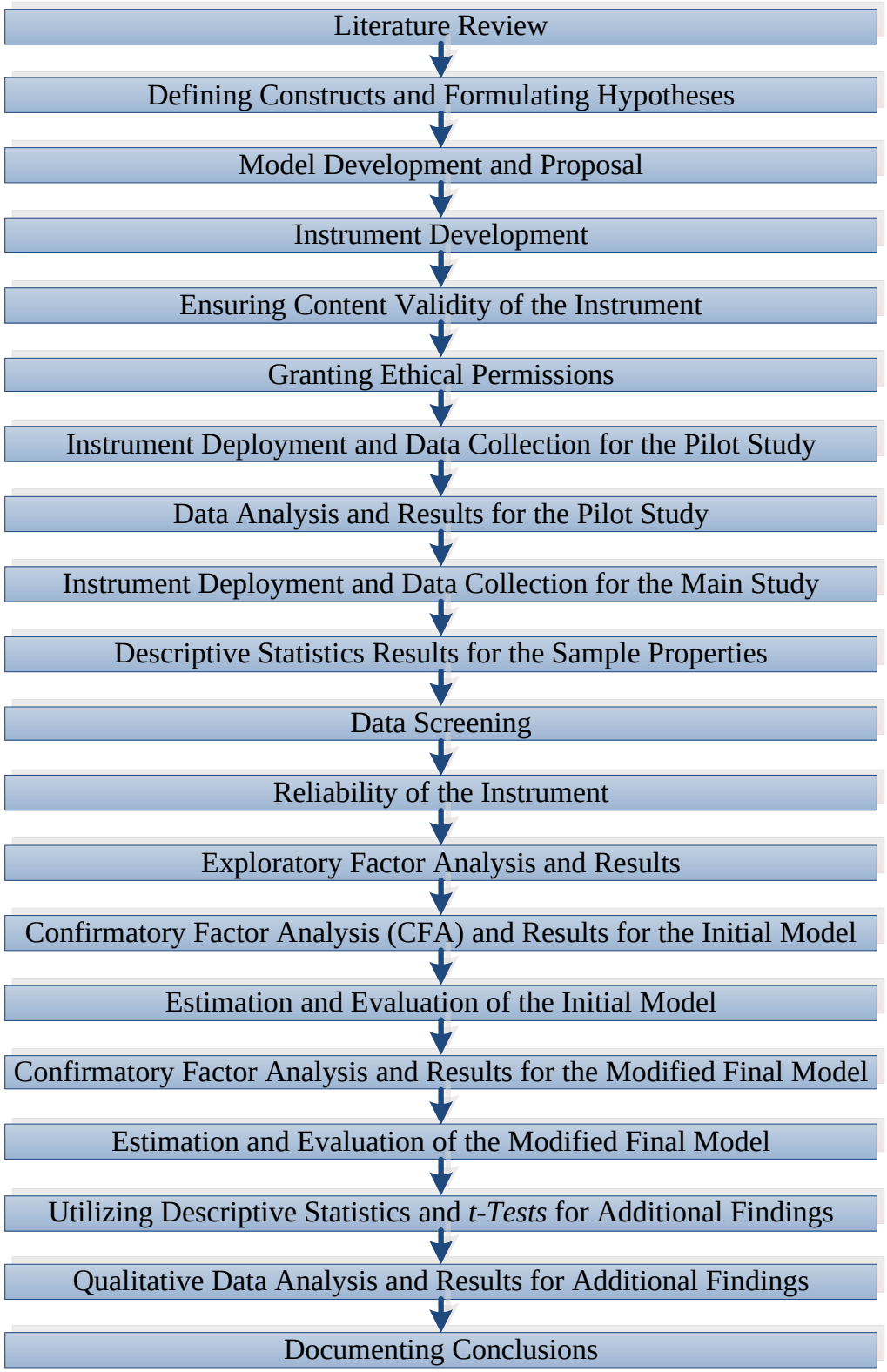


Figure 1.1: Overall Evolution of the Study

CHAPTER II

LITERATURE REVIEW

In this chapter, the literature reviewed in the context of this research is provided. In this context,

- Section 2.1 provides the core and synthesized concepts and information regarding the technology acceptance models and theories intended for the sake of this study,
- Section 2.2 provides the fundamental and synthesized concepts and facts regarding the synthesis of the literature on processes, and fascinated standards and model meant for the sake of this study,
- Section 2.3 presents some related previous researches and studies by some researchers regarding the process acceptance content and context, and
- Section 2.4 gives the summary of the literature review.

Despite the fact that certain pertinent literature review was provided in this chapter, further literature justifications and information are included in the following chapters, as applicable.

2.1 Synthesis of the Literature on Technology Acceptance Models and Theories

2.1.1 Definition and Prominence of the Acceptance

As pointed out by Dillon and Morris (1996), technology acceptance (TA) is the user acceptance which can be expressed as the discernable willingness of the users to use information technology (IT) for the aims that it is envisioned to aid. Demonstrable willingness of the users to use related IT must be reached for TA, as Dillon and Morris argue. What's more, Dillon and Morris also note that every TA process for envisioned purposes can be modeled and predicted. Honestly, this is a promising statement; as Dillon and Morris argue that thanks to TA theory, it is possible to model and predict any intended ITs' TA. Moreover, in this context, Davis (1993) suggests that TA is the key factor that determines whether an information system (IS) or IT project is to be successful or not.

Surely, IT or IS projects are going to be useless and meaningless unless they are accepted by the intended users for intended purposes. Identifying intermediations influencing the acceptance and use of projects can aid executives on decision-making for effective and efficient enactment policies (Jasperson et al., 2005). Therefore, managers or responsible people must develop and implement effective interventions with the aim of taking full advantage of employees' acceptance and use for the designated systems or contexts. Consequently, the acceptance matters, since it is to govern the success of the systems unswervingly.

2.1.2 Models and Theories for Acceptance

There are models and theories trying to explain and shape the TA process and its characteristics. For instance, as said by Rogers (1995), innovation diffusion theory (IDT) says that there are five characteristics of a technology that determine an IT's or IS's TA. These are trialability, complexity, compatibility, relative advantage, and observability. As said by Rogers, with the proviso that these five concerns are

took seriously and managed well, related IT or IS is to be accepted by intended users aimed at intended purposes.

Additionally, Davis, Bagozzi, and Warshaw (1989)'s Technology Acceptance Model (TAM), Ajzen (1991)'s Theory of Planned Behavior (TPB), Venkatesh and Davis (2000)'s Technology Acceptance Model 2 (TAM 2), and Venkatesh, Morris, F. Davis, and G. Davis (2003)'s Unified Theory of Acceptance and Use of Technology (UTAUT) are the models in the literature, customarily used to design, implement and test TA of IT or IS.

Of these models, the most usually cited one is the Davis et al.'s TAM. Their work not only provides a major contribution to the TA literature, but this model is used as a reference by other studies. TAM of Davis et al. predicts that TA of any IT is determined by two factors. These are perceived ease of use (PEOU) and perceived usefulness (PU) and. PEOU can be expressed as a degree to which the users consider that using a system or project will be easy and stress-free. Moreover, PU can be expressed as a degree to which users consider that using a system or project will improve performance regarding the intended purpose. In accordance with TAM, both PU and PEOU have major impacts on a users' attitude toward using the IT and determining its TA.

The illustrations of the models related with TA, Davis et al.'s TAM (1989), Ajzen's TPB (1991), Venkatesh and Davis's TAM 2 (2000), and Venkatesh et al.'s UTAUT (2003), are provided below in Figures 2.1, 2.2, 2.3, 2.4.

Additionally, definitions of the constructs/variables used in these models/figures are provided in Table 2.1. Definitions are provided to reflect the theoretical explanations for the items included in the models and/or theories for acceptance contexts. As these TA models are central to understand the TA studies, it is worthy to examine the below figures (Figures 2.1, 2.2, 2.3, and 2.4).

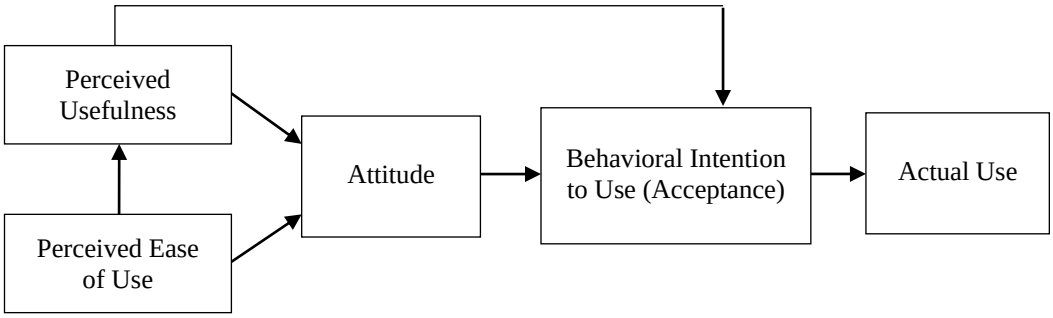


Figure 2.1: Illustration of TAM

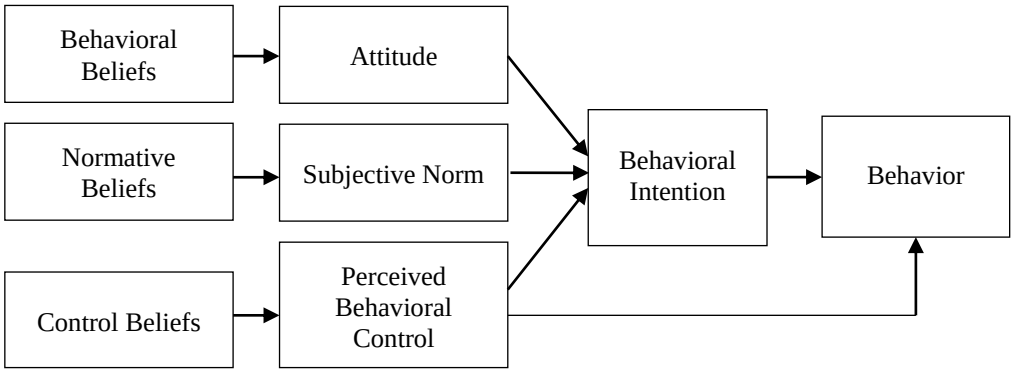


Figure 2.2: Illustration of TPB

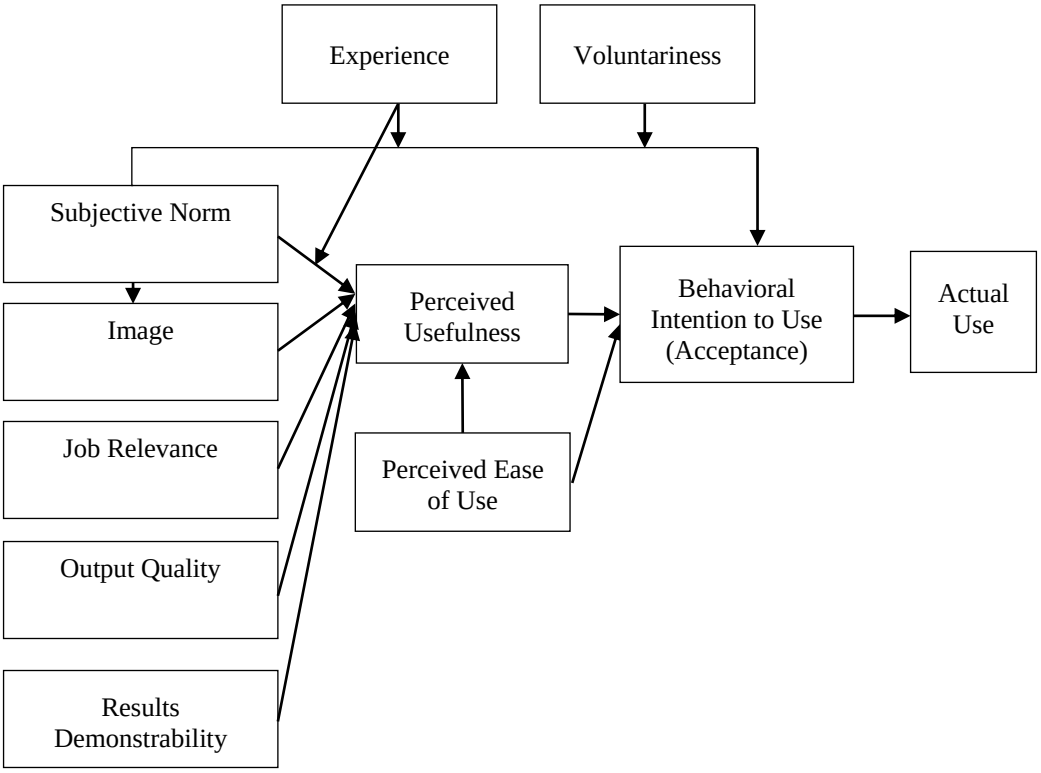


Figure 2.3: Illustration of TAM 2

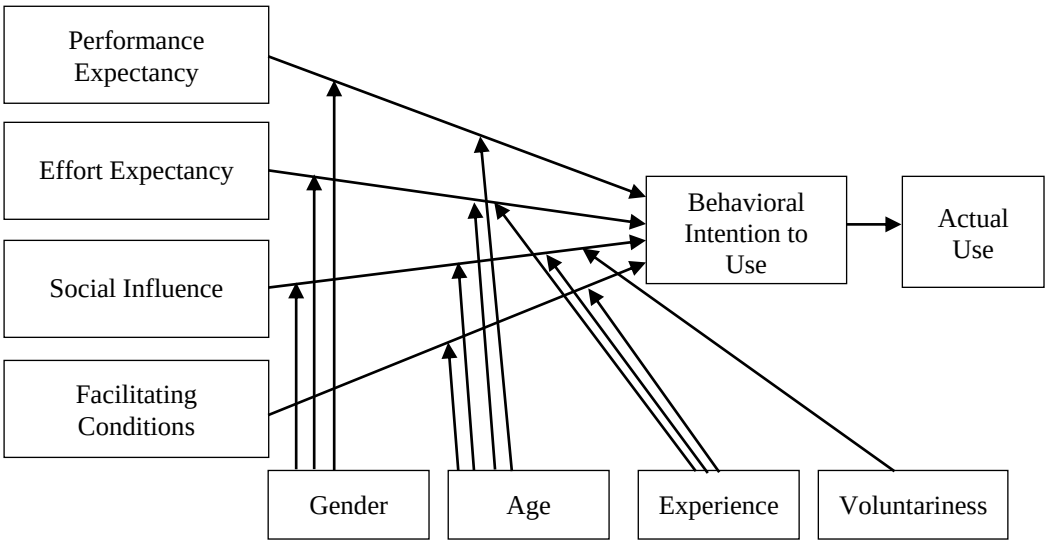


Figure 2.4: Illustration of UTAUT

Recently, there is another technology acceptance model by Venkatesh and Bala (2008). This extended model, called TAM 3, added new constructs to the TAM 2 to broaden and clear the perceived usefulness part of the TAM 2. New added constructs via TAM 3 are Computer Self-efficacy, Perceptions of External Control, Computer Anxiety, Computer Playfulness, Perceived enjoyment, and Objective Usability. All these are added to clarify the factors that affect Perceived Ease of Use part of the model. Model view is presented in Figure 2.5.

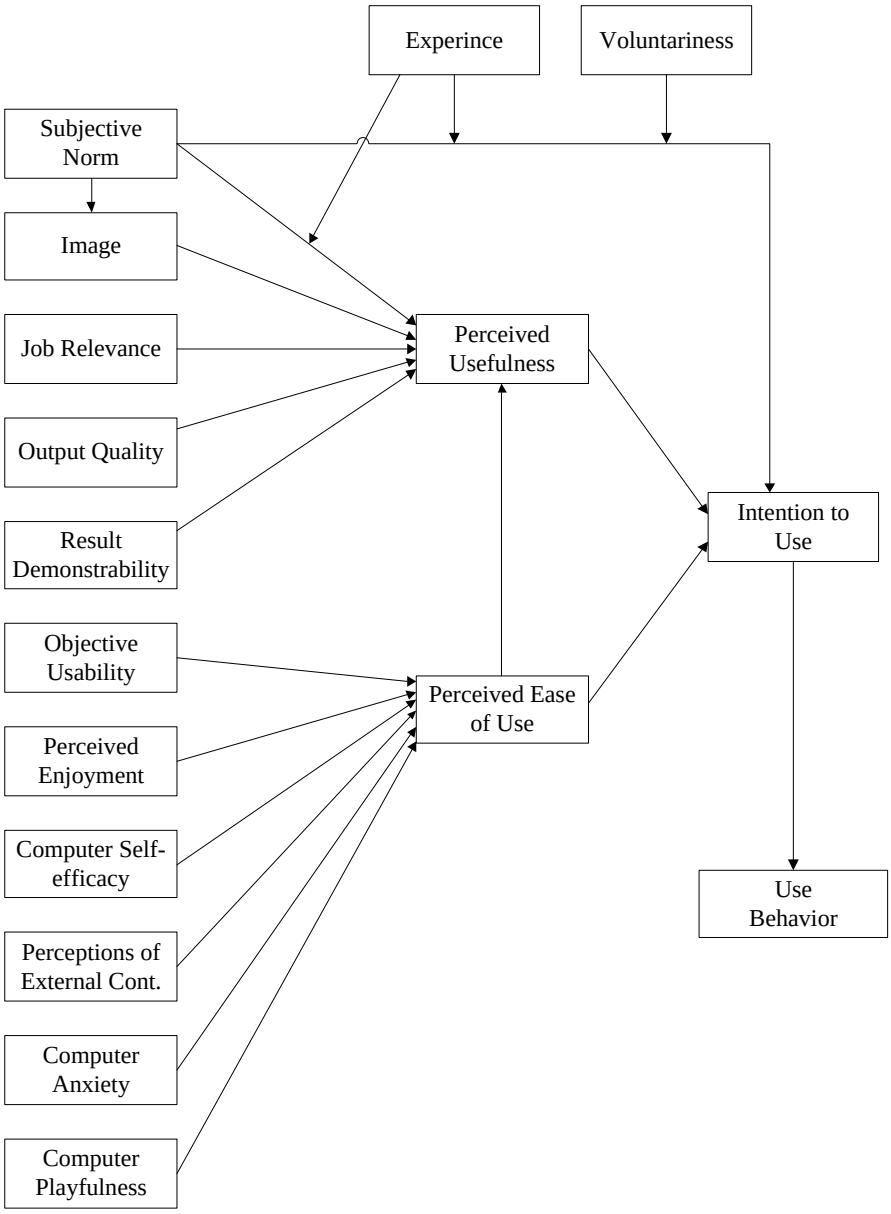


Figure 2.5: Illustration of TAM 3

Table 2.1: Definitions of Variables/Constructs

Variable	Definition
Attitude	"An individual's evaluative judgment of the target behavior on some dimension (e.g., good/bad, harmful/beneficial, pleasant/unpleasant)" (Davis, et al., 1989; Ajzen, 1991).
Behavioral Beliefs	"An individual's belief about consequences of particular behavior" (Ajzen, 1991).
Behavioral Intention	"One specific behavior of interest performed by individuals with regard to some IT system" (Davis, et al., 1989; Ajzen, 1991; Venkatesh & Davis, 2000; Venkatesh, et al., 2003; Venkatesh & Bala, 2008).
Computer Anxiety	"The degree of an individual's apprehension, or even fear, when she/he is faced with the possibility of using computers" (Venkatesh & Bala, 2008).
Computer Playfulness	"The degree of cognitive spontaneity in microcomputer interactions" (Venkatesh & Bala, 2008).
Computer Self-efficacy	"The degree to which an individual beliefs that he or she has the ability to perform specific task/job using computer" (Venkatesh & Bala, 2008).
Control Beliefs	"An individual's beliefs about the presence of factors that may facilitate or impede performance of the behavior" (Ajzen, 1991).
Effort Expectancy	"An individual's perception that using an IT system will be free of effort" (Venkatesh, et al., 2003).

Table 2.1 (continued).

Facilitating Conditions	"An individual's perception of how easy or difficult it will be to perform the target behavior (self-efficacy), of factors that impede or facilitate the behavior (facilitating conditions), or of the amount of control that one has over performing the behavior (controllability)" (Venkatesh, et al., 2003).
Image	"The degree to which one perceives the use of the technology as a means of enhancing one's status within a social group" (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).
Job Relevance	"An individual's perception of the degree to which the technology is applicable to his or her job" (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).
Normative Beliefs	"An individual's perception about the particular behavior, which is influenced by the judgment of significant others" (Ajzen, 1991).
Objective Usability	"A comparison of systems based on the actual level (rather than perceptions) of effort required to complete specific tasks" (Venkatesh & Bala, 2008).
Output Quality	"An individual's perception of how well a system performs tasks necessary to his or her job" (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).

Table 2.1 (continued).

Perceived Behavioral Control	"An individual's perception of how easy or difficult it will be to perform the target behavior (self-efficacy), of factors that impede or facilitate the behavior (facilitating conditions), or of the amount of control that one has over performing the behavior (controllability)" (Ajzen, 1991).
Perception of External Control	Same delineation with the facilitating conditions construct/variable.
Performance Enjoyment	"The extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use" (Venkatesh & Bala, 2008).
Perceived Ease of Use	"An individual's perception that using an IT system will be free of effort" (Davis, et al., 1989; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).
Perceived Usefulness	"An individual's perception that using an IT system will enhance job performance" (Davis, et al., 1989; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).
Performance Expectancy	"An individual's perception that using an IT system will enhance job performance" (Venkatesh, et al., 2003).
Results Demonstrability	"The tangibility of the results of using the technology" (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).

Table 2.1 (continued).

Social Influence	"The degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh, et al., 2003).
Subjective Norm	"An individual's perception of the degree to which important other people approve or disapprove of the target" (Ajzen, 1991; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008).
Voluntariness	"The extent to which potential adopters perceive the adoption decision to be non-mandatory" (Venkatesh & Bala, 2008).

2.2 Synthesis of the Literature on Processes, and Fascinated Standards and Model

2.2.1 Definition of the Process

Process is a set of organized activities transforming inputs into outputs, with the purpose of accomplishing a prearranged aim. There are "process," "subprocess" and "process element" terms used, forming like a pecking order. Process stays at the top, the broadest term, subprocess is under process, and process element as the most specific and more detailed (CMMI Product Team, 2010). An all-purpose appearance of a process can be illustrated as given in Figure 2.6.

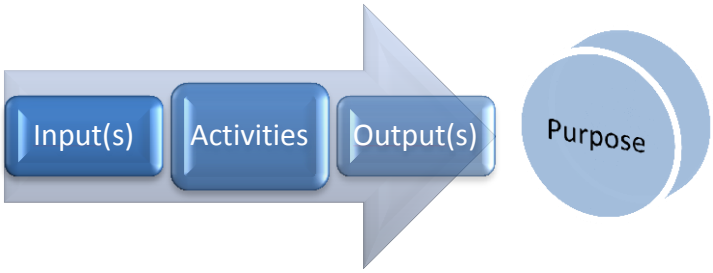


Figure 2.6: Illustration of a Process

A good process is characteristically defined using certain components given in Table 2.2 (Persse, 2007). A defined-process have devoted parts for purpose, inputs, outputs, roles, measures, entry criteria, exit criteria, activities, and verification steps (CMMI Product Team, 2010).

Table 2.2: The Components of a Well-Designed Process

Purpose	Objective of a process.
Actors/Roles	Roles needed to accomplish activities of a process.
Entry criteria	Situations and settings that need to be ready and/or achieved before process accomplishments can start.
Inputs	Documents and/or products that need to be ready and/or referenced before process accomplishments can start.
Steps	Step-wise sequence of process activities.
Verification steps	Stages to confirm whether a process is implemented or not.
Output	Documents and/or products to be created and/or formed by process activities.
Exit criteria	Situations and settings that shall happen when a process is implemented.
Measures	Measures required to be collected once a process is implemented.

2.2.2 Significance of Processes

Having a lot of technological and infrastructural facilities and opportunities, in this (21^{st}) century, organizations are required to build and deliver ever more multifaceted products and/or services ever improved, quicker, and economical for their customers and consumers. Nowadays, generally, components of a product or

service are not developed by a single unit of an organization or by a single company; rather some parts are built internally and some other parts are acquired from different units or companies, and then integration is performed to produce and realize the ultimate and absolute products or services. In such settings and circumstances, organizations are required to cope with and regulate these multifarious and composite development and/or maintenance processes to survive and provide products or services for their customers (Chrissis et al., 2006).

Shewhart (1931) began working in process improvement by means of principles of statistical quality control to know more about the quality factors and their statistical relationships. After Shewhart, these principles were refined by Deming (1986), Crosby (1979), and Juran (1988) (CMMI Product Team, 2010). To get the best out of the personnel's productivity and throughputs, and to make best use of the use of technology and systems with the aim of being more competitive in order to deal with an ever-changing world and sector realities, a focus on process (process-focus) delivers the expected groundwork. Manufacturing industry acknowledged the importance of process effectiveness and efficiency, and the benefits of process-focus for many years (Chrissis, et al., 2006).

An integrated approach is needed for the organizations providing enterprise-wide solutions. Therefore, organizational assets shall be commendably managed via an integrated approach for business success. Happily, maturity models, standards, methodologies, and guidelines are there for these organizations to improve the way they do business in such settings. The Carnegie Mellon University (CMU)'s Software Engineering Institute (SEI) utters that there are three critical dimensions that organizations typically come to grips with to improve their businesses with the purpose of developing and/or maintaining quality products and services. These are simply procedures and methods, people, and tools and equipment. However, these three core and critical dimensions are kept together by means of processes. Processes are there with the aim of aligning the manner for doing business, to provide and ensure scalability, to ensure a method to incorporate the understanding

of how to do things better-quality and value-added, to weight staff, infrastructure and other resources, and to observe business and understand trends regarding the businesses (Garcia & Turner, 2006; Chrissis, et al., 2006).

The process management principle "the quality of a system or product is highly influenced by the quality of the process used to develop and maintain it," has been taken by the SEI of CMU, and the belief in this evidence is appreciated worldwide in quality movements, as demonstrated by the body of standards of the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) (Chrissis, et al, 2006).

2.2.3 ISO 9001 (Quality Management Systems - Requirements)

Conceivably, ISO 9001 (Quality Management Systems - Requirements) is the most well-known, pervasive and ubiquitous quality management systems (QMS) standard (Kneuper, 2008). Expressed in very general terms, the ISO 9001 developed by/from the manufacturing industry to cover all industries, from producing nails to services to systems/software development. Furthermore, as noted by Kneuper (2008), ISO 9001 covers all crucial business processes, since in order to be successful, a development organization implementing its development processes well should also perform processes like marketing, distribution, and/or recruitment satisfactorily.

There are nearly one million organizations certified as the ISO 9001-compliant, and the standard has been adopted worldwide besides in most industry sectors. The ISO 9001 is one of the most commonly used standards aimed at accomplishment of evolution on the way to an ever improved and enhanced QMS (Rusjan & Castka, 2010). The process approach (process-focused) of ISO 9001 was introduced in version 2000 of the standard, and it was to be a major change. ISO 9001 describes and entails strict requirements for processes, such as determination of processes and their interactions, criteria and methods for effective control of processes, and monitoring, measuring and analyzing processes (Ollila, 2012).

ISO 9001 is there with the aim of providing and improving customer satisfaction via the active and efficient implementation of a QMS, which comprises processes aimed at capturing and investigation of customer and/or consumer comments and opinions, and continuous improvement of a subject QMS (Smith, 2010).

2.2.4 AS 9100 (Quality Management System Requirements for Design and/or Manufacture of Aerospace Products)

AS 9100 (Quality Management System Requirements for Design and/or Manufacture of Aerospace Products), published by the Society for Automotive Engineers in 1999, is an internationally recognized quality management standard specially aimed meant for the aerospace industry. AS 9100 defines additional requirements within an aerospace QMS that must be addressed and satisfied while realizing an ISO 9001 compliant QMS. ISO 9001 makes up the seventy percent of the AS 9100, and the remaining thirty percent of AS 9100 includes specific requirements regarding aerospace and defense industry (AS 9100 Store, n.d.). Just like ISO 9001, AS 9100 is also process-focused.

2.2.5 ISO 27001 (Information Security Management Systems - Requirements)

There are international standards that deal with information security management, and the main one is ISO 27001 (Information technology - Security techniques - ISMS - Requirements). The ISO 27001 necessitates an information security management system (ISMS) based on processes that is a part of the larger management system, based on a business risk methodology, to establish, implement, operate, monitor, review, maintain and improve information security in the ISMS (Calder & Watkins, 2008). As said by the International Register of ISMS Certificates, a total of nearly 7600 organizations accredited worldwide. The biggest advocate of ISO 27001 is Japan, accounting for more than half of the total at nearly 4000 (International Register of ISMS Certificates, 2012). ISMS is a business governance matter and has to be contended with via the management of processes, policies and people (Everett, 2011).

An organization adopting and deploying an ISO 27001 ISMS is to realize following benefits (Calder, 2005):

- Economical, fit-for-purpose ISMS and regulatory compliance, and
- Out-performance concerning competitors and competitive advantage.

2.2.6 AQAP 160 (NATO Integrated Quality Requirements for Software throughout the Life Cycle) and AQAP 2110 (NATO Quality Assurance Requirements for Design, Development and Production)

AQAP 160 (Allied Quality Assurance Publication, NATO Integrated Quality Requirements for Software throughout the Life Cycle) provides the requirements for a software quality (management) system. An AQAP 160 compliant QMS needs to be established, documented, applied, maintained, assessed and improved, and/or evaluated, in line with requirements contained in the AQAP 160 standard. These requirements are there to safeguard a self-reliance in a contractor's competence to deliver a product and/or service that obeys to and meets customer expectations and necessities, and to establish a collective outline for software life-cycle progressions (AQAP 160, 2001). AQAP 160 comprises specific NATO requirements, ISO 9001 standard's requirements, and ISO 12207 (Information technology - Software life cycle processes) standard's requirements. Hence, processes are in the hearth of the AQAP 160. AQAP 2110 (NATO Quality Assurance Requirements for Design, Development and Production) contains the NATO requirements for quality. It covers certain requirements of ISO 9001, and adds NATO specific requirements to those. As it is based on ISO 9001, in order to achieve this standard's certification, organizations need to establish and maintain processes; again, process-focused approach is needed.

2.2.7 ISO 15504 (Information Technology - Process Assessment)

ISO 15504 (Information technology - Process assessment standard [a.k.a. SPICE (Software Process Improvement and Capability dEtermination)]) delineates an outline for maturity models and complementary assessment methods for process assessments (Kneuper, 2008).

The SPICE (Software Process Improvement and Capability dEtermination) is an worldwide collaborative work to support the development of a new worldwide standard meant for process appraisal regarding software (Rout, 2002).

ISO 15504 (SPICE) model includes 29 processes categorized as five process groupings. These are organization, customer-supplier, support, management, and engineering process groupings (Jung & Huner, 2003).

Furthermore, ISO 15504 purely deals with processes, and process-focused approach is again required and expected by the ISO 15504.

2.2.8 CMMI (Capability Maturity Model Integration)

The CMMI (Capability Maturity Model Integration) is a collection of process and product development best practices, and a framework for process infrastructure. CMMI delivers industry best practices, and may be used as a roadmap for process implementation and/or improvement (Siviy, Penn, & Stoddard, 2007).

CMMI models are pools of best practices that assist organizations on behalf of improving and enhancing processes. Product teams with associates from manufacturing and business, government, and people in the CMU's SEI developed CMMI models (CMMI Product Team, 2010).

Most of the system development organizations find it challenging to reliably deliver the product or service with respect to agreed-upon quality and within time and/or budget parameters (Kneuper, 2008). Consequently, quality, cost, and schedule matter regarding the competitive advantage of the organizations. For both customer and contractor, a product or service that do not satisfy the cost, quality and schedule requirements or expectations are to create problems. Kneuper (2008) notes that these types of problems seemed in the early stages of the American Strategic Defense Initiative (SDI, a.k.a. the Star Wars program, whose intents included the development of highly complex software.). Consequently, in order to help choose and elect suppliers that would be able to supply the promised cost,

quality and schedule, the American Department of Defense (DoD) initiated work for a solution to address the related problems with respect to cost, quality and schedule. Another motivation for the related solution was to help suppliers improve their own processes in order to be more realistic in their promises, and to handle a higher level of complexity. As a result, from these efforts, the Capability Maturity Model (CMM) is originated in 1991. At the beginning, the CMM was used only by organizations that were forced to do so by the DoD or other military agencies. However, as CMM ascertained its clear benefits for the contractors as well as for the customers, other organizations instigated to use CMM for their own process improvement purposes in order to achieve their plans and promises (Kneuper, 2008).

Gibson, Goldenson, and Kost (2006) state that the belief that process improvement using the CMMI Product Suite provides enhancements in performances regarding budget and plan performances, return on investment values, product/service quality, and other outcomes is proved. That is why, today, organizations are constantly interested in CMMI Product Suite, and they want to achieve a specific maturity level in CMMI.

Organizations are required to institutionalize a managed process, and institutionalize a defined process in order to achieve a maturity level in CMMI. The principle for process management, "the quality of a system or product is highly influenced by the quality of the process used to develop and maintain it," has been taken by the SEI, and the SEI defined all CMMs that embody this foundation (CMMI Product Team, 2010).

Organizations basing their process improvement activities on CMMI models can and have achieved noticeable performance improvements, but more remains to be learned. The reasons for these should be researched. Even though case studies deliver enormous appreciated information and context, results of these cannot automatically be treated as comprehensive. Absolutely, a better understanding of the reasons for varying success is indispensible. Consequently, an equally

important task is to obtain more evidence about the statistical relationships between process capability and program performance, in conjunction with the organizational and product characteristics that might affect those (Gibson et al., 2006).

2.2.9 Maturity Levels for Organizations

Organizational maturity is the degree to which an organization steadily and dependably executes and performs processes within a defined scope that adds to achievement of its current or projected business goals or objectives (Rout, 2003).

Levels of organizational maturity (comparable to CMMI) in ISO 15504 are of six ranks. These are Immature [0], Basic [1], Managed [2], Established [3], Predictable [4], and Innovating [5] (Mueller & Bella, 2009). Maturity levels explained and designed for CMMI and SPICE are similar to Crosby's QMMG (Quality Management Maturity Grid) and Weinberg's SSSP (Six Software Subcultural Patterns), which are there to describe and catalog organizations. QMMG comprises five stages of maturity. These are named as Uncertainty, Awakening, Enlightenment, Wisdom and Certainty (Crosby, 1979). Weinberg's SSSP consists of six patterns. These are Obvious, Variable, Routine, Steering, Anticipating, and Congruent (Weinberg, 1991).

In CMMI, in order to gear up in maturity levels, organizations are required to develop and improve a group of related processes through incrementally addressing successive collections of process areas defined in the model. Levels describe improvement from a nebulous, chaotic and ad-hoc state to a state where quantitative data and information are used to regulate and govern, and accomplish and ensure anticipated improvements with the aim of meeting an organization's business goals or objectives (Chrissis et al., 2006). An organization's process maturity level can be used as an indicator for envisaging and judging an organization's performance in a prearranged content and context (Chrissis et al., 2006).

Five maturity levels are demarcated for CMMI, and these levels labeled by numbers from 1 towards 5:

- Maturity level 1 is characterized as "initial" maturity. At this level, processes are generally informal and/or disordered.
- Maturity level 2 is characterized as "managed" maturity. At this level, processes are simply planned and executed in agreement with a course of action. However, the process context is reactive at this level.
- Maturity level 3 is characterized as "defined" maturity. At this level, processes are finely described and understood, and are designated in standards, methods, tools, and procedures. The process context is proactive at this level.
- Maturity level 4 is characterized as "quantitatively managed" maturity. At this level, an organization and projects determine and set quantitative and measurable intentions for performances regarding quality and process and these are used as benchmarks in management practices for processes.
- Maturity level 5 is characterized as "optimizing" maturity. At this level, organizations uninterruptedly and continuously improve their processes grounded on measurable and quantitative interpretations.

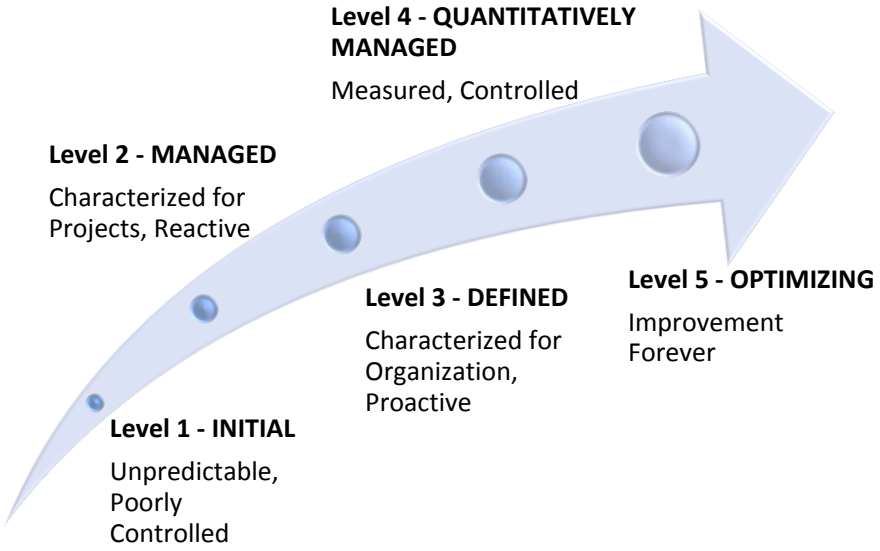


Figure 2.7: Maturity Levels

2.3 Synthesis of the Literature on the Related Previous Works

2.3.1 Riemenschneider, Hardgrave, and Davis's Related Previous Work

In their study, Riemenschneider, Hardgrave, and Davis (2002), tried to describe the reasons of individual developers for agreeing to use or refusing to use development procedures. In this context, they examined five theoretical models (TAM, TAM 2, PCI [Perceived Characteristics of Innovating], TPB, and MPCU) of individual intentions to accept IT tools.

On the subject of working on these five models, Riemenschneider, Hardgrave, and Davis determined that four elements of intentions for use are worth mentioning in at least one of the models that they worked on.

To be exact, usefulness was determined as a main element for all five models, subjective norm was determined as a key element for TAM 2, TPB, and MPCU, voluntariness was determined as a central hint for TAM 2 and PCI, and compatibility was determined as a leading component for PCI. Yet, these five models, which Riemenschneider, Hardgrave and Davis worked on, don't share these four leading and prominent elements to guide on the way to promote the use of methods for development. Accordingly, Riemenschneider, Hardgrave, and Davis note that if developers do not regard a methodology as useful, the deployment and the success of the methodology will be problematic and mostly difficult.

Furthermore, Riemenschneider, Hardgrave, and Davis claimed that methodology adoption intentions of developers are mostly driven by the below listed three elements:

- Existence of an organizational mandate regarding the use,
- Methodology's compatibility with developers' tasks and assignments, and
- Thoughts of workfellows and managers headed for using a related methodology.

2.3.2 Green, Hevner, and Collins's Related Previous Work

In their study, Green, Hevner, and Collins (2004) examined factors that encourage developers to adopt and sustain the use of software process improvements (SPIs). In this context, Green, Hevner, and Collins tried to discover what establishes an evident achievement of an SPI to developers.

Green, Hevner, and Collins concluded that increased perception of quality improvements and increased perception of productivity improvements are related with an increased perception of the usefulness, and increased perceptions of the usefulness is associated with increased levels of use on the behalf of SPIs.

To be brief, the SPIs ought to reveal positive impacts on quality and/or productivity, and the SPI must be perceived as useful for developers.

2.3.3 Dingsoyr and Moe's Related Previous Work

In their study, Dingsoyr and Moe (2008) discussed how taking part in process workshops affect the use of processes, electronic process guides. That is, they specifically addressed the use and participation in development relation.

As a result, Dingsoyr and Moe found that following three major points:

- Workshop participants (people participated in the process development activities) opened and used processes approximately a half extra times than the ones who didn't attend to workshops for processes. This advocates that involvement in process workshops brings about greater degree of use of process systems.
- Workshop participants used more functions. Specifically, while workshop participants used approximately five-unit functions, nonparticipants used nearly only three-unit functions regarding process systems. This submits that involvement in process workshops brings about an advanced degree of seriousness of detection regarding functions.

- Workshop participants reported additional benefits but also extra shortcomings. Specifically, they have more to share regarding deployed process system.

In short, personnel to use process guides ought to have participations in development and/or maintenance of the related systems, since this typically promotes the use behavior for processes. Therefore, participation in development is significant and advantageous.

2.4 Summary of the Literature Review

The literature was reviewed in three dimensions. In the first dimension, core and synthesized concepts and information regarding the technology acceptance models and theories were reviewed. In the second dimension, fundamental and synthesized concepts and facts regarding processes, and fascinated standards and model (CMMI, ISO 15504, ISO 9001, ISO 27001, AQAP-160, AQAP-2110, and AS 9100) were reviewed. In the last dimension of the literature review, some related previous researches and studies by some researchers regarding the process acceptance content and context were reviewed.

As a result of this comprehensive review of the relatable literature, the gap related with a study systematically and comprehensively addressing and identifying the factors influencing the acceptance of processes was recognized. Moreover, some state of the art and distilled information were gathered to build and develop a study addressing the recognized gap.

However, further literature justifications and information that were distilled on the subject of the factors influencing the acceptance of processes were comprised in the following chapters, as needed.

CHAPTER 3

RESEARCH MODEL AND METHODOLOGY

In this chapter, research model and methodology of the study is explained.
In this context,

- Section 3.1 provides defined constructs and formulated hypotheses,
- Section 3.2 shows the proposed model,
- Section 3.3 explains the study setting and sample selection,
- Section 3.4 presents the details of instrument development,
- Section 3.5 addresses the way for the reliability of the instrument,
- Section 3.6 addresses the way for the validity of the instrument,
- Section 3.7 gives the ethical permission information for the deployment of developed questionnaire instrument,
- Section 3.8 delivers the information about instrument deployment and data collection for the pilot study,
- Section 3.9 clarifies data analysis and results for the pilot study,
- Section 3.10 provides the information regarding instrument deployment and data collection for the main study,
- Section 3.11 gives some information on the subject of exploratory factor analysis (EFA),

- Section 3.12 delivers the theoretical and methodological information and the justifications for the each applied steps of EFA,
- Section 3.13 presents some information on the subject of confirmatory factor analysis (CFA),
- Section 3.14 delivers the theoretical and methodological information and justifications for the each applied steps of CFA,
- Section 3.15 provides the information regarding the applied structural equation modeling (SEM),
- Section 3.16 clarifies the method for the applied descriptive statistics and *t*-tests, and
- Section 3.17 presents the manner for the qualitative data analysis for the context of this study.

3.1 Defining Constructs and Formulating Hypotheses

In order to define constructs and formulate hypotheses, three steps were followed, as shown in Figure 3.1.

Details of each step are elucidated and elaborated in the following Sections 3.1.1, 3.1.2, and 3.1.3.

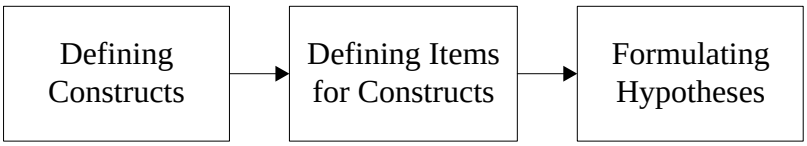


Figure 3.1: Applied Steps for Defining Constructs and Formulating Hypothesis

3.1.1 Defining Constructs

Principally, this research uses some constructs from the selected technology acceptance models and/or theories, and adds its own special and contextual constructs to provide an extended acceptance model for the acceptance of processes.

Specifically,

- Perceived Usefulness (PU), Perceived Ease of Use (PEOU) and Behavioral Intention (BI) constructs of Technology Acceptance Model (TAM) of Venkatesh and Davis (2000),
- Facilitating Conditions (FC) construct of Unified Theory of Acceptance and Use of Technology (UTAUT) of Venkatesh et al. (2003), and
- Subjective Norm (SN), Output Quality (OQ), Results Demonstrability (RD), Job Relevance (JR), and Objective Usability (OU) constructs of TAM 3 of Venkatesh and Bala (2008) are used from the selected acceptance models and/or theories.

Moreover, new constructs were added regarding the process acceptance content and context. These are:

- Organizational Culture (OC),
- Audit (AUD),
- Tailoring (TLR),
- Operations and Maintenance (OM),
- Stability (STB),
- Granularity (GRN),
- Participation in Development (PD),
- Training (TRN),
- Medium (MED), and
- Modeling (MDL).

On the other hand, as seen above, not all of the constructs of previous models and/or theories are included in the subject research. The vital reason for this is that it was evaluated that omitted constructs are not associated with the process acceptance content and/or context. Consequently, the fundamental code to determine the constructs to include is the appropriateness and relevancy of the constructs with the process acceptance content and/or context.

Accordingly, there are in total 19 constructs defined (three of them were derived from the TAM, one of them was derived from the UTAUT, five of them were derived from the TAM 3, and ten of them are defined as new constructs) for the acceptance of processes context and content.

Brief definitions and/or explanations for each construct are given below in an alphabetical order, as they are crucial to apprehend the proposed model.

- ***Audit (AUD)***: It is defined as a careful check or review of something, or an objective examination of work product(s) or processes pertaining to specific set of criteria (CMMI Product Team, 2010, p. 436).

- ***Behavioral Intention (BI)***: BI is the extent to which a person has formulated aware ideas to do or not do an identified behavior (Davis et al., 1989).

- ***Facilitating Conditions (FC):*** FC is the organizational and technical/procedural groundwork and/or arrangements available so as to assist and encourage use of a nominated system (Venkatesh et al., 2003).

- ***Granularity (GRN)***: By GRN, it was aimed to indicate the details level of a process. It is assumed that good granularity means not too much or too less information or details in the defined processes. To be exact, there should be just required and enough information and steps in the processes, nothing more or less for a good granularity process.

- ***Job Relevance (JR)***: JR deals with a system's applicability and relevancy to jobs or tasks (Venkatesh & Davis, 2000). That is, relevancy and applicability are required for JR construct.

- ***Medium (MED)***: By using MED, it is aimed to imply three main things. These are the language of the process documentations, the media of the

process system as online or hard-copy, and the elements contained in the process definitions as texts, and/or visuals, etc.

- ***Modeling (MDL)***: By MDL construct, it is aimed to imply the process modeling, and process modeling means abstract depiction of a process architecture, design, or definition (Feiler & Humphrey, 1992). For the context of this research, modeling is defined as either prescriptive or descriptive. A prescriptive process model is a model that describes "how to do" information, and a descriptive process model is a model that describes "what to do" information (Wang & King, 2000, p. 40).

- ***Objective Usability (OU)***: Venkatesh and Davis (2000) define OU as assessment of arrangements regarding a concrete and real amount of work necessary on the way to complete a specific task, instead of the one that is perceived.

- ***Operation & Maintenance (OM)***: By means of OM construct, it is aimed to take care of the efforts and/or resources devoted for the operations and maintenance of processes. With good OM practices, it is assumed that there are actively and proactively definition, deployment, and maintenance of processes by devoted and proficient bodies or systems. Via this construct, it is aimed to address some noble characteristics of an ideal OM for processes.

- ***Organizational Culture (OC)***: Ravasi and Schultz (2006) define OC as a set of collective mental conventions shaping understandings and behaviors in organizations by way of describing proper actions meant for a number of circumstances or perspectives.

- ***Output Quality (OQ)***: Venkatesh and Davis (2000) express OQ as an extent to which an individual have confidence in that the system accomplishes job tasks well and in an expected manner.

- ***Participation in Development (PD)***: It was aimed to delineate PD as participation or share of management people, practitioners, or doers in development of processes, before deployment or during definition to ensure its applicability and appropriateness. In this construct, additionally the importance of qualified personnel in development and commitments of people before deployment was stressed

- ***Perceived Ease of Use (PEOU)***: PEOU means the extent to which a person considers that use of something is to be easy and stress-free (Davis et al., 1989).

- ***Perceived Usefulness (PU)***: Davis et al. (1989) define PU as an extent to which a person considers that using a system will provide aid and advantage to achieve improvements in performances.

- ***Result Demonstrability (RD)***: Moore and Benbasat (1991) describe RD as the extent to which an individual considers that the results of using a system are concrete, noticeable, and communicable.

- ***Stability (STB)***: STB was defined as the condition in which processes are updated not too frequently or disturbingly. It was assumed processes should be generally stable, and changes and improvements should be incorporated as planned and required.

- ***Subjective Norm (SN)***: Fishbein and Ajzen (1975) describe SN as the extent to which a person acknowledges that most people who are significant to her/him deliberate that she/he ought to or ought not to use a system.

- ***Tailoring (TLR):*** TLR means efforts for assembling, shifting, or adjusting defined processes for an unambiguous aim (CMMI Product Team, 2010, p. 464). Specifically, for processes, TLR is there to provide that processes are suited regarding the lifecycle realities of the projects.

- ***Training (TRN)***: TRN is the options for formal and informal learning, including lecture hall training, causal guiding, e-training/learning, steered self-learning, and/or official on the job trainings (CMMI Product Team, 2010, p. 466). By this construct, it was aimed to remark the requirement of trainings regarding processes, process purposes, and process systems, structures and interactions.

3.1.2 Defining Items for Constructs

As this research does not replicate or re-apply an acceptance model to a previously studied content or context, not all but some of

- defined items for the PU, PEOU, BI factors were used from the study of Venkatesh and Davis (2000),
- defined items for the FC construct were adapted from the study of Venkatesh et al. (2003), and
- defined items for the SN, OQ, RD, JR, and OU factors were generally taken from the study of Venkatesh and Bala (2008).

What's more, for the distinctive constructs of OC, AUD, TLR, OM, STB, GRN, PD, TRN, MED and MDL, the items were designed and defined in accordance with the definitions provided in Section 3.1.1 and pertinent literature elucidated and represented in the CHAPTER 2.

Accordingly, Table 3.1 provides the defined items for each defined construct for this research to determine factors influencing the acceptance of processes.

Table 3.1: Defined Items for Each Defined Constructs

#	ID	Related Construct	Defined Item
1.	MDL1	Modeling	Processes should be defined so that they just direct "what to do" information.

Table 3.1 (continued).

2.	MDL3	Modeling	In addition to “what to do” information, processes should be defined so that they also direct “how to do” information.
3.	MDL2	Modeling	Processes directing just “what to do” information provides that personnel’s creativity/capability are not restricted in a way.
4.	MDL4	Modeling	If processes are defined so that in addition to “what to do,” they direct “how to do” information, this is to bring about that personnel do not have to discover America, again and again.
5.	MDL5	Modeling	Depending on the purposes of the processes, some processes should be defined so that they just direct “what to do” information, and some processes should be defined so that they also direct “how to do” information.
6.	BI1	Behavioral Intention	If processes are defined and designed so that they are useful and easy to use for me, I use processes.
7.	OU1	Objective Usability	Processes should not create extra costs or paperwork while performing a work; instead, they should be defined to eliminate all non-value adding costs or paperwork.

Table 3.1 (continued).

8.	OU2	Objective Usability	Independent from the personnel whoever implements the process, processes should be defined to provide usefulness for all.
9.	PD1	Participation in Development	During the phases for definition or update of processes, people who have knowledge about processes and their practices and have experience in these should take part in.
10.	PD2	Participation in Development	During the phases for definition or update of processes, people directly using or implementing the processes should also actively take part in.
11.	PD3	Participation in Development	Commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes.
12.	OC1	Organizational Culture	If there is active use of processes as an established culture by everybody in the organization, this motivates me to use processes actively too.
13.	OC2	Organizational Culture	Encouragement should be there for use of processes as organizational culture to provide that everybody in the organization use processes.

Table 3.1 (continued).

14.	OC3	Organizational Culture	Existence of an organizational culture for use of processes positively influences the use behavior for process of the people in the organization whose thoughts and behaviors are paid importance in the organization.
15.	OC4	Organizational Culture	I think organizational culture may influence the use behavior for processes of the people in the organization whose thoughts and behaviors are paid importance by me.
16.	JR1	Job Relevance	Processes should be directly related to the work or practice to be performed.
17.	JR2	Job Relevance	My intention to use processes is negatively influenced if processes are not relevant to the work that I do, or processes are not important for the work.
18.	JR3	Job Relevance	When evaluated with respect to job or practice to be performed, processes should be applicable in real life (concerning project/department realities).
19.	OQ1	Output Quality	Processes should be defined so that outputs produced as results of implementation of processes are more profitable regarding the quality when compared with the outputs that are results of a setting where there is no defined process used.

Table 3.1 (continued).

20.	OQ2	Output Quality	Processes should be defined so that outputs produced as result of implementation of processes should meet the expected quality performance.
21.	OQ3	Output Quality	My intention to use processes is negatively influenced if processes are not defined to let me do my work better.
22.	RD1	Result Demonstrability	Processes should be defined so that outputs produced as result of implementation of processes are important, beneficial, and meaningful.
23.	RD2	Result Demonstrability	The outputs or results of processes should be applicable to use for certain purposes.
24.	RD3	Result Demonstrability	For processes, there should be defined and meaningful outputs or results, and these should be easily recognizable and noticeable.
25.	TLR1	Tailoring	Some processes should be tailored for specific needs of projects, and tailored processes should be used.
26.	TLR2	Tailoring	There should be defining rules for process tailoring.
27.	TLR3	Tailoring	Some processes should be tailored in accordance with defined rules, with respect to project realities, rather than using them as they are.

Table 3.1 (continued).

28.	TLR4	Tailoring	As the projects' realities or priorities may differ from each other, not every project should be expected to implement all organizational processes as they are, tailoring should be permitted.
29.	AUD1	Audit	Implementation of processes should be actively audited by the competent people continuously.
30.	AUD2	Audit	Work products that are outputs of processes should be actively reviewed by the competent people continuously.
31.	AUD3	Audit	Good audits and reviews by competent people let me do my work better.
32.	TRN1	Training	Trainings should be delivered to the personnel by the competent people regarding processes or process updates, and these trainings should be repeated as necessary.
33.	TRN2	Training	Trainings should be delivered to the personnel by the competent people regarding process system, structure, and interactions; and these trainings should be repeated as necessary.
34.	TRN3	Training	An easily accessible guide about process system, structure, and interactions should be provided to the personnel.

Table 3.1 (continued).

35.	TRN4	Training	If I am given trainings regarding processes, I possibly will implement processes more productively.
36.	STB1	Stability	Continuous improvement of processes is important and required, yet for the means of continuous improvement, there should not be frequent/disturbing changes in the processes.
37.	STB2	Stability	Processes should be deployed once they are mature enough, and by this way, more stable and mature processes should be generated.
38.	STB3	Stability	I prefer to live with more stable and mature processes, rather than the ones that are frequently changed.
39.	BI2	Behavioral Intention	As long as it is provided that processes are useful and easy to use, they are to be used by the personnel.
40.	SN1	Subjective Norm	Active use of processes by the people in the organization whose thoughts and behaviors are paid importance by me motivates me positively to use processes actively.
41.	SN2	Subjective Norm	If people who are good at their work use processes, this positively influences my intention to use processes.

Table 3.1 (continued).

42.	SN3	Subjective Norm	Active use of processes by the people in the organization whose thoughts and behaviors are paid importance by me positively support my thought “processes are useful.”
43.	SN4	Subjective Norm	If people using the processes produce good works, I think, “processes are useful.”
44.	PU1	Perceived Usefulness	To provide use of processes, processes should be useful or they should be designed in this manner.
45.	PU2	Perceived Usefulness	My intention to use processes positively increases provided that processes are designed to provide usefulness/benefits for me.
46.	PU3	Perceived Usefulness	Processes should be designed to provide performance improvement.
47.	PU4	Perceived Usefulness	Processes should be designed and defined to provide productivity improvement.
48.	PU5	Perceived Usefulness	Processes should be designed and defined to provide efficiency and effectiveness improvement of personnel.
49.	GRN1	Granularity	Processes should not be very/too detailed.
50.	GRN2	Granularity	Processes should not include so/too many steps.

Table 3.1 (continued).

51.	GRN3	Granularity	Processes should neither be high-level nor include many details, they should just include required and enough information.
52.	FC1	Facilitating Conditions	There should be effective and efficient systems to provide processes to the people in the organization.
53.	FC2	Facilitating Conditions	There should be active, competent, and professional consultants in the organizations, who are to be contacted with in cases regarding use and implementation of processes.
54.	FC3	Facilitating Conditions	In the organization, there should be tools to access processes easily and to use them as I want.
55.	MED1	Medium	There should be well-refined and meaningful visual elements, flows, and diagrams in the processes.
56.	MED2	Medium	Processes should not be composed of only texts.
57.	MED3	Medium	Processes should be documented in users' native language or a language in which users are proficient.
58.	MED4	Medium	Processes should not be documented in a foreign language for the users or a language in which users are not proficient.

Table 3.1 (continued).

59.	MED5	Medium	Processes should be easily searchable and be online.
60.	PEOU1	Perceived Ease of Use	Ease of use of the processes increases the usefulness of the processes.
61.	PEOU2	Perceived Ease of Use	It should be easy to use processes.
62.	PEOU3	Perceived Ease of Use	My interaction with the processes should be clear and understandable.
63.	PEOU4	Perceived Ease of Use	My interaction with the processes should not require too much mental effort, and it should not be too complex.
64.	PEOU5	Perceived Ease of Use	Processes should provide that intended work is done easily, and they should not create pointless paperwork.
65.	PEOU6	Perceived Ease of Use	Ease of use of the processes positively influences the usefulness of the processes.
66.	BI3	Behavioral Intention	For personnel to use processes, processes should be useful, and processes should be easy to use.
67.	OM1	Operations & Maintenance	Active, competent, and professional people should take part in during deployment, maintenance and operations of processes.

Table 3.1 (continued).

68.	OM2	Operations & Maintenance	Updates based on the improvements in the processes should be performed by the people who are competent enough regarding processes and process system, and field knowledge.
69.	OM3	Operations & Maintenance	Activities for deployment, operations, and maintenance of processes should be performed in accordance with a plan or program, and parallel to the organization's business and strategic objectives.
70.	OM4	Operations & Maintenance	A group should be composed for the activities for deployment, operations, and maintenance of processes, and this group should be composed of competent people who are directly responsible for their work, and have adequate theoretical and practical knowledge in the field.

3.1.3 Formulating Hypotheses

As there are three core elements (PU, PEOU, and BI) in the TAM, hypotheses were formulated based on these core elements.

Specifically, to formulate hypotheses, primarily each remaining constructs (FC, SN, OQ, RD, JR, OU, OC, AUD, TLR, OM, STB, GRN, PD, TRN, MED and MDL) were linked to these three constructs to decide on which construct(s) promotes which construct(s).

Consequently, formulated hypotheses are provided in Table 3.2.

Table 3.2: Formulated Hypotheses among Constructs

#	ID	Hypotheses
1.	H.1.a	Audit positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
2.	H.1.b	Audit positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
3.	H.1.c	Audit positively influences Behavioral Intention in favor of the context for the acceptance of processes.
4.	H.2.a	Facilitating Conditions positively influences Perceived Usefulness in support of the context for the acceptance of processes.
5.	H.2.b	Facilitating Conditions positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
6.	H.2.c	Facilitating Conditions positively influences Behavioral Intention in support of the context for the acceptance of processes.
7.	H.3.a	Granularity positively influences Perceived Usefulness in support of the context for the acceptance of processes.
8.	H.3.b	Granularity positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
9.	H.3.c	Granularity positively influences Behavioral Intention in support of the context for the acceptance of processes.
10.	H.4.a	Job Relevance positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
11.	H.4.b	Job Relevance positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.

Table 3.2 (continued).

12.	H.4.c	Job Relevance positively influences Behavioral Intention in favor of the context for the acceptance of processes.
13.	H.5.a	Medium positively influences Perceived Usefulness in support of the context for the acceptance of processes.
14.	H.5.b	Medium positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
15.	H.5.c	Medium positively influences Behavioral Intention in support of the context for the acceptance of processes.
16.	H.6.a	Modeling positively influences Perceived Usefulness in support of the context for the acceptance of processes.
17.	H.6.b	Modeling positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
18.	H.6.c	Modeling positively influences Behavioral Intention in support of the context for the acceptance of processes.
19.	H.7.a	Objective Usability positively influences Perceived Usefulness in support of the context for the acceptance of processes.
20.	H.7.b	Objective Usability positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
21.	H.7.c	Objective Usability positively influences Behavioral Intention in support of the context for the acceptance of processes.
22.	H.8.a	Operation and Maintenance positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
23.	H.8.b	Operation and Maintenance positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.

Table 3.2 (continued).

24.	H.8.c	Operation and Maintenance positively influences Behavioral Intention in favor of the context for the acceptance of processes.
25.	H.9.a	Organizational Culture positively influences the Perceived Usefulness meant for the acceptance of processes.
26.	H.9.b	Organizational Culture positively influences the Perceived Ease of Use meant for the acceptance of processes.
27.	H.9.c	Organizational Culture positively influences the Behavioral Intention meant for the acceptance of processes.
28.	H.10.a	Output Quality positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
29.	H.10.b	Output Quality positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
30.	H.10.c	Output Quality positively influences Behavioral Intention in favor of the context for the acceptance of processes.
31.	H.11.a	Participation in Development positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
32.	H.11.b	Participation in Development positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
33.	H.11.c	Participation in Development positively influences Behavioral Intention in favor of the context for the acceptance of processes.
34.	H.12.a	Results Demonstrability positively influences Perceived Usefulness in favor of the context for the acceptance of processes.

Table 3.2 (continued).

35.	H.12.b	Results Demonstrability positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
36.	H.12.c	Results Demonstrability positively influences Behavioral Intention in favor of the context for the acceptance of processes.
37.	H.13.a	Stability positively influences Perceived Usefulness in support of the context for the acceptance of processes.
38.	H.13.b	Stability positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
39.	H.13.c	Stability positively influences Behavioral Intention in support of the context for the acceptance of processes.
40.	H.14.a	Subjective Norm positively influences the Perceived Usefulness meant for the acceptance of processes.
41.	H.14.b	Subjective Norm positively influences the Perceived Ease of Use meant for the acceptance of processes.
42.	H.14.c	Subjective Norm positively influences the Behavioral Intention meant for the acceptance of processes.
43.	H.15.a	Tailoring positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
44.	H.15.b	Tailoring positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
45.	H.15.c	Tailoring positively influences Behavioral Intention in favor of the context for the acceptance of processes.
46.	H.16.a	Training positively influences Perceived Usefulness in favor of the context for the acceptance of processes.

Table 3.2 (continued).

47.	H.16.b	Training positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
48.	H.16.c	Training positively influences Behavioral Intention in favor of the context for the acceptance of processes.
49.	H.17	Perceived Usefulness positively influences the Behavioral Intention meant for the acceptance of processes.
50.	H.18.a	Perceived Ease of Use positively influences the Perceived Usefulness meant for the acceptance of processes.
51.	H.18.b	Perceived Ease of Use positively influences the Behavioral Intention meant for the acceptance of processes.

3.2 Model Development and Proposal

Based on the formulated hypotheses in Section 3.1.3, proposed model is depicted and given in Figure 3.2.

3.3 Study Setting and Sample Selection

Sampling is defined as the selection of some part of a target population to observe with the purpose of estimating something about the whole population (Thompson, 2002, p. 1). This research used probability sampling, in which sample is taken in a way that each and every member of the target population has an equal probability of being picked (Thompson, 2002, p. 11). Random samples and probability samples are both given names for the selected samples as results of probability sampling techniques (Fuller, 2009, p. 2). Therefore, the samples in this research can be named as random samples, as they are randomly selected from the target population.

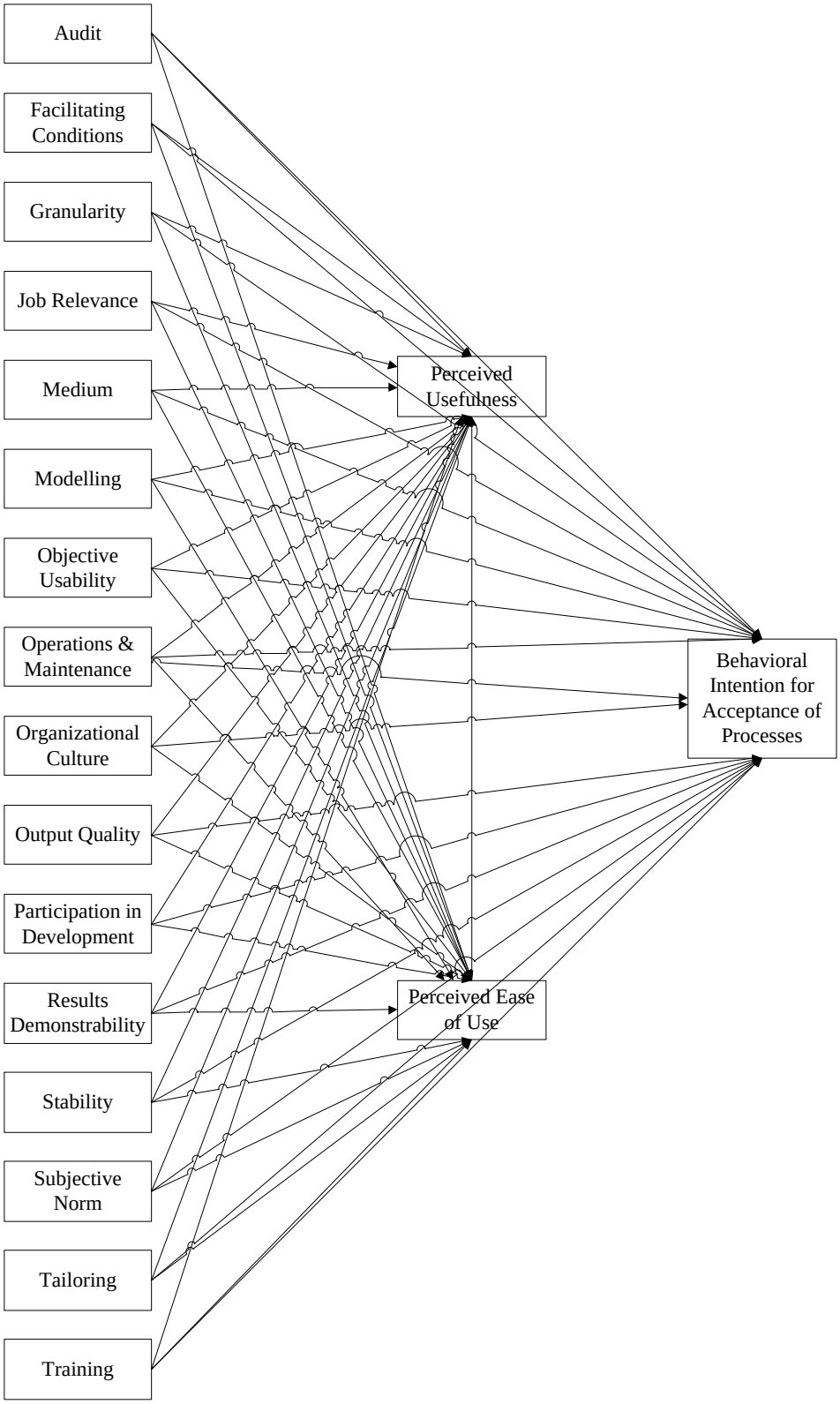


Figure 3.2: Proposed Model

This research's target population is people working in organizations having CMMI Level 5, ISO 15504 Level 5, CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100 certifications, and/or people having auditor, contributor, or assessor roles for CMMI Level 5, ISO 15504 Level 5, CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100 assessments/appraisals.

To be precise, target population includes people who have relations with CMMI Level 5, ISO 15504 Level 5, CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

3.4 Instrument Development

Based on the defined constructs and items for these constructs, a survey instrument (questionnaire) was designed to collect data.

In the questionnaire design, generally questions about the same construct were grouped together, as this makes it quicker for people to answer questions more quickly and easily (Shuttleworth, 2008; Walonick, 2010; Malhotra, 2006).

Kendall K. and Kendall J. (2005) also note that in the questionnaire similar topics should be clustered together, since randomization of questions tries the patience of respondents.

This was intentionally done as the designed questionnaire is a bit log, as it has 81 questions in total, and the researched did not want that people leave the questionnaire thinking that it takes much time.

After initial design of the questionnaire, five steps were followed to make the questionnaire mature and refined before deployment.

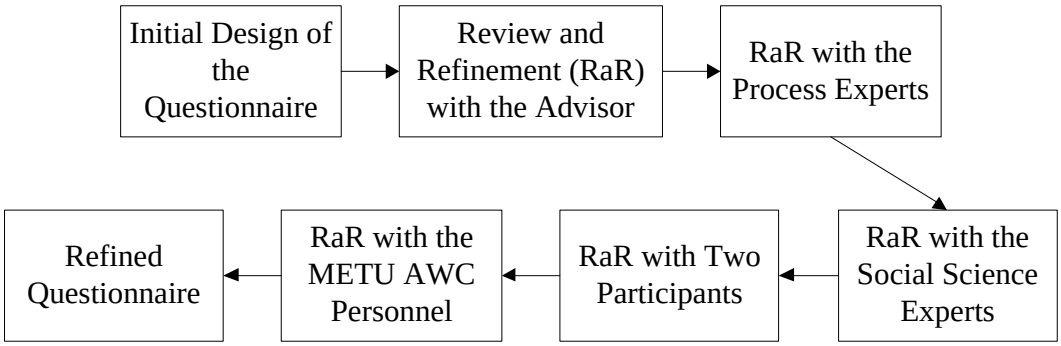


Figure 3.3: Refinement Cycle Applied for the Questionnaire

These five steps include:

1. General review and refinement with the thesis advisor,
2. Review and refinement with the two experts in the process and process management domain to evaluate the constructs' and questionnaire items' (statements) maturity and relevancy on the subject of capturing information related with the acceptance of processes,
3. Review with two experts in social sciences domain to evaluate the maturity of the questionnaire regarding social sciences context,
4. Review with two master's students, one from social sciences and one from engineering domain to have their general comments about questionnaire items and general design, and
5. Review and refinement with the METU Academic Writing Center's (METU AWC) personnel regarding grammar, sentence structures, and general design of the questionnaire.

After these five steps review and refinement cycle, the below reported changes were incorporated into the questionnaire:

1. A new Tailoring (TLR) construct was defined, and four related items (statements) were defined for TLR construct.
2. Image (IMG) construct and its relevant items were removed from the questionnaire, as it was evaluated that it is not really related and required.
3. A new optional part (PART 3 – Other) was added to the questionnaire to collect additional qualitative data from the participants regarding other

potential factors that they think influence the acceptance of the processes by the people in the organization.

4. For the printed-form questionnaire, “Did you fully and completely fill out the first two parts of the questionnaire?” statement was added to the end of questionnaire to let readers remember that completely filling-out the first two parts of the questionnaire is expected by the researcher.
5. For the online-questionnaire, it was set that it is not possible to leave a question blank or empty in the first two parts of the questionnaire.
6. In the first part of the questionnaire “Certifications for which You Have/Had Auditor/Appraiser/Contributor Role” part was added in addition to the “Certificates Hold by the Organization You Work for” part.
7. English form and Turkish form of the questionnaire were separated into two distinct forms. Initially, they were combined to let participants select the way that they want. Yet, as it was too long as combined, these are separated. As a result, total of 20-page questionnaire is shortened to 10-page questionnaire for each language option.
8. By manipulating the page margins, the questionnaire was shortened to 6-page.
9. For printed-form questionnaires, two-sided printing was applied.
10. Questions and statements were shortened as much as possible.
11. “None” and “Other” options were provided for “Certificates Hold by the Organization You Work for” and “Certifications for which You Have/Had Auditor/Appraiser/Contributor Role” fields in the first part of the questionnaire.
12. “You may check more than one box.” note was added for “Certificates Hold by the Organization You Work for” and “Certifications for which You Have/Had Auditor/Appraiser/Contributor Role” fields in the first part of the questionnaire.

13. A new “Type of Organization You Work for” question was added to the first part of questionnaire with “Public Organization” and “Private Sector Organization” alternatives.
14. “Antartica” word was changed as “Antarctica” in the “Continent You Live in” field of questionnaire.
15. As a new item for tailoring construct, “There should be defining rules for process tailoring.” was added.
16. “Please, feel free to write down whatever comes to your mind in this context.” statement was added for the direction of the last part of the questionnaire.
17. “There should be diagrams in the processes.” statement was changed, as “There should be well-refined and meaningful visual elements, flows, and diagrams in the processes.”
18. “Processes should not be too detailed.” expression was changed as “Processes should not be very/too detailed.”
19. “Processes should not include too many steps.” expression was changed as “Processes should not include so/too many steps.”
20. “Commitments of especially people to directly implement the processes should be ensured before deployment of processes.” expression was changed as “Commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes.”
21. “Processes should not be documented in a foreign language for the users or a language in which users are not proficient.” expression was changed as “Processes should not be documented in a foreign language for the users or a language in which users are proficient.”
22. As a new statement related with organizational culture construct “Encouragement should be there for use of processes as organizational culture to provide that everybody in the organization use processes.” was added.

23. In the Turkish form of the questionnaire for some words, their synonyms or alternatives were provided in parentheses. These are “efor (çaba),” “yararlı (kullanışlı),” “çevrim içi (online),” “metinden (yazıdan),” “araçlar (tools),” “arttıracak (iyileştirecek).”

Consequently, designed questionnaire consisted of three parts. First part (***General***) is to gather some non-personal data regarding the participants. Second part (***Main***) is to let participants reflect their opinions regarding some expressions and thoughts by means of a Likert scale (marking numbers from five to one regarding whether participant agrees or disagrees with the statement). Third and the last part (***Other***) is to let participants note their additional other comments.

Additionally, questionnaire was prepared both in English and Turkish versions, and they made available as both online and printed-form.

Full-form of the printed-form questionnaire in English is provided in the APPENDIX A, and full-form of the printed-form questionnaire in Turkish is provided in the APPENDIX B.

Additionally, some screenshots of online questionnaire in English are provided in the APPENDIX C, and some screenshots of online questionnaire in Turkish are provided in the APPENDIX D.

3.5 Reliability of the Instrument

Reliability is defined by Carmines and Zeller (1979) as the degree to which a tool yields the equal results on repetitive tests. For research purposes, a minimum reliability of 0.70 is required, and Cronbach’s alpha is commonly used for determining the internal constancy and balance for the cases with attitude instruments that use the Likert scale. Additionally, the higher the Cronbach’s alpha score, the more reliable the generated instrument is (Reynaldo & Santos, 1999; Gliem J. & Gliem R., 2003). Furthermore, George and Mallery (as cited in Gliem

J. & Gliem R., 2003) provide the following rules of thumb for evaluation of Cronbach's alpha value for the reliability of an instrument:

If Cronbach's alpha is

- greater than value of 0.9, evaluation result is "excellent,"
- greater than value of 0.8, evaluation result is "good,"
- greater than value of 0.7, evaluation result is "acceptable,"
- greater than value of 0.6, evaluation result is "questionable"
- greater than value of 0.5, evaluation result is "poor," and
- lesser than value of 0.5, evaluation result is "unacceptable."

Further details pertaining to the reliability of the instrument are provided in Section 4.3.

3.6 Validity of the Instrument

Validity is the extent to which a tool yields measurement results regarding whatever it is designed to measure (Carmines & Zeller, 1979). With the purpose of making the content validity of the instrument certain, the general content to be characterized was identified. After this, items are chosen from the content that will correctly represent the information in all determined areas. Accordingly, a group of items that is descriptive of the content of the features/constructs/factors to be measured were obtained (Key, 1997).

As there is no statistical test to decide whether an instrument adequately covers a content area or sufficiently represents a construct, content validity generally depends on the judgments of professionals or experts in the field (Kimberlin & Winterstein, 2008).

Further details pertaining to the validity of the instrument are provided in Section 4.4.

3.7 Granting Ethical Permission

As the studies, involving collection of data from human participants, conducted in the Middle East Technical University (METU) and/or studies conducted by METU personnel/students, are subject to review by the METU Human Subjects Ethics Committee (HSEC), METU HSEC application form was properly filled and submitted to the METU HSEC along with the other required documents. Accordingly, approval of the HSEC was granted. Related official letter showing the related approval of METU HSEC is provided in the APPENDIX E.

3.8 Instrument Deployment and Data Collection for the Pilot Study

After completing the design, review, and refinement of the questionnaire, the questionnaire was applied to a total of 250 participants for one-week period.

At the end of one-week, 60 responses were collected (response rate: 24%). The purpose was to re-check and re-evaluate the appropriateness of the developed instrument.

3.9 Data Analysis and Results for the Pilot Study

First of all, to decide on the reliability of the instrument that was reviewed and refined in accordance with the steps explained in Section 3.4. Overall reliability of the instrument was calculated based on the answers by 60 participants in the pilot study. As shown in Table 3.3, Cronbach's alpha value for the pilot study is 0.949. This, in fact, ensured the reliability of the developed instrument. With respect to details provided in Section 3.5, instrument's reliability can be treated as "excellent" as Cronbach's alpha is greater than 0.9 value.

Table 3.3: Reliability Statistics for the Pilot Study

Cronbach's Alpha	N of Items
0.949	70

Additionally, some analysis details of the results regarding the pilot study are summarized throughout in Table 3.4 to Table 3.11.

Table 3.4: Frequency Statistics of the Education Levels of Participants for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Doctorate	7	11.7	11.7	11.7
	Graduate	32	53.3	53.3	65.0
	Undergraduate	21	35.0	35.0	100.0
	Total	60	100.0	100.0	

Table 3.5: Frequency Statistics of the Age Intervals of Participants for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	8	13.3	13.3	13.3
	26-33	28	46.7	46.7	60.0
	34-41	16	26.7	26.7	86.7
	42-49	6	10.0	10.0	96.7
	50 or Over	2	3.3	3.3	100.0
	Total	60	100.0	100.0	

Table 3.6: Frequency Statistics of the Total Work Experiences of Participants for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-3 Years	10	16.7	16.7	16.7
	12 Years or More	17	28.3	28.3	45.0
	3-6 Years	14	23.3	23.3	68.3
	6-9 Years	11	18.3	18.3	86.7
	9-12 Years	8	13.3	13.3	100.0
	Total	60	100.0	100.0	

Table 3.7: Frequency Statistics of the Fields in Which Participants Work for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Consultancy	4	6.7	6.7	6.7
	Engineering	26	43.3	43.3	50.0
	Human Resources or Training	2	3.3	3.3	53.3
	Independent Auditing and Certification	2	3.3	3.3	56.7
	Management	4	6.7	6.7	63.3
	Other	6	10.0	10.0	73.3
	Quality Assurance or Process	16	26.7	26.7	100.0
	Total	60	100.0	100.0	

Table 3.8: Frequency Statistics of the Fields from Which Participants Graduated for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Economics and Administrative Sciences	3	5.0	5.0	5.0
	Engineering	37	61.7	61.7	66.7
	Informatics	9	15.0	15.0	81.7
	Other	5	8.3	8.3	90.0
	Science	3	5.0	5.0	95.0
	Social Sciences	3	5.0	5.0	100.0
	Total	60	100.0	100.0	

Table 3.9: Frequency Statistics of the Assigned* Maturity Levels for the Participants' Associations for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	26	43.3	43.3	43.3
	3	25	41.7	41.7	85.0
	5	9	15.0	15.0	100.0
	Total	60	100.0	100.0	

**Note: Maturity level was assigned based on the following rules:*

- *"5" if at least one of CMMI Level 5 or ISO 15504 Level 5 choices was selected by the participants,*
- *"3" if at least one of CMMI Level 3 or ISO 15504 Level 3 choices was selected by the participants, where no selection for CMMI Level 5 and/or ISO 15504 Level 5, and*
- *"2" if at least one of ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, or AS 9100 choices was selected by the participants, where no selection for CMMI Level 5 and/or ISO 15504 Level 5, and CMMI Level 3 and/or ISO 15504 Level 3.*

Table 3.10: Frequency Statistics of the Organization Types in Which Participants Work for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private Sector Organization	49	81.7	81.7	81.7
	Public Organization	11	18.3	18.3	100.0
	Total	60	100.0	100.0	

Table 3.11: Frequency Statistics of the Continents in Which Participants Live/Work for the Pilot Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	America	1	1.7	1.7	1.7
	Asia	41	68.3	68.3	70.0
	Australia	1	1.7	1.7	71.7
	Europe	17	28.3	28.3	100.0
	Total	60	100.0	100.0	

After analyzing these descriptive statistics, the answers of the participants for the questions in the second part of the questionnaire were also individually analyzed to detect if there is something to improve or not. There was nothing found to change or improve as a results of these analysis. This is probably owing to the review and refinement steps explained in Section 3.4. Owing to that, there is nothing changed from pilot study to main study. Hence, it was decided to include the pilot study samples in the analyses of main study samples.

3.10 Instrument Deployment and Data Collection for the Main Study

The questionnaire was applied to nearly 4000 participants for one-month period. At the end of one-month, 368 responses are collected (response rate: ~9.2%). Note, these numbers reflect the cumulative results, including the samples from the pilot study.

To distribute questionnaire and collect data, below mentioned methods were followed:

1. A total 200 printed-form questionnaires were distributed to people from six different organizations.
2. Nearly 1700 individual e-mail messages were sent to the people to invite them participate in the online questionnaire on the LinkedIn. These people were from six different continents and from different disciplines and departments having relation with the processes.
3. Nearly 300 individual e-mail messages were sent to the people from the SEI Partner Organizations to invite them participate in the online questionnaire, whose e-mail addresses were obtained from the SEI Partner Organizations Web Page.
4. Nearly 100 individual e-mail messages were sent to the people from the Turkish Standards Institute to invite them participate in the online questionnaire, whose e-mail addresses are obtained from the Turkish Standards Institute web page.

5. Nearly 300 individual e-mail messages were forwarded by the friends to the people to invite them participate in the online questionnaire.
6. Nearly 300 individual e-mail messages were sent to friends to invite them participate in the online questionnaire.
7. Nearly 1100 individual e-mail messages were sent to the people to invite them participate in the online questionnaire on the related Yahoo Groups. These people are from six different continents and from different disciplines and departments having relation with the processes.

Consequently, a total of 368 responses were obtained. The 77 of these were obtained via printed-form questionnaires, and the 291 of these were obtained via online questionnaire. Additional statistics and analyses for these participants are provided in the CHAPTER 4.

3.11 Exploratory Factor Analysis (EFA)

Exploratory factor analysis (EFA) is used to explore and review the causal and principal correlational relations in a set of data (Neill, 2012).

In this study, following 11 steps were tailed to apply EFA. These steps were not sequentially and/or linearly followed, certain steps were applied simultaneously. Yet, the details were listed in succession to let the readers easily recognize the elements of the applied EFA, and capture details of every minute in the applied EFA:

1. Sample size adequacy was checked.
2. Anti-image correlation matrix was analyzed.
3. Kaiser-Meier-Olkin (KMO) and Bartlett's test was applied.
4. Extracted communalities were checked and addressed.
5. Factor analysis extraction method was defined and applied.
6. Rotation method was defined and applied.
7. Item main loadings (coefficients) were checked.
8. Rotated component matrix was created.

9. Number of factors was determined.
10. Total variance explained was evaluated and analyzed.
11. Factors and items per factors were defined and analyzed.

3.12 Theoretical and Methodological Information and Justifications for the Applied EFA

In this section, theoretical and methodological information and justifications for the applied EFA in the context of this study are provided. For each step of the applied EFA, related information is provided in the following sections throughout Section 3.12.1 to 3.12.11.

3.12.1 Step 1: Checking Sample Size Adequacy

The minimum sample size in factor analysis is can be decided via rule of ten. That is, as a minimum ten cases for each focus in the used instrument must be attained (Garson, 2012).

Additionally, Fabrigar, Wegener, MacCallum, and Strahan (1999) note that a sample of 200 or more is suitable.

Data analyses and results pertaining to this step are provided in Section 4.5.1.

3.12.2 Step 2: Analyzing Anti-image Correlation Matrix

Measuring of sampling adequacy (MSA) for each item in the questionnaire is tested by looking at the values on the diagonals in anti-image correlation matrix (AIC). MSA values on the diagonals of AIC are used to check if correlations among the individual items are strong enough to advocate that the correlation matrix is factorable (Pett, Lackey, & Sullivan, 2003, p. 81).

To provide this factorability and to ensure strong correlations among items, MSA values on the AIC should be greater than 0.50 (Schwab, 2007).

Data analyses and results pertaining to this step are provided in Section 4.5.2.

3.12.3 Step 3: Applying KMO and Bartlett's Test

For a good factor analysis, Kaiser-Meier-Olkin (KMO) sampling adequacy value of 0.6 or above is required (Tabachnick & Fidell, 2001, p. 589). Additionally, in their work, Hutcheson and Sofroniou (as cited in Field, 2009, p. 659) proposed bare minimum of 0.5 value for KMO, and that values between 0.5 and 0.7 are average, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great and values for KMO above 0.9 are excellent. Moreover, Garson (2012) note that a value of 0.6 or greater is accepted as satisfactory, and a value of 0.8 or greater is recognized as noble factorability.

Bartlett's test of sphericity can be referenced to accept or reject the null hypothesis that variables are uncorrelated in a population. If null hypothesis cannot be vetoed, then and there the suitability and correctness of factor analysis must be probed (Malhotra, 2004). Explicitly, null hypothesis is vetoed and appropriateness of factor analysis is safeguarded when the Bartlett's test of sphericity result is significant (Garson, 2012). Specifically, Sig. value for Bartlett's Test of Sphericity should be less than 0.05.

Data analyses and results pertaining to this step are provided in Section 4.5.3.

3.12.4 Step 4: Checking and Addressing Extracted Communalities

Communality measures percentage of differences in a specified variable described by all factors conjointly, and might be treated as the reliability of items (Garson, 2012). Garson (2012) also notes that communalities can be used to decide how good a factor analysis is working on behalf of measured items in an instrument.

For EFA, extracted communality values for the items should be greater than 0.50 (Schwab, 2007; Cretu & Brodie, 2009). Communalities less than 0.50 are accepted as low communality, and this means there is a considerable variance unexplained by the factors extracted (Neill, 2012).

Data analyses and results pertaining to this step are provided in Section 4.5.4.

3.12.5 Step 5: Defining and Applying Factor Analysis Extraction Method

There are two main approaches to EFA: Principal components method (PC) and principal axis factoring (PAF). PC is used to reduce data to a set of factor scores for use in other data analyses. When compared with the PAF, PC is more common and more practical, and PC analyses all the variance, although PAF analyzes only the shared variance (Neill, 2012).

Data analyses and results pertaining to this step are provided in Section 4.5.5.

3.12.6 Step 6: Defining and Applying Rotation Method

Vogt (as cited in Brown, 2009) defines rotation as methods in factor analysis by which a researcher attempts to relate the calculated factors to theoretical entities, while a researcher does this in a different way depending upon whether the factors are supposed to be correlated (oblique) or uncorrelated (orthogonal). In addition, Kim and Mueller (as cited in Brown, 2009) note that whether factors are correlated or not may not make much difference in the exploratory stages of analysis, and employing a method of orthogonal rotation may be preferred over oblique rotation. Gorsuch (as cited in Brown, 2009) lists four different orthogonal methods for rotation: Equamax, orthomax, quartimax, and varimax. Kim and Mueller (as cited in Brown, 2009) additionally advises the selection of the commonly available methods of rotation, such as varimax if orthogonal rotation is pursued, for the beginners in the field.

Furthermore, the best orthogonal rotation is widely believed to be varimax (DeCoster, 1998). Costello and Osborne (2005) also assert that in spite of the availability of different options for rotation, varimax rotation is undoubtedly the most customarily used option, and it is the default option of the statistical packages that have defaults (Tabachnick & Fidell, 2001, p. 615).

Data analyses and results pertaining to this step are provided in Section 4.5.6.

3.12.7 Step 7: Checking Item Main Loadings (Coefficients)

Neill (2012) recommends item main loadings (coefficients) whose absolute values below 0.4 should be suppressed in the composition of factor structure to make it more interpretable.

Data analyses and results pertaining to this step are provided in Section 4.5.7.

3.12.8 Step 8: Creating Rotated Component Matrix

There is no additional theoretical and methodological information and justifications for this step.

Data analyses and results pertaining to this step are provided in Section 4.5.8.

3.12.9 Step 9: Determining Number of Factors

The Kaiser criterion, a method to decide the optimal number of factors, recommends that the number of factors to be extracted ought to be equal to the number of the eigenvalues of the correlation matrix that are larger than one (DeCoster, 1998; Habing, 2003; Tabachnick & Fidel, 2001, p. 620). Eigenvalue (EV) indicates the amount of variance that each identified factor comprises, and EVs over one are stable (Neill, 2012).

The Scree test, another method to determine the optimal number of factors, states that the eigenvalues of the correlation matrix should be plotted in descending order, and number of factors equal to the number of eigenvalues that occur before the last specified drop in eigenvalue magnitude should be determined as the number of factors extracted (DeCoster, 1998; Tabachnick & Fidel, 2001, p. 621).

Data analyses and results pertaining to this step are provided in Section 4.5.9.

3.12.10 Step 10: Evaluating and Analyzing Total Variance Explained

Faithfully, researchers are happy with 50-75% of the total variance explained values (Neill, 2012).

Data analyses and results pertaining to this step are provided in Section 4.5.10.

3.12.11 Step 11: Defining and Analyzing Factors and Items per Factors

Bare minimum for number of items per factor is two, and recommended minimum is three (Neill, 2012). Furthermore, two-indicator rule says that two items per factor is sufficient, and three-indicator rule says that three items per factor is enough for identification of the construct (O'Brien, 1994).

Data analyses and results pertaining to this step are provided in Section 4.5.11.

3.13 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is used to check whether factors (components) and loadings of measured variables (items) on them comply with what is projected based on previously formed theories (Garson, 2012). A CFA model may arise from a theoretical considerations and/or be based on the results of the EFA (Everitt & Hothorn, 2011, p. 201).

In this study, following seven steps were tailed to apply CFA. These steps were not sequentially and/or linearly followed, certain steps were applied simultaneously. Yet, the details were listed in succession to let the readers easily recognize the elements of the applied CFA, and capture details of every minute in the applied CFA:

1. Model was drawn with SmartPLS (Ringle, Wende, & Will, 2005).
2. PLS (Partial Least Squares) algorithm was run.
3. Factor loadings were checked.
4. Composite reliabilities (CR) were checked.
5. Average variance extracted (AVE) values were checked.
6. Convergent validity was ensured.
7. Discriminant validity was checked and ensured.

3.14 Theoretical and Methodological Information and Justifications for the Applied CFA

In this section, theoretical and methodological information and justifications for the applied CFA in the context of this study are provided. For each step of the applied CFA, related information is provided in the following sections throughout Section 3.14.1 to 3.14.7.

3.14.1 Step 1: Drawing Model with SmartPLS

Schumacker & Lomax Model (1996, p. 81) note that a model is drawn with an intention of specifying associations and interactions between latent variables (constructs/factors) and observed variables (items).

Drawn model for the initial model is given in Section 4.6.1, and drawn model for the modified final model is provided in Section 4.8.1.

3.14.2 Step 2: Running PLS Algorithm

After drawing model, PLS algorithm is run in order to ensure or refute convergent validity and discriminant validity of the measurement model. There is no additional direct theoretical and methodological citation for this step, yet this step was provided to let the readers know the structure and capture details of every minute in the applied CFA.

Results of PLS algorithm run for the initial model are given in Section 4.6.2, and results of PLS algorithm run for the modified final model are provided in Section 4.8.2.

3.14.3 Step 3: Checking Factor Loadings

In PLS, individual item reliabilities are evaluated by means of investigation of factor loadings (or basic correlations) of measures with corresponding factors (Hulland, 1999). For CFA, factor loadings should be greater than 0.6 (Bagozzi &

Yi, 1988). Yet, Hulland (1999) emphasize that general opinion of many scholars is accepting indicators/items whose loading values are 0.7 or larger.

Data analyses and results pertaining to this step for the initial model are given in Section 4.6.3, and for the modified final model are provided in Section 4.8.3.

3.14.4 Step 4: Checking Composite Reliabilities (CR)

The composite reliability (CR) is there to check how well a construct (factor/component) is measured by its assigned items (Gotz, Liehr-Gobbers, & Krafft, 2010, p. 695). CR values larger than 0.6 are normally judged as satisfactory (Bagozzi & Yi, 1988). Furthermore, a block is considered homogenous as long as the CR is larger than 0.7 (Vinzi, Trinchera, & Amato, 2010, p. 50).

Data analyses and results pertaining to this step for the initial model are given in Section 4.6.4, and for the modified final model are provided in Section 4.8.4.

3.14.5 Step 5: Checking Average Variance Extracted (AVE) Values

Average variance extracted (AVE) comprises a variance of factor's indicators (items) collected by a factor with regard to a total extent of variance, which contains a variance caused by a measurement error (Gotz et al., 2010, p. 696). In their work, Homburg and Giering, and Rodgers and Pavlou (as cited in Gotz et al., 2010, p. 696) note that AVE values less than 0.5 are considered unsatisfactory, since this means more variance is owing to the error variance than caused by the item variance.

Data analyses and results pertaining to this step for the initial model are given in Section 4.6.5, and for the modified final model are provided in Section 4.8.5.

3.14.6 Step 6: Ensuring Convergent Validity

Convergent validity can be expresses as a degree to which results of an indicator (item) are similar to the results of another measure (item) that it should be akin to (Byrne, 1998, p. 193). Explicitly, in consequences of the convergent validity

assessment, it is expected to attain ensured convergent validity for the items of constructs with respect to gathered answers. Convergent validity is checked and ensured by the steps 3, 4, and 5, explained above. Namely, factor loadings, CR values, and AVE values are calculated and evaluated to check and ensure convergent validity.

Results pertaining to this step for the initial model are given in Section 4.6.6, and for the modified final model are provided in Section 4.8.6.

3.14.7 Step 7: Checking and Ensuring Discriminant Validity

Discriminant validity is defined as the unlikeness of the constructs (factors/components) in a measurement model (Gotz et al., 2010, p. 696). Fornell and Larcker note that AVE values ought to be used to ensure or refute discriminant validity (1981). Hulland (1999) remarks that this measure ought to be larger than a variance shared between a construct and other constructs in a model; specifically, squared correlations among constructs. Discriminant validity can be revealed in a correlation matrix. Correlations, in a correlation matrix, among constructs in the lower left off-diagonal elements of a matrix, and square roots of AVE values calculated for each of constructs along the diagonal (Hulland, 1999). To be precise, in order to ensure discriminant validity, square roots of the AVE values for each factor must be greater than correlations among factors.

Data analyses and results pertaining to this step for the initial model are given in Section 4.6.7, and for the modified final model are provided in Section 4.8.7.

3.15 Structural Equation Modeling (SEM)

Hoyle (as cited in Weston & Gore, 2006) defines model as a statistical declaration, communicated by means of equivalences or a drawing, on the subject of theorized or posited associations and interactions among variables based on a theory or a research.

Structural equation modeling (SEM) might be supposed as a fusion of factor analysis and path analysis; yet main distinction between a SEM and other methods is a SEM's capability to estimate and test associations and interactions among factors/latent variables (Weston & Gore, 2006).

Before going further about the theoretical and methodological information and justifications for the applied SEM, it is deemed necessary to make the definitions of some terms clear to provide stress-free understanding of this part to readers. Below provided definitions were mostly adapted from the work of Weston and Gore (2006).

- ***Latent variable, factor, construct, or component***: Unobserved hypothetical variable (for instance, organizational culture).
- ***Manifest variable, indicator, measured variable, or item***: Observed variable (for example, PEOU1 item in the questionnaire).
- ***Factor loading or path loading***: Correlation between a latent variable and a manifest variable (e.g., unidirectional arrow from Audit to AUD1).
- ***Path coefficient, direct effect, or path***: Correlation between two latent variables (e.g., unidirectional arrow from PU to BI).
- ***Independent variable, exogenous variable, or predictor***: Variable not dependent on or predicted by other latent variables (for example, STB construct).
- ***Dependent variable, endogenous variable, or criterion***: Variable predicted by other latent variables (for instance, PEOU construct).
- ***Measurement model***: Designates relationships between manifest variables (items) and latent variables (factors).
- ***Structural model***: Designates associations and/or interactions among latent variables.
- ***Composite model***: Defines a situation where a measurement model and a structural model are together implied.

SEM might be utilized to express an extent to which IS researches fulfill recognized benchmarks for superior and high-grade statistical analyses (Gefen, Straub, & Boudreau, 2000).

As SEM is a crossbreed of a factor analysis and a path analysis, it has two main components: a structural model and a measurement model (Weston & Gore, 2006; Gefen et al., 2000).

A covariance based SEM and a partial least squares (PLS) SEM are types of available, and widely used and exploited SEMs (Gefen et al., 2000). The latter, is also refereed as a component based SEM. Pertaining to analysis purposes, statistical suppositions, and natures of suitable statistics, these two distinct types of SEM show a discrepancy (Gefen et al., 2000).

Thompson, Barclay, and Higgins say (as cited in Gefen et al., 2000) that the overall statistical aim of a PLS SEM is to show high R square and significant *t*-values, accordingly refusing the null hypothesis of no-influence. However, Bollen, Hair, Anderson, Tatham, and Black, and Joreskog and Sorbom say (as cited in Gefen et al., 2000) that the aim of a covariance-based SEM is to demonstrate that an operationalization of a theory being studied is verified/confirmed and not vetoed by data in hand.

It was decided to use PLS SEM (Partial Least Squares Structural Equation Modeling) over covariance based SEM, owing to the listed reasons below:

- PLS SEM requires only the very limited distributional assumptions (Chin, Peterson, & Brown, 2008).
- In PLS SEM, bootstrapping is used to empirically estimate standard errors for its parameter estimates, which safes escape from constricting distributional assumptions (Gefen, Rigdon, & Straub, 2011).
- PLS PM does not necessarily necessitate sound theory base. That is to say, PLS supports both exploratory and confirmatory research (Gefen, Rigdon, & Straub, 2011).

- Wold note (as cited in Gefen et al., 2011) that PLS PM is a tool for situations that are “data-rich but theory-primitive.”
- PLS SEM ought to be chosen provided that the research is exploratory or an extension of an existing structural theory (Hair, Ringle, & Sarstedt, 2011).
- If there is many constructs and many indicators in the structural model, that is the structural model is complex; PLS SEM should be selected (Hair et al., 2011).

Hoyle, Kaplan, Kline, and Schumacker and Lomax, in their studies, (as cited in Weston & Gore, 2006) note that scholars working with SEM practices agree on six fundamental steps required for model testing. These are data collection, model specification, identification, estimation, evaluation, and modification.

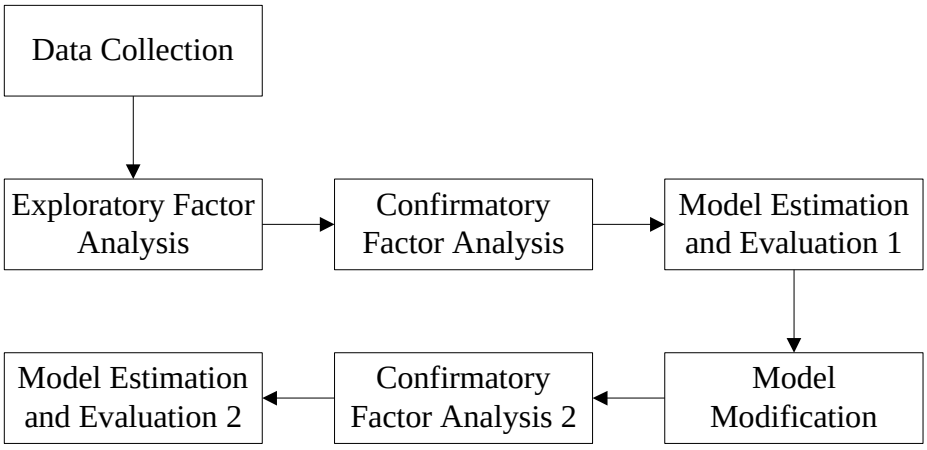


Figure 3.4: Structural Equation Modeling (SEM) Steps

3.15.1 SEM Step 1 - Data Collection

This step is the very first step in SEM. In this step, a researcher collects data from a defined sample from the target population, based on established hypothesis and other constraints set by the researcher.

Data collection details for this study are explained in Section 3.10.

3.15.2 SEM Step 2 - Model Specification

In order to provide model specification, it is required to identify which relationships are assumed to be present or not to be present among manifest variables and latent variables (Weston & Gore, 2006).

This step of the SEM is accomplished by means of the applied CFA, based on the applied EFA explained thoroughly in Sections 3.11 and 3.12.

Applied CFA is explained comprehensively in Sections 3.13 and 3.14.

3.15.3 SEM Step 3 - Model Identification

The number of degrees of freedom (DF) is there to determine the model identification. The number of DF in a model equals to the difference between the number of parameters to be estimated and the number of known elements. When there is

- more than zero degrees of freedom, the model is categorized as over-identified,
- zero degrees of freedom, the model is called as just-identified and will fit the data perfectly, and
- less than zero degrees of freedom, the model is called as under-identified and cannot be estimated.

To sum up, the larger the degrees of freedom is, the more parsimonious the model is, and when a parsimonious model fits the data well, researchers are able to prove that relationships between manifest variables and latent variables are most significant (Weston & Gore, 2006).

This step of the SEM is also fulfilled by means of the applied CFA, based on the applied EFA explained thoroughly in Sections 3.11 and 3.12.

Applied CFA is explained comprehensively in Sections 3.13 and 3.14.

3.15.4 SEM Step 4 - Estimation

Estimation is the determination of the values of the unknown parameters and the errors related with the estimated values. Generally a SEM software program is used to calculate the estimates of the unknown parameters (Weston & Gore, 2006). In PLS SEM, bootstrapping is performed meant for estimating the significance (*t*-values) of the paths (Gefen et al., 2000).

During bootstrapping, the minimum number of bootstrap samples should be 5000, and the number of cases should be equal to the number of observations in the original sample (Hair et al., 2011). Based on this, in this study, bootstrapping was applied with below given parameters and values:

- Cases (actual number of sample size): 368
- Samples (bootstraps resamples): 5000

Analyses and detailed results of this step of the applied SEM for the initial model are thoroughly given in Section 4.7, and analyses and detailed results for the modified final model are thoroughly provided in Section 4.9.

3.15.5 SEM Step 5 - Evaluation

Evaluation is done with the intention of determining if the relations among manifest and latent variables, proposed by a researcher's estimated model, sufficiently reveal and adhere to the observed relations in the collected data (Weston & Gore, 2006).

In PLS SEM, goodness for model fit is ensured with statistically significant path coefficients, high R square values, and construct reliabilities being above a value of 0.70 for each latent variable (Gefen et al., 2000).

R square values for endogenous latent variables in the structural model can be described as given in Table 3.12 (Hair et al., 2011).

Table 3.12: R Square Values and Their Descriptions

R square Value	Description for the Value
R square > 0.75	Substantial
R square > 0.25 & R square < 0.75	Moderate
R square < 0.25	Weak

Additionally, critical *t*-values for a one-tailed test are given in Table 3.13 (Stevens, 2009, p. 599).

Analyses and detailed results of this step of the applied SEM for the initial model are thoroughly given in Section 4.7, and analyses and detailed results for the modified final model are thoroughly provided in Section 4.9.

Table 3.13: Critical Values for *t* on behalf of the Cases where Degree of Freedom is Greater than 120 (or ∞)

	Level of Significance for One-Tailed Test					
Degree of freedom	0.10	0.05	0.025	0.01	0.005	0.0005
∞ (>120)	1.282	1.645	1.960	2.326	2.576	3.291

3.15.6 SEM Step 6 - Modification

Modification of the model (re-specification) is done by freeing or setting parameters to achieve the best-fitting model (Weston & Gore, 2006).

In this step of the SEM, the model was iteratively and consciously modified, as required by the SEM to accomplish the best-fitting model. That's why, the data analysis and results for both the "initial" model and the "modified final" model were provided in the CHAPTER 4.

Evaluation and results details for the initial model are comprehensively given in Section 4.7, and evaluation and results details for the modified final model are comprehensively provided in Section 4.9.

3.16 Descriptive Statistics and *t*-Tests

In addition to the quantitative analysis methods, detailed and explained in previous sections, descriptive statistics and the *t*-tests were used in order to get more information about collected data and tried to reach more conclusions and interpretations.

Descriptive statistics are used with the intention of describing samples of subjects in terms of items in the questionnaire and/or variables (Tabachnick & Fidell, 2001, p. 7).

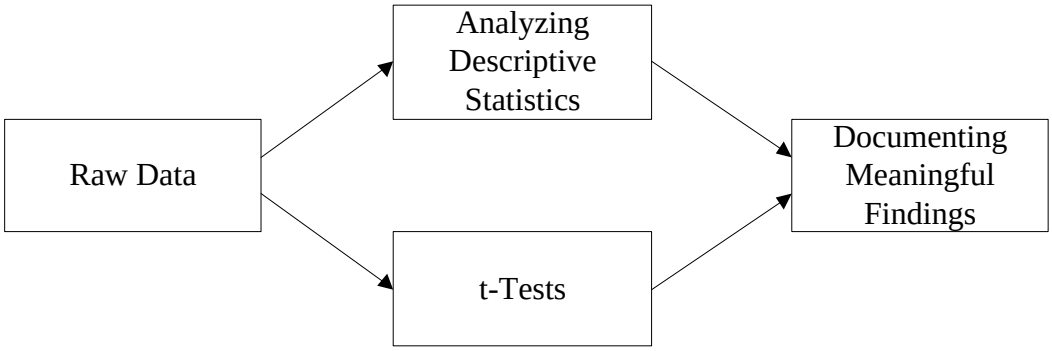


Figure 3.5: Flow for the Descriptive Statistics and *t*-Tests

Moreover, *t*-test is used with the purpose of evaluating the differences in means between two groups, and *t*-tests measure if means of two groups are statistically significantly diverse (Trochim, 2006; StatSoft, n.d.).

In addition to data analyses and results provided in previous sections, it was aimed to achieve additional findings to reflect some attention-grabbing and imperative points additionally discovered in the course of data analyses.

In this context, frequency statistics tables were created for certain items in the questionnaire, and applied *t*-tests for certain groups to elicit statistically significant

differences in order to draw more conclusions based on the collected data to test and/or explore or answer below listed questions.

- Is there a need of an easily accessible guideline about processes?
- Is there a need for tools regarding processes?
- What should be the language for documenting processes?
- Is just text is enough for process definitions?
- Is there a need to compose a devoted-group for process activities?
- Is there a need of consultants for processes?
- How much information or details should a process include?
- Does gender make any difference for preference regarding the modeling type of processes based on the purposes?
- Does gender make any difference for preference regarding outputs of processes?
- Does gender make any difference for preference regarding deployment and stability of processes?
- Does gender make any difference for preference regarding stability of processes?
- Does gender make any difference for preference regarding how much text there should be in the processes?
- Does gender make any difference for preference regarding how much complex the interaction with the processes should be?
- Does maturity level make any difference for preference regarding the modeling type of processes?
- Is there a statistically significant relationship between maturity level and process modeling type?
- Does maturity level make any difference for preference regarding outputs or results of processes?
- Is there a statistically significant relationship between maturity level and tailoring of processes?

- Does continent (Asia or Europe) make any difference for preference regarding that commitments of people about processes?
- Does continent (Asia or Europe) make any difference for preference regarding the organizational culture about processes?
- Does continent (Asia or Europe) make any difference for preference regarding the tailoring of processes?
- Is there a statistically significant difference between undergraduate and graduate people regarding trainings?
- Is there a statistically significant difference between engineering and quality assurance/process people for preference regarding the constructs?

Further details, analysis, and results of descriptive statistics and *t*-tests for the above listed content and context are provided in Section 4.10.

3.17 Qualitative Data Analysis for the Main Study

Even though this study is generally a quantitative research and it proposes and tries to verify the theses via quantitative methods, the quantitative part of the study were also addressed and dealt with to a certain extent, with the purpose of identifying factors influencing the acceptance of processes.

The core of qualitative research and analysis includes describing phenomena, classifying it, and seeing how concepts interconnect and related, regarding meanings (Dey, 1993).

The over-all flow of the qualitative analysis that was followed in this study is depicted in Figure 3.6.

Meant for qualitative data analysis, a table was composed to list and manage the qualitative data gathered. After populating the table, the quasi-statistics were used to determine the possible additional factors for process acceptance. To do so, a descriptive statistics-frequency table was created to observe and analyze the initial frequencies of assigned codes. Additionally, another descriptive statistics-

frequency table was created to detect and analyze the final frequencies of assigned codes, once somehow irrelevant or lacking with respect to quality, content or context qualitative data are excluded. At this time, a criterion was set to include the new constructs: including ones have frequency equal to or more than seven; in order to deal with repetitive and shared concerns for the context, more willingly than dealing with the individual or distinctive concerns or comments. The seven is determined as seven counts nearly 5% of the whole usable samples (131) providing qualitative answers.

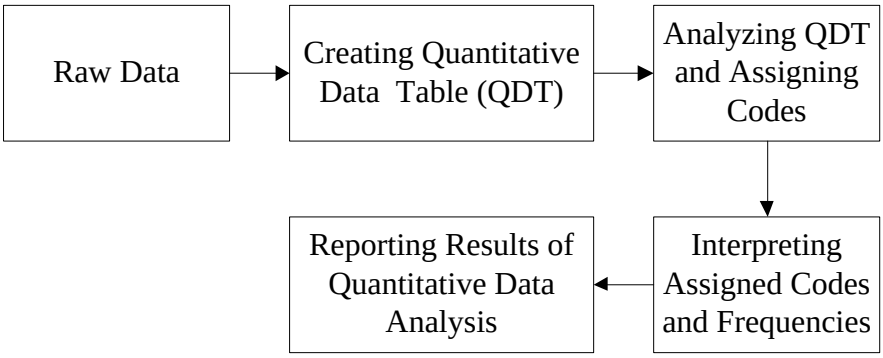


Figure 3.6: Over-all Flow of the Applied Qualitative Analysis

Further details, analyses, and results of the qualitative part of the study are provided in Section 4.11.

CHAPTER 4

DATA ANALYSIS AND RESULTS

In this chapter, data analysis and results of the study are provided.

In this context,

- Section 4.1 delivers descriptive statistics results for the whole sample properties,
- Section 4.2 explains the things done in the scope of data screening the proposed model,
- Section 4.3 shows the reliability of the instrument,
- Section 4.4 shows the validity of the instrument,
- Section 4.5 gives the details for the applied exploratory factor analysis and results,
- Section 4.6 delivers the information about the applied confirmatory factor analysis and results for the initial model,
- Section 4.7 gives details about the estimation and evaluation of the initial model,
- Section 4.8 delivers the information about the applied confirmatory factor analysis and results for the modified final model,
- Section 4.9 gives details about the estimation and evaluation of the modified final model,

- Section 4.10 supplies additional findings based on descriptive statistics and *t*-tests, and
- Section 4.11 provides additional findings based on qualitative data analysis and results.

4.1 Descriptive Statistics Results for the Sample Properties

For the whole sample, 368 participants, the descriptive statistics results were created to reflect their characteristics and features. Outcomes of these descriptive statistics results for the sample properties are provided throughout in Table 4.1 to Table 4.10.

Table 4.1: Frequency Statistics of the Education Levels of Participants for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduate	204	55.4	55.4	55.4
	Undergraduate	110	29.9	29.9	85.3
	Doctorate	43	11.7	11.7	97.0
	High School	7	1.9	1.9	98.9
	Associate Degree	4	1.1	1.1	100.0
	Total	368	100.0	100.0	

Table 4.2: Frequency Statistics of the Age Intervals of Participants for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	26-33	146	39.7	39.7	39.7
	34-41	83	22.6	22.6	62.2
	50 or Over	65	17.7	17.7	79.9
	42-49	48	13.0	13.0	92.9
	18-25	26	7.1	7.1	100.0
	Total	368	100.0	100.0	

Table 4.3: Frequency Statistics of the Genders of Participants for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	227	61.7	61.7	61.7
	Female	140	38.0	38.0	99.7
	Other	1	0.3	0.3	100.0
	Total	368	100.0	100.0	

Table 4.4: Frequency Statistics of Total Work Experiences of Participants for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12 Years or More	158	42.9	42.9	42.9
	3-6 Years	66	17.9	17.9	60.9
	6-9 Years	60	16.3	16.3	77.2
	9-12 Years	48	13.0	13.0	90.2
	0-3 Years	36	9.8	9.8	100.0
	Total	368	100.0	100.0	

Table 4.6: Frequency Statistics of Fields from Which Participants Graduated for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Engineering	227	61.7	61.7	61.7
	Science	41	11.1	11.1	72.8
	Informatics	34	9.2	9.2	82.1
	Economics and Administrative Sciences	25	6.8	6.8	88.9
	Other	24	6.5	6.5	95.4
	Social Sciences	17	4.6	4.6	100.0
	Total	368	100.0	100.0	

Table 4.5: Frequency Statistics of Fields in Which Participants Work for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Engineering	144	39.1	39.1	39.1
	Quality Assurance or Process	90	24.5	24.5	63.6
	Consultancy	43	11.7	11.7	75.3
	Management	40	10.9	10.9	86.1
	Independent Auditing and Certification	13	3.5	3.5	89.7
	Human Resources or Training	11	3.0	3.0	92.7
	Other	10	2.7	2.7	95.4
	Acquisition/Contract/Purchasing	7	1.9	1.9	97.3
	Administrative Affairs	4	1.1	1.1	98.4
	Marketing	4	1.1	1.1	99.5
	Finance	2	0.5	0.5	100.0
	Total	368	100.0	100.0	

Table 4.7: Frequency Statistics of Assigned* Maturity Levels for the Participants' Associations for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	146	39.7	39.7	39.7
	5	137	37.2	37.2	76.9
	2	85	23.1	23.1	100.0
	Total	368	100.0	100.0	

**Note: Maturity level was assigned based on the following rules:*

- *"5" if at least one of CMMI Level 5 or ISO 15504 Level 5 choices was selected by the participants,*
- *"3" if at least one of CMMI Level 3 or ISO 15504 Level 3 choices was selected by the participants, where no selection for CMMI Level 5 and/or ISO 15504 Level 5, and*
- *"2" if at least one of ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, or AS 9100 choices was selected by the participants, where no*

selection for CMMI Level 5 and/or ISO 15504 Level 5, and CMMI Level 3 and/or ISO 15504 Level 3.

Table 4.8: Frequency Statistics of High Maturities* for the Participants' Associations for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mature	231	62.8	62.8	62.8
	High Mature	137	37.2	37.2	100.0
	Total	368	100.0	100.0	

**Note: High-maturity was decided on the following rules:*

- *"High Mature" if at least one of CMMI Level 5 or ISO 15504 Level 5 choices was selected by the participants, and*
- *"Mature" if at least one of CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, or AS 9100 choices was selected by the participants, where no selection for CMMI Level 5 and/or ISO 15504 Level 5.*

Table 4.9: Frequency Statistics of Organization Types in Which Participants Work for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private Sector Organization	316	85.9	85.9	85.9
	Public Organization	52	14.1	14.1	100.0
	Total	368	100.0	100.0	

Table 4.10: Frequency Statistics of Continents in Which Participants Live/Work for the Main Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asia	210	57.1	57.1	57.1
	Europe	111	30.2	30.2	87.2
	America	42	11.4	11.4	98.6
	Australia	4	1.1	1.1	99.7
	Africa	1	0.3	0.3	100.0
	Total	368	100.0	100.0	

4.2 Data Screening

4.2.1 Checking for Incorrectly Entered Data

As this research used both online and printed-form questionnaires to collect data, it may be quite possible that there were some incorrectly entered data during transfer of results of printed-form questionnaires.

In this study, 77 of 368 total responses (20.9%) for the questionnaire were gathered via printed-form questionnaires, and these were transferred to the main database by making use of the designed online questionnaire which was designed so that incorrect data entry is prevented.

Screening for accuracy of a large data file, like the one used in this research, requires making use of descriptive statistics of the variables, and descriptive programs like SPSS frequencies (Tabachnick and Fidell, 2001, p. 57). To check whether there was something wrong with the entered data, the whole data were checked against any possible incorrectly entered data. In this context, based on the frequency tables created with SPSS for each item in the questionnaire, it was checked whether or not there were values and/or answers available which are out of defined range or values. After this evaluation and checking, it is seen that there was no incorrectly entered data.

Actually, this is owing to the fact that the online questionnaire was used to transfer and record the results of printed-form questionnaires. As the designed online questionnaire prevents incorrect data entry, it was thereby prevented for the ones of printed-form questionnaires, and correct data entry was ensured for all samples.

4.2.2 Checking for Missing Data

One of the general problems in data analysis is missing data issues (Tabachnick and Fidell, 2001, p. 58). That's why, it was checked whether there was any missing data values in the subject study. Additionally, missing data values in

variables are to affect the statistical analysis of data, and these should be handled for statistical analyses (Schumacker and Lomax, 2004, p. 25).

This research used a questionnaire which has three parts and it was asked and imposed that the first two parts (part 1 and part 2) of the questionnaire shall be completed fully by the participants, yet the last part (part 3) of the questionnaire was optional to fill out.

Therefore, for the sake of analysis and meeting related statistical methods and/or application requirements any missing data shall be identified and handled. In order to check the missing data frequencies table was created with SPSS and number of missing data cases were evaluated. Table 4.11 provides the details for the missing values for the items included in the questionnaire; numbers of missing values for the items in the questionnaire are highlighted in the Table 4.11.

Table 4.11: Descriptive Statistics for Missing Data Values of the Items in the Questionnaire

		EL	AGE	GEN	EXP	FW	FG
N	Valid	368	368	368	368	368	368
	Missing	0	0	0	0	0	0

CW	CP	OT	CONT	MDL1	MDL3
368	368	368	368	368	368
0	0	0	0	0	0

MDL2	MDL4	MDL5	BI1	OU1	OU2
368	368	368	368	368	368
0	0	0	0	0	0

PD1	PD2	PD3	OC1	OC2	OC3
368	368	368	368	368	368
0	0	0	0	0	0

OC4	JR1	JR2	JR3	OQ1	OQ2
368	368	368	368	368	368
0	0	0	0	0	0

OQ3	RD1	RD2	RD3	TLR1	TLR2
368	368	368	368	368	368
0	0	0	0	0	0

Table 4.11 (continued).

TLR3	TLR4	AUD1	AUD2	AUD3	TRN1
368	368	368	368	368	368
0	0	0	0	0	0
TRN2	TRN3	TRN4	STB1	STB2	STB3
368	368	368	368	368	368
0	0	0	0	0	0
BI2	SN1	SN2	SN3	SN4	PU1
368	368	368	368	368	368
0	0	0	0	0	0
PU2	PU3	PU4	PU5	GRN1	GRN2
368	368	368	368	368	368
0	0	0	0	0	0
GRN3	FC1	FC2	FC3	MED1	MED2
368	368	368	368	368	368
0	0	0	0	0	0
MED3	MED4	MED5	PEOU1	PEOU2	PEOU3
368	368	368	368	368	368
0	0	0	0	0	0
PEOU4	PEOU5	PEOU6	BI3	OM1	OM2
368	368	368	368	368	368
0	0	0	0	0	0
OM3	OM4				
368	368				
0	0				

As seen in the Table 4.11, there was no missing value / data for all of the must items in the questionnaire to fill out.

In fact, this was achieved via two basic tactics:

1. For the online questionnaire, the questionnaire was designed so that is impossible to skip a question or item which is must to fill out (that is, all items in part 1 and part 2 of questionnaire). Specifically, it was technically made impossible to submit a questionnaire without fully completing the

first two parts of the questionnaire. This provided that there was no missing value for the online questionnaires, which included the 291 samples of 368 total sample (79.1%).

2. For the printed-form questionnaire, the need and expectation of the researcher about the full completion of the first two parts of the questionnaire was highlighted in the cover page of the questionnaire (Figure 4.1). Additionally, in order to remind the expectation to the participant a checking section was added to the end of the printed-form questionnaire to let the participant recheck that whether there is unfilled part in the first two part of the questionnaire or not (Figure 4.2). This also provided that there was no missing value for the printed-form questionnaires, which included the 77 samples of 368 total sample (20.9%).

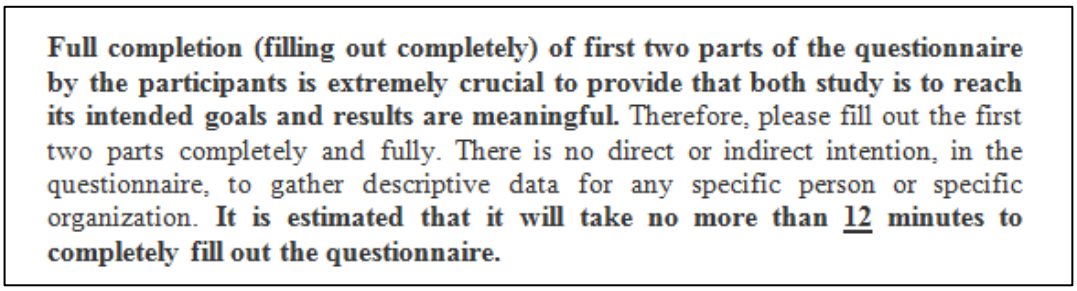
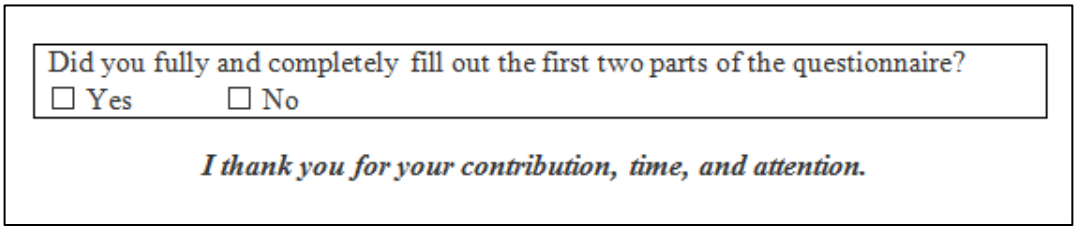

Full completion (filling out completely) of first two parts of the questionnaire by the participants is extremely crucial to provide that both study is to reach its intended goals and results are meaningful. Therefore, please fill out the first two parts completely and fully. There is no direct or indirect intention, in the questionnaire, to gather descriptive data for any specific person or specific organization. **It is estimated that it will take no more than 12 minutes to completely fill out the questionnaire.**

Figure 4.1: Highlight for the Expectation of the Researcher for the Full Completion of the First Two Sections of the Questionnaire


Did you fully and completely fill out the first two parts of the questionnaire?
☐ Yes ☐ No

I thank you for your contribution, time, and attention.

Figure 4.2: Reminder and Checking Section for the Expectation of the Researcher for the Full Completion of the First Two Sections of the Questionnaire

4.2.3 Checking for Outliers

Outlier is defined as "a case whose value on a variable falls outside the typical pattern (either much higher or lower than other values)" (Dietz and Kalof, 2009, p. 541). As noted by Tabachnick and Fidell (2001, p. 67), there are four reasons for the occurrence of outliers:

1. ***Incorrect data entry***. This issue is addressed in Section 4.2.1. According to analysis results, there was no incorrectly entered data in the data file and all data are accurate. Therefore, there is no problem/issue regarding the incorrect data entry that may cause outliers.

2. ***Failure to specify missing value codes***. In such a case, it is possible that missing-value indicators are read and/or interpreted as real data. As there was no missing value in the data file, this potential cause for occurrence of outliers is not valid for the subject research.

3. ***Outlier is not of a member of target population***. This happens when in the data file there are values belong to the ones who are not member of the target population. In fact, this is important to provide that these sorts of data should be detected and removed. In this research, people who have relations with certain standards and/or models (i.e. CMMI, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, AS 9100, ISO 27001, and ISO 15504) were specifically included. Therefore, someone who have no relation with these standards and/or model should not be included in the whole sample, if included then they shall be removed to eliminate the occurrence of outliers as results of that outlier is not of a member of target population.

   Actually, in order to check this, "Certifications for which You Have/Had Auditor/Appraiser/Contributor Role" and "Certificates Hold by the Organization You Work for" questions were included in the first part of the questionnaire and provided "None" or "Other" answer options for the

questions. Thereby, participants selecting “None” or selecting just “Other” option for these questions were decided to be evaluated that they are not the member of target population.

To check any possibility of these sorts of data, the whole raw data file was analyzed in order to find (if any) “None” or just “Other” answers for both of the “Certifications for which You Have/Had Auditor/Appraiser/Contributor Role” and “Certificates Hold by the Organization You Work for” questions.

After this check, it was seen that there is no case for which both of these two questions have “None” or just “Other” answers. This ensured that there is no problem/issue regarding that outlier is not of a member of target population, which may cause outliers.

4. ***The case is from the intended population yet the distribution for the item/indicator has further excessive values than a distribution where normality is ensured***. This is a special point where a considerable amount of time was spent to deal with so as to decide whether these sorts of for deletion or retention. In order to decide on deletion or retention of such possible data the trimmed means technique was used for the detection of outliers’ effects on the means of the variables. Walfish (2006) states that trimmed means entails the mean which is calculated by ignoring some percentage of the lowermost and uppermost marks in the whole data, and real means and trimmed means are analyzed and evaluated to perceive any potential influences on the actual means for the variables of the outliers.

   In this research, the actual means and 5% trimmed means (5% of greatest and 5% of lowest values, 10% in total) of all items were compared, and the differences that possible outliers cause on the means were evaluated. Table 4.12 shows the means values, 5% trimmed mean values and difference values for all items.

Table 4.12: Means, 5% Trimmed Means and Differences for Observed Variables (Items)

Observed Variable ID	N	Mean	5% Trimmed Mean	Difference
MDL1	368	3.18	3.19	0.004
MDL3	368	3.77	3.81	0.010
MDL2	368	3.25	3.27	0.005
MDL4	368	3.79	3.83	0.010
MDL5	368	3.88	3.95	0.016
BI1	368	4.52	4.52	0.000
OU1	368	4.49	4.53	0.008
OU2	368	4.47	4.49	0.004
PD1	368	4.62	4.64	0.003
PD2	368	4.59	4.62	0.006
PD3	368	4.46	4.50	0.009
OC1	368	4.46	4.45	0.000
OC2	368	4.49	4.50	0.002
OC3	368	3.85	4.34	0.002
OC4	368	4.29	4.31	0.003
JR1	368	4.43	4.44	0.003
JR2	368	4.31	4.33	0.003
JR3	368	4.52	4.54	0.005
OQ1	368	4.46	4.47	0.003
OQ2	368	4.43	4.44	0.002
OQ3	368	4.31	4.34	0.007
RD1	368	4.44	4.45	0.002

Table 4.12 (continued).

RD2	368	4.37	4.40	0.006
RD3	368	4.35	4.38	0.006
TLR1	368	4.50	4.53	0.007
TLR2	368	4.48	4.49	0.001
TLR3	368	4.43	4.46	0.007
TLR4	368	4.44	4.47	0.008
AUD1	368	4.54	4.55	0.001
AUD2	368	4.48	4.45	0.007
AUD3	368	4.45	4.48	0.007
TRN1	368	4.54	4.55	0.002
TRN2	368	4.51	4.52	0.002
TRN3	368	4.53	4.55	0.004
TRN4	368	4.47	4.48	0.004
STB1	368	4.41	4.46	0.011
STB2	368	4.35	4.40	0.012
STB3	368	4.41	4.46	0.011
BI2	368	4.54	4.54	0.001
SN1	368	4.28	4.32	0.009
SN2	368	4.18	4.23	0.011
SN3	368	4.21	4.24	0.008
SN4	368	4.23	4.26	0.009
PU1	368	4.41	4.41	0.001
PU2	368	4.39	4.39	0.001
PU3	368	4.44	4.45	0.001

Table 4.12 (continued).

PU4	368	4.44	4.45	0.002
PU5	368	4.44	4.45	0.000
GRN1	368	4.19	4.23	0.010
GRN2	368	4.20	4.24	0.010
GRN3	368	4.40	4.43	0.006
FC1	368	4.43	4.42	0.000
FC2	368	4.38	4.41	0.007
FC3	368	4.51	4.53	0.005
MED1	368	4.47	4.49	0.006
MED2	368	4.43	4.49	0.016
MED3	368	4.51	4.53	0.003
MED4	368	4.42	4.45	0.008
MED5	368	4.49	4.52	0.006
PEOU1	368	4.49	4.51	0.004
PEOU2	368	4.45	4.47	0.005
PEOU3	368	4.48	4.48	0.001
PEOU4	368	4.40	4.43	0.007
PEOU5	368	4.50	4.52	0.005
PEOU6	368	4.45	4.45	0.000
BI3	368	4.52	4.52	0.000
OM1	368	4.43	4.42	0.001
OM2	368	4.43	4.44	0.002
OM3	368	4.47	4.47	0.000
OM4	368	4.42	4.44	0.004

After evaluation of the values in Table 4.12, it was seen that the differences are not extreme and/or not significant, and the decision of retention was made, instead of deletion of cases causing outliers.

In addition to the Tabachnick and Fidell's four reasons, additional rule was set to detect other possible outliers. The rule was that evaluating cases where all items had the same values for a sample as outliers. That is, for example, if a respondent did give the "5" answers to the all questions/items, it was to be treated as outliers, since the questionnaire included some sort of questions which interfere with each other, and logically it is impossible to have the same answer for these contrast questions. Therefore, this additional outlier detection rule was set and the whole data file was checked against this rule. As result of this evaluation, it was seen that there was no case in which all the questions have the same answers for a participant.

Consequently, by following the five rules explained above, it is ensured that in the scope of this study outliers do not have adverse, extreme and pervasive influence on the means of the variables, and they were all okay to retain, as opposed to deletion.

4.2.4 Checking for Normality (Normal Distribution)

Normal (symmetrical) distribution is bell-shaped, unimodal, and symmetrical distribution. It is a theoretical distribution of responses to an item on behalf of which the mean, the median, and the mode have same values (Kendrick, 2005, p. 553).

Morgan and Griego (1998, p. 49) define skewness as lack of symmetry in a frequency distribution. Moreover, distributions having an extended tail to the right are termed as positively skewed, and distributions having an extended tail to the left are categorized as negatively skewed.

Additionally, again Morgan and Griego (1998, p. 49) remark that kurtosis is there to measure whether the peak of the distribution is taller or shorter than the ideal normal curve, and very peaked curves has positive kurtosis.

For normal distribution of a variable, skewness value should be within the range –1 and +1, and kurtosis value should be within the range –3 and +3, (Mutum, 2011; "Testing of Assumptions," n.d.).

Additionally, Leech, Barrett and Morgan (2005, p. 44) point out that if skewness value for the variable is in between +1 and –1, the variable is acknowledged to have a normal distribution. Moreover, Leech et al. (2005, p. 31) recommend that when median, mode, and mean values are nearly equivalent; the distribution is decided as practically normal.

Therefore, with the aim of checking the normality of the variables, Table 4.13 was created with SPSS to analyze the skewness and kurtosis values for the variables.

After this analysis, it was detected that skewness values for the items MDL5, OU1, OU2, MED2, MED4, and PEOU5 are less than –1; and kurtosis values for the items OU1, OU2, SN3, SN4, and MED2 are greater than +3. This may be treated as these variables' normal distribution assumptions were violated to some extent.

In such a case, there is an alternative to apply data transformation (re-expression) to make data normally distributed.

With the aim of doing so, the following transformation methods/techniques were applied:

- Square root transformation,
- Reciprocal transformation,
- Log transformation, and
- Box-cox transformation.

Yet, all the efforts to make the non-normally distributed data transformed into normal distribution have inopportunely failed.

Table 4.13: Descriptive Statistics for Mean, Skewness and Kurtosis Values of the Items in the Questionnaire

	N	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
MDL1	368	3.17	-0.038	0.127	-1.218	0.254
MDL3	368	3.77	-0.696	0.127	-0.324	0.254
MDL2	368	3.24	-0.038	0.127	-1.126	0.254
MDL4	368	3.78	-0.732	0.127	-0.139	0.254
MDL5	368	3.88	-1.057	0.127	0.817	0.254
BI1	368	4.52	-0.140	0.127	-1.827	0.254
OU1	368	4.48	-1.241	0.127	3.380	0.254
OU2	368	4.46	-1.021	0.127	3.295	0.254
PD1	368	4.62	-0.616	0.127	-1.292	0.254
PD2	368	4.58	-0.767	0.127	-0.572	0.254
PD3	368	4.45	-0.654	0.127	0.425	0.254
OC1	368	4.45	0.016	0.127	-1.571	0.254
OC2	368	4.48	-0.216	0.127	-1.333	0.254
OC3	368	4.32	-0.040	0.127	-0.062	0.254
OC4	368	4.29	-0.020	0.127	0.088	0.254
JR1	368	4.42	-0.118	0.127	-1.118	0.254
JR2	368	4.31	-0.309	0.127	1.107	0.254
JR3	368	4.51	-0.628	0.127	-0.090	0.254
OQ1	368	4.45	-0.352	0.127	-0.327	0.254
OQ2	368	4.42	-0.262	0.127	-0.344	0.254
OQ3	368	4.31	-0.403	0.127	0.849	0.254
RD1	368	4.43	-0.106	0.127	-1.190	0.254
RD2	368	4.36	-0.708	0.127	2.258	0.254
RD3	368	4.35	-0.268	0.127	-0.172	0.254
TLR1	368	4.50	-0.544	0.127	-0.734	0.254
TLR2	368	4.48	-0.145	0.127	-1.450	0.254
TLR3	368	4.42	-0.463	0.127	-0.198	0.254
TLR4	368	4.43	-0.640	0.127	0.349	0.254
AUD1	368	4.54	-0.277	0.127	-1.624	0.254
AUD2	368	4.48	-0.285	0.127	-1.149	0.254
AUD3	368	4.45	-0.525	0.127	-0.167	0.254
TRN1	368	4.53	-0.935	0.127	3.032	0.254
TRN2	368	4.50	-0.436	0.127	-0.369	0.254
TRN3	368	4.53	-0.481	0.127	-1.006	0.254

Table 4.13 (continued).

TRN4	368	4.46	-0.910	0.127	2.797	0.254
STB1	368	4.40	-0.955	0.127	2.063	0.254
STB2	368	4.34	-0.843	0.127	1.027	0.254
STB3	368	4.40	-0.803	0.127	1.016	0.254
BI2	368	4.53	-0.195	0.127	-1.807	0.254
SN1	368	4.27	-0.580	0.127	1.376	0.254
SN2	368	4.17	-0.982	0.127	2.641	0.254
SN3	368	4.20	-0.789	0.127	3.148	0.254
SN4	368	4.22	-0.809	0.127	3.194	0.254
PU1	368	4.40	-0.173	0.127	-0.331	0.254
PU2	368	4.38	-0.255	0.127	0.408	0.254
PU3	368	4.44	-0.045	0.127	-1.359	0.254
PU4	368	4.43	-0.106	0.127	-1.190	0.254
PU5	368	4.44	0.005	0.127	-1.456	0.254
GRN1	368	4.18	-0.712	0.127	1.104	0.254
GRN2	368	4.19	-0.734	0.127	1.171	0.254
GRN3	368	4.40	-0.694	0.127	1.313	0.254
FC1	368	4.42	,080	0.127	-1.438	0.254
FC2	368	4.38	-0.226	0.127	-0.769	0.254
FC3	368	4.50	-0.617	0.127	-0.097	0.254
MED1	368	4.46	-0.548	0.127	-0.152	0.254
MED2	368	4.42	-1.567	0.127	4.657	0.254
MED3	368	4.51	-0.509	0.127	-0.271	0.254
MED4	368	4.41	-1.014	0.127	2.887	0.254
MED5	368	4.49	-0.739	0.127	0.558	0.254
PEOU1	368	4.49	-0.629	0.127	0.512	0.254
PEOU2	368	4.45	-0.314	0.127	-0.925	0.254
PEOU3	368	4.48	-0.092	0.127	-1.570	0.254
PEOU4	368	4.39	-0.613	0.127	0.774	0.254
PEOU5	368	4.49	-1.040	0.127	2.982	0.254
PEOU6	368	4.44	0.048	0.127	-1.566	0.254
BI3	368	4.52	-0.076	0.127	-2.005	0.254
OM1	368	4.42	-0.050	0.127	-0.578	0.254
OM2	368	4.43	-0.407	0.127	0.374	0.254
OM3	368	4.46	0.018	0.127	-1.700	0.254
OM4	368	4.41	-0.564	0.127	0.959	0.254
Valid N (listwise)	368					

Nonetheless, Barnes, Cote, Cudeck, and Malthouse note (as cited in Vieira, 2011, p. 22) that variables are rarely normally distributed, and the question is a non-issue as no variable practically follows a normal distribution.

Besides, Barnes, Cote, Cudeck, and Malthouse affirm (as cited in Vieira, 2011, p. 22) that in principle data coming from 7-point scales are not normally distributed. Indeed, there is usually skewness toward one end of the scale, uniformity, or even bimodality for the distribution of variables measured on such scales. Therefore, for this research's case it was somehow acceptable that some of the variables do not follow a normal distribution, as they come from a 5-point Likert scale instrument.

On the other hand, Stevens (2009, p. 221) emphasizes that skewness has only a minor influence (usually only a few hundredths) on the level of significance and power of the statistical analyses. Furthermore, the effects of kurtosis on the level of significance, while greater, tend to be insignificant correspondingly. Accordingly, it was evaluated that regarding the whole data and items, the normality assumption was not extremely violated, and it was okay to continue.

4.3 Reliability of the Instrument

In order to calculate and evaluate the reliability of the questionnaire, the whole (368-participants) sample was included (Table 4.14). As a result of calculations, the Cronbach's alpha value was found as 0.947, which is greater than the required minimum reliability of 0.70 (Table 4.15).

Indeed, the reliability of the instrument can also be categorized as excellent since it is also greater than the 0.9 value, which is the lower limit for excellent reliability.

In addition, in Table 4.16, the Cronbach's alpha if item deleted values for each item were provided with the aim of analyzing and reflecting the each item's weight on the reliability of the instrument.

Table 4.14: Case Processing Summary for Evaluating the Reliability of the Questionnaire

		N	%
Cases	Valid	368	100.0
	Excluded[a]	0	0.0
	Total	368	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4.15: Reliability Statistics for the Instrument

Cronbach's Alpha	N of Items
0.947	70

Table 4.16: Item-Total Statistics for the Items

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
MDL1	302.15	395.177	0.095	0.951
MDL3	301.55	396.335	0.106	0.949
MDL2	302.07	393.071	0.155	0.949
MDL4	301.54	395.748	0.128	0.949
MDL5	301.44	395.572	0.134	0.949
BI1	300.80	389.692	0.587	0.946
OU1	300.84	394.229	0.293	0.947
OU2	300.86	393.577	0.338	0.947
PD1	300.70	394.570	0.347	0.947
PD2	300.73	392.735	0.408	0.947
PD3	300.87	390.421	0.477	0.946
OC1	300.87	392.306	0.447	0.946
OC2	300.83	391.447	0.477	0.946
OC3	301.00	391.147	0.481	0.946
OC4	301.03	390.784	0.497	0.946
JR1	300.89	391.327	0.474	0.946
JR2	301.01	391.673	0.443	0.946

Table 4.16 (continued).

JR3	300.81	390.080	0.518	0.946
OQ1	300.87	388.724	0.589	0.946
OQ2	300.89	388.460	0.605	0.946
OQ3	301.01	390.022	0.497	0.946
RD1	300.89	388.249	0.626	0.946
RD2	300.95	389.336	0.516	0.946
RD3	300.97	388.160	0.587	0.946
TLR1	300.82	390.856	0.473	0.946
TLR2	300.84	390.391	0.534	0.946
TLR3	300.90	389.908	0.503	0.946
TLR4	300.89	390.034	0.484	0.946
AUD1	300.78	391.442	0.494	0.946
AUD2	300.84	391.715	0.455	0.946
AUD3	300.87	391.283	0.443	0.946
TRN1	300.79	389.261	0.567	0.946
TRN2	300.82	389.016	0.589	0.946
TRN3	300.79	388.842	0.593	0.946
TRN4	300.86	389.422	0.526	0.946
STB1	300.92	391.939	0.374	0.947
STB2	300.98	391.297	0.380	0.947
STB3	300.92	391.440	0.403	0.947
BI2	300.79	389.918	0.577	0.946
SN1	301.04	389.273	0.506	0.946
SN2	301.14	387.895	0.505	0.946
SN3	301.12	388.754	0.526	0.946
SN4	301.10	388.756	0.526	0.946
PU1	300.92	387.813	0.640	0.946
PU2	300.93	388.884	0.587	0.946
PU3	300.88	388.565	0.622	0.946
PU4	300.89	389.611	0.560	0.946
PU5	300.88	389.677	0.573	0.946
GRN1	301.14	394.294	0.258	0.947
GRN2	301.12	393.755	0.279	0.947
GRN3	300.92	392.220	0.393	0.947
FC1	300.90	389.880	0.566	0.946
FC2	300.94	390.765	0.471	0.946

Table 4.16 (continued).

FC3	300.82	388.547	0.583	0.946
MED1	300.86	390.231	0.494	0.946
MED2	300.90	391.892	0.342	0.947
MED3	300.81	390.214	0.526	0.946
MED4	300.91	389.559	0.487	0.946
MED5	300.83	390.871	0.464	0.946
PEOU1	300.83	389.879	0.527	0.946
PEOU2	300.87	387.785	0.622	0.946
PEOU3	300.84	387.732	0.673	0.946
PEOU4	300.93	388.880	0.535	0.946
PEOU5	300.83	389.436	0.523	0.946
PEOU6	300.87	388.535	0.636	0.946
BI3	300.80	389.932	0.582	0.946
OM1	300.89	389.632	0.578	0.946
OM2	300.89	388.293	0.606	0.946
OM3	300.85	390.638	0.534	0.946
OM4	300.90	388.942	0.557	0.946

4.4 Validity of the Instrument

With the purpose of confirming the content validity of the questionnaire, the general content to be characterized was identified. After this, items were chosen from the content that will correctly represent the information in all determined areas. Consequently, a group of items that is descriptive of the content of the features/constructs/factors to be measured was obtained.

Moreover, the review of the instrument by the professionals was ensured to decide whether the developed instrument adequately covers or sufficiently represents the determined content area. Additional details for this are provided in Section 3.4.

Accordingly, content validity of the instrument was provided and ensured, as its reliability was provided and ensured in Section 4.3.

4.5 Exploratory Factor Analysis (EFA) and Results

In this section, data analysis and results for the applied EFA in the context of this study are provided. For each step of the applied EFA, related data analyses and results are provided in the following sections throughout Section 4.5.1 to 4.5.11.

4.5.1 Step 1: Checking Sample Size Adequacy

To ensure that sample size is adequate, there must be no less than ten samples for each focus in the questionnaire being used, or a sample of 200 or more is desirable.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.1.

In this research, there were 19 subjects and 368 cases available. Therefore, this requirement was correctly met. That is, subjects to variables (cases) ratio for this research was 19.4, which is remarkably greater than the suggested 10 value. Additionally, sample size for this research was 368, which is also remarkably greater than the suggested 200 value.

Descriptive statistics showing the number of cases for each item are given in Table 4.17.

Table 4.17: Descriptive Statistics for the Number of Cases for the Items in the Questionnaire

	Mean	Std. Deviation	Analysis N
MDL1	3.17	1.287	368
MDL3	3.77	1.020	368
MDL2	3.24	1.174	368
MDL4	3.78	0.977	368
MDL5	3.88	0.971	368
BI1	4.52	0.506	368
OU1	4.48	0.608	368
OU2	4.46	0.580	368
PD1	4.62	0.498	368
PD2	4.58	0.536	368

Table 4.17 (continued).

PD3	4.45	0.579	368
OC1	4.45	0.514	368
OC2	4.48	0.527	368
OC3	4.32	0.538	368
OC4	4.29	0.540	368
JR1	4.42	0.537	368
JR2	4.31	0.553	368
JR3	4.51	0.552	368
OQ1	4.45	0.545	368
OQ2	4.42	0.542	368
OQ3	4.31	0.577	368
RD1	4.43	0.533	368
RD2	4.36	0.589	368
RD3	4.35	0.571	368
TLR1	4.50	0.562	368
TLR2	4.48	0.522	368
TLR3	4.42	0.576	368
TLR4	4.43	0.591	368
AUD1	4.54	0.510	368
AUD2	4.48	0.537	368
AUD3	4.45	0.574	368
TRN1	4.53	0.542	368
TRN2	4.50	0.532	368
TRN3	4.53	0.537	368
TRN4	4.46	0.575	368
STB1	4.40	0.631	368
STB2	4.34	0.661	368
STB3	4.40	0.619	368
BI2	4.53	0.505	368
SN1	4.27	0.603	368
SN2	4.17	0.670	368
SN3	4.20	0.605	368
SN4	4.22	0.606	368
PU1	4.40	0.538	368
PU2	4.38	0.540	368
PU3	4.44	0.524	368

Table 4.17 (continued).

PU4	4.43	0.533	368
PU5	4.44	0.519	368
GRN1	4.18	0.677	368
GRN2	4.19	0.675	368
GRN3	4.40	0.586	368
FC1	4.42	0.516	368
FC2	4.38	0.568	368
FC3	4.50	0.557	368
MED1	4.46	0.570	368
MED2	4.42	0.687	368
MED3	4.51	0.537	368
MED4	4.41	0.611	368
MED5	4.49	0.572	368
PEOU1	4.49	0.552	368
PEOU2	4.45	0.555	368
PEOU3	4.48	0.516	368
PEOU4	4.39	0.590	368
PEOU5	4.49	0.577	368
PEOU6	4.44	0.514	368
BI3	4.52	0.500	368
OM1	4.42	0.516	368
OM2	4.43	0.548	368
OM3	4.46	0.510	368
OM4	4.41	0.565	368

4.5.2 Step 2: Analyzing Anti-image Correlation Matrix

MSA values on the diagonals of AIC were used to check if correlations among the individual items are strong enough to advocate that the correlation matrix is factorable. To provide this factorability and to ensure strong correlations among items, MSA values on the AIC should be greater than 0.50.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.2.

As shown in Table 4.18, the AIC – MSA values for the items in this research varied between 0.665 and 0.954. That is, they were all greater than the recommended value.

Table 4.18: Anti-image Correlation – MSA Values for the Items

Item	Anti-image Correlation
MDL1	0.665[a]
MDL3	0.672[a]
MDL2	0.676[a]
MDL4	0.678[a]
MDL5	0.711[a]
BI1	0.906[a]
OU1	0.787[a]
OU2	0.818[a]
PD1	0.845[a]
PD2	0.869[a]
PD3	0.921[a]
OC1	0.935[a]
OC2	0.911[a]
OC3	0.893[a]
OC4	0.907[a]
JR1	0.916[a]
JR2	0.909[a]
JR3	0.938[a]
OQ1	0.939[a]
OQ2	0.935[a]
OQ3	0.935[a]
RD1	0.943[a]
RD2	0.933[a]
RD3	0.945[a]
TLR1	0.925[a]
TLR2	0.936[a]
TLR3	0.886[a]
TLR4	0.894[a]
AUD1	0.874[a]
AUD2	0.880[a]
AUD3	0.929[a]
TRN1	0.905[a]
TRN2	0.897[a]
TRN3	0.949[a]

Table 4.18 (continued).

TRN4	0.954[a]
STB1	0.883[a]
STB2	0.862[a]
STB3	0.865[a]
BI2	0.905[a]
SN1	0.926[a]
SN2	0.898[a]
SN3	0.888[a]
SN4	0.922[a]
PU1	0.930[a]
PU2	0.931[a]
PU3	0.932[a]
PU4	0.910[a]
PU5	0.924[a]
GRN1	0.704[a]
GRN2	0.695[a]
GRN3	0.877[a]
FC1	0.941[a]
FC2	0.922[a]
FC3	0.919[a]
MED1	0.921[a]
MED2	0.858[a]
MED3	0.898[a]
MED4	0.914[a]
MED5	0.924[a]
PEOU1	0.900[a]
PEOU2	0.921[a]
PEOU3	0.951[a]
PEOU4	0.927[a]
PEOU5	0.906[a]
PEOU6	0.934[a]
BI3	0.928[a]
OM1	0.933[a]
OM2	0.941[a]
OM3	0.938[a]
OM4	0.937[a]

a. Measures of Sampling Adequacy (MSA)

4.5.3 Step 3: Applying KMO and Bartlett's Test

KMO sampling adequacy value of 0.6 or above was required, and that values between 0.5 and 0.7 are average, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great and values for KMO above 0.9 are excellent.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.3.

Since, in this study, as shown in Table 4.19, KMO of sampling adequacy was 0.906, superb (excellent) criterion was satisfied for sampling adequacy and factorability.

Table 4.19: KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.906
Bartlett's Test of Sphericity	Approx. Chi-Square	16187.471
	df	2415
	Sig.	0.000

Specifically, Sig. value for Bartlett's Test of Sphericity should be less than 0.05. Bartlett's Test of Sphericity value for this study, as shown in Table 4.19, was 0.000.

Therefore, the appropriateness of factor analysis for the subject study was also ensured.

4.5.4 Step 4: Checking and Addressing Extracted Communalities

For EFA, extracted communality values for the items should be greater than 0.50.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.4.

The initial extracted communality values are provided in Table 4.20.

Table 4.20: Initial Extracted Communalities

	Initial	Extraction
MDL1	1.000	0.806
MDL3	1.000	0.838
MDL2	1.000	0.835
MDL4	1.000	0.836
MDL5	1.000	0.496
BI1	1.000	0.895
OU1	1.000	0.714
OU2	1.000	0.759
PD1	1.000	0.655
PD2	1.000	0.733
PD3	1.000	0.536
OC1	1.000	0.641
OC2	1.000	0.691
OC3	1.000	0.741
OC4	1.000	0.707
JR1	1.000	0.580
JR2	1.000	0.603
JR3	1.000	0.564
OQ1	1.000	0.624
OQ2	1.000	0.680
OQ3	1.000	0.516
RD1	1.000	0.696
RD2	1.000	0.537
RD3	1.000	0.654
TLR1	1.000	0.725
TLR2	1.000	0.640
TLR3	1.000	0.777
TLR4	1.000	0.752
AUD1	1.000	0.805
AUD2	1.000	0.782
AUD3	1.000	0.680
TRN1	1.000	0.820
TRN2	1.000	0.805
TRN3	1.000	0.716
TRN4	1.000	0.648

Table 4.20 (continued).

STB1	1.000	0.643
STB2	1.000	0.739
STB3	1.000	0.742
BI2	1.000	0.919
SN1	1.000	0.735
SN2	1.000	0.785
SN3	1.000	0.845
SN4	1.000	0.781
PU1	1.000	0.639
PU2	1.000	0.587
PU3	1.000	0.839
PU4	1.000	0.827
PU5	1.000	0.791
GRN1	1.000	0.836
GRN2	1.000	0.886
GRN3	1.000	0.655
FC1	1.000	0.620
FC2	1.000	0.675
FC3	1.000	0.683
MED1	1.000	0.665
MED2	1.000	0.573
MED3	1.000	0.698
MED4	1.000	0.658
MED5	1.000	0.581
PEOU1	1.000	0.689
PEOU2	1.000	0.752
PEOU3	1.000	0.770
PEOU4	1.000	0.657
PEOU5	1.000	0.568
PEOU6	1.000	0.704
BI3	1.000	0.890
OM1	1.000	0.694
OM2	1.000	0.743
OM3	1.000	0.620
OM4	1.000	0.649

Extraction Method: Principal Component Analysis.

After analyzing the values in Table 4.20, the MDL5 item of the questionnaire was excluded, whose extracted communality value was 0.496, less than 0.50.

After removal of MDL5 item from the item list, communalities values for the remaining 69 items were recalculated, and it was seen that final extracted communalities for the items varies between 0.519 and 0.918 range. Explicitly, they were all in accepted range for extracted communalities.

The final extracted communality values are provided in Table 4.21.

Table 4.21: Final Extracted Communalities

	Initial	Extraction
MDL1	1.000	0.789
MDL3	1.000	0.808
MDL2	1.000	0.812
MDL4	1.000	0.803
BI1	1.000	0.895
OU1	1.000	0.719
OU2	1.000	0.800
PD1	1.000	0.685
PD2	1.000	0.743
PD3	1.000	0.531
OC1	1.000	0.638
OC2	1.000	0.694
OC3	1.000	0.741
OC4	1.000	0.719
JR1	1.000	0.621
JR2	1.000	0.623
JR3	1.000	0.576
OQ1	1.000	0.642
OQ2	1.000	0.695
OQ3	1.000	0.519
RD1	1.000	0.691
RD2	1.000	0.534
RD3	1.000	0.675
TLR1	1.000	0.734
TLR2	1.000	0.651
TLR3	1.000	0.778

Table 4.21 (continued).

TLR4	1.000	0.755
AUD1	1.000	0.810
AUD2	1.000	0.800
AUD3	1.000	0.681
TRN1	1.000	0.821
TRN2	1.000	0.811
TRN3	1.000	0.715
TRN4	1.000	0.651
STB1	1.000	0.643
STB2	1.000	0.749
STB3	1.000	0.743
BI2	1.000	0.918
SN1	1.000	0.735
SN2	1.000	0.788
SN3	1.000	0.848
SN4	1.000	0.787
PU1	1.000	0.642
PU2	1.000	0.614
PU3	1.000	0.839
PU4	1.000	0.827
PU5	1.000	0.792
GRN1	1.000	0.841
GRN2	1.000	0.894
GRN3	1.000	0.655
FC1	1.000	0.625
FC2	1.000	0.674
FC3	1.000	0.683
MED1	1.000	0.675
MED2	1.000	0.566
MED3	1.000	0.696
MED4	1.000	0.658
MED5	1.000	0.581
PEOU1	1.000	0.686
PEOU2	1.000	0.756
PEOU3	1.000	0.775
PEOU4	1.000	0.660
PEOU5	1.000	0.578
PEOU6	1.000	0.706

Table 4.21 (continued).

BI3	1.000	0.890
OM1	1.000	0.695
OM2	1.000	0.746
OM3	1.000	0.621
OM4	1.000	0.650

Extraction Method: Principal Component Analysis.

4.5.5 Step 5: Defining and Applying Factor Analysis Extraction Method

PC is used to reduce data to a set of factor scores for use in data analyses. When compared with the PAF, PC is more common and more practical, and PC analyses all the variance, although PAF analyzes only the shared variance. For this reason, PC was used as the factor analysis extraction method.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.5.

The results are given in Table 4.22, Table 4.23, and Table 4.24.

4.5.6 Step 6: Defining and Applying Rotation Method

To relate the calculated factors to theoretical entities, varimax (oblique) rotation was applied.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.6.

The results are given in Table 4.22, Table 4.23, and Table 4.24.

4.5.7 Step 7: Checking Item Main Loadings (Coefficients)

Item main loadings (coefficients) whose absolute values below 0.4 were suppressed in the composition of factor structure to make it more interpretable.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.7.

Obtained factor structure (rotated component matrix) with values below 0.4 were suppressed is provided in Table 4.22, Table 4.23, and Table 4.24.

4.5.8 Step 8: Creating Rotated Component Matrix

Based on the judgments fixed in previous sections, rotated component matrix was created.

It is given as three parts in Table 4.22, Table 4.23, and Table 4.24, since it is a bit wide concerning the page sizes, and to improve readability and interpretability.

4.5.9 Step 9: Determining Number of Factors

The number of factors extracted ought to be equal to the number of the eigenvalues of the correlation matrix that are greater than one.

Additionally, eigenvalues of the correlation matrix should be plotted in descending order, and number of factors equal to the number of eigenvalues that occur before the last specified drop in eigenvalue magnitude should be determined as the number of factors extracted.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.9.

For this context, eigenvalues of numbers greater than one was decided, and number of factors was decided with respect to this pronouncement.

As a result, as also shown in Table 4.25 and Figure 4.3, number of factors was determined as 18.

Table 4.22: Rotated Component Matrix – Part 1

	Component					
	1	2	3	4	5	6
PEOU2	0.731					
PEOU3	0.702					
PEOU1	0.696					
PEOU6	0.657					
PEOU4	0.615					
PEOU5	0.587					
PU4		0.822				
PU3		0.806				
PU5		0.795				
PU2		0.577				
PU1		0.546				
SN3			0.856			
SN2			0.815			
SN4			0.802			
SN1			0.782			
OQ2				0.691		
RD1				0.641		
OQ3				0.597		
OQ1				0.595		
RD3				0.529		
RD2				0.480		
TLR4					0.804	
TLR3					0.784	
TLR1					0.783	
TLR2					0.663	
MDL3						0.866
MDL2						-0.854
MDL1						-0.852
MDL4						0.838
MED3						
MED1						
MED4						
MED5						
MED2						
TRN1						
TRN2						

Table 4.22 (continued).

TRN3						
TRN4						
BI2						
BI1						
BI3						
OM2						
OM1						
OM4						
OM3						
OC3						
OC4						
OC2						
OC1						
AUD1						
AUD2						
AUD3						
GRN2						
GRN1						
GRN3						
STB2						
STB3						
STB1						
PD2						
PD1						
PD3						
FC2						
FC1						
FC3						
JR2						
JR1						
JR3						
OU2						
OU1						

Table 4.23: Rotated Component Matrix – Part 2

	Component					
	7	8	9	10	11	12
PEOU2						
PEOU3						
PEOU1						
PEOU6						
PEOU4						
PEOU5						
PU4						
PU3						
PU5						
PU2						
PU1						
SN3						
SN2						
SN4						
SN1						
OQ2						
RD1						
OQ3						
OQ1						
RD3						
RD2						
TLR4						
TLR3						
TLR1						
TLR2						
MDL3						
MDL2						
MDL1						
MDL4						
MED3	0.699					
MED1	0.675					
MED4	0.637					
MED5	0.626					
MED2	0.593					
TRN1		0.789				
TRN2		0.779				

Table 4.23 (continued).

TRN3		0.660				
TRN4		0.641				
BI2			0.859			
BI1			0.844			
BI3			0.835			
OM2				0.712		
OM1				0.686		
OM4				0.648		
OM3				0.637		
OC3					0.761	
OC4					0.745	
OC2					0.707	
OC1					0.624	
AUD1						0.819
AUD2						0.817
AUD3						0.737
GRN2						
GRN1						
GRN3						
STB2						
STB3						
STB1						
PD2						
PD1						
PD3						
FC2						
FC1						
FC3						
JR2						
JR1						
JR3						
OU2						
OU1						

Table 4.24: Rotated Component Matrix – Part 3

	Component					
	13	14	15	16	17	18
PEOU2						
PEOU3						
PEOU1						
PEOU6						
PEOU4						
PEOU5						
PU4						
PU3						
PU5						
PU2						
PU1						
SN3						
SN2						
SN4						
SN1						
OQ2						
RD1						
OQ3						
OQ1						
RD3						
RD2						
TLR4						
TLR3						
TLR1						
TLR2						
MDL3						
MDL2						
MDL1						
MDL4						
MED3						
MED1						
MED4						
MED5						
MED2						
TRN1						
TRN2						

Table 4.24 (continued).

TRN3						
TRN4						
BI2						
BI1						
BI3						
OM2						
OM1						
OM4						
OM3						
OC3						
OC4						
OC2						
OC1						
AUD1						
AUD2						
AUD3						
GRN2	0.924					
GRN1	0.898					
GRN3	0.724					
STB2		0.797				
STB3		0.783				
STB1		0.697				
PD2			0.781			
PD1			0.758			
PD3			0.457			
FC2				0.682		
FC1				0.564		
FC3				0.553		
JR2					0.659	
JR1					0.622	
JR3					0.544	
OU2						0.839
OU1						0.772

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Table 4.25: Eigenvalues for the Components (Factors)

Component	Initial Eigenvalues Total
1	18.965
2	3.325
3	2.764
4	2.549
5	2.307
6	2.125
7	1.920
8	1.827
9	1.709
10	1.661
11	1.511
12	1.472
13	1.426
14	1.281
15	1.225
16	1.176
17	1.094
18	1.057

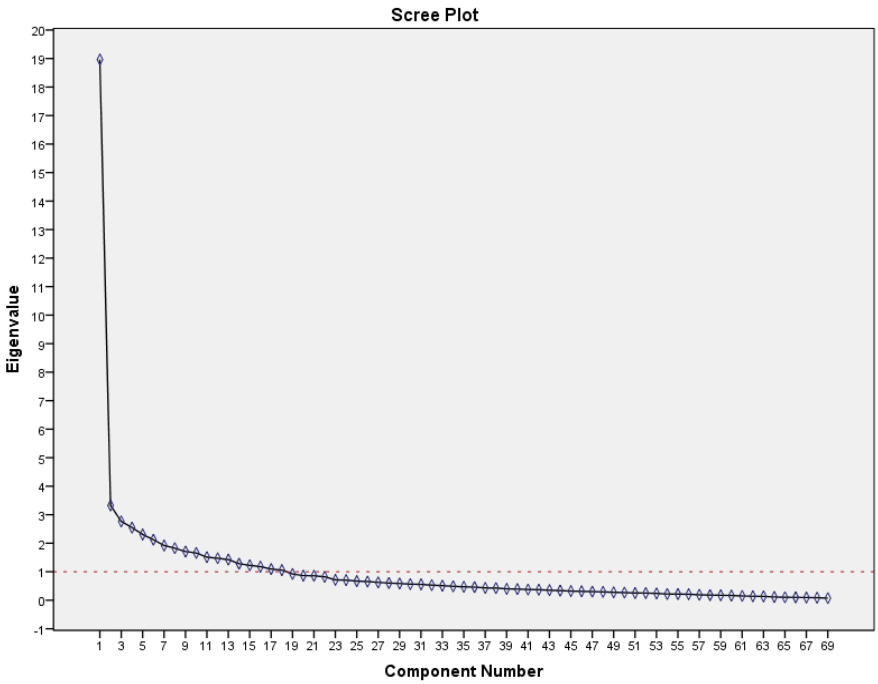


Figure 4.3: Scree Plot for the Components (Factors)

4.5.10 Step 10: Evaluating and Analyzing Total Variance Explained

Researchers are generally happy with 50-75% of the total variance explained.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.10.

The total variance explained value, as shown in Table 4.26, for this study was 71.583.

Table 4.26: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	18.965	27.485	27.485	18.965	27.485	27.485	3.823	5.540	5.540
2	3.325	4.819	32.304	3.325	4.819	32.304	3.638	5.272	10.812
3	2.764	4.006	36.310	2.764	4.006	36.310	3.522	5.105	15.917
4	2.549	3.694	40.004	2.549	3.694	40.004	3.291	4.769	20.686
5	2.307	3.343	43.347	2.307	3.343	43.347	3.179	4.607	25.293
6	2.125	3.079	46.426	2.125	3.079	46.426	3.043	4.410	29.703
7	1.920	2.783	49.209	1.920	2.783	49.209	2.997	4.344	34.047
8	1.827	2.647	51.856	1.827	2.647	51.856	2.972	4.307	38.354
9	1.709	2.477	54.333	1.709	2.477	54.333	2.914	4.224	42.578
10	1.661	2.407	56.740	1.661	2.407	56.740	2.806	4.067	46.645
11	1.511	2.190	58.930	1.511	2.190	58.930	2.737	3.967	50.612
12	1.472	2.134	61.064	1.472	2.134	61.064	2.522	3.656	54.267
13	1.426	2.066	63.130	1.426	2.066	63.130	2.483	3.599	57.866
14	1.281	1.857	64.987	1.281	1.857	64.987	2.271	3.291	61.157
15	1.225	1.775	66.762	1.225	1.775	66.762	1.885	2.732	63.889
16	1.176	1.704	68.467	1.176	1.704	68.467	1.840	2.667	66.556
17	1.094	1.585	70.052	1.094	1.585	70.052	1.816	2.633	69.189
18	1.057	1.532	71.583	1.057	1.532	71.583	1.652	2.394	71.583
19	0.922	1.336	72.919						
20	0.865	1.253	74.172						
21	0.859	1.245	75.417						
22	0.823	1.193	76.610						
23	0.716	1.038	77.648						
24	0.707	1.025	78.672						
25	0.673	0.975	79.647						

Table 4.26 (continued).

26	0.656	0.951	80.598						
27	0.626	0.907	81.505						
28	0.605	0.876	82.382						
29	0.587	0.851	83.233						
30	0.565	0.819	84.052						
31	0.557	0.808	84.859						
32	0.530	0.769	85.628						
33	0.511	0.740	86.368						
34	0.491	0.711	87.079						
35	0.472	0.684	87.763						
36	0.461	0.669	88.432						
37	0.434	0.629	89.060						
38	0.428	0.620	89.680						
39	0.401	0.581	90.262						
40	0.393	0.569	90.831						
41	0.375	0.543	91.374						
42	0.370	0.537	91.911						
43	0.353	0.511	92.422						
44	0.338	0.489	92.912						
45	0.322	0.466	93.378						
46	0.314	0.455	93.833						
47	0.304	0.441	94.274						
48	0.293	0.425	94.698						
49	0.279	0.405	95.103						
50	0.268	0.389	95.492						
51	0.253	0.367	95.859						
52	0.251	0.364	96.224						
53	0.239	0.346	96.570						
54	0.218	0.316	96.886						
55	0.215	0.311	97.197						
56	0.211	0.305	97.502						
57	0.192	0.278	97.781						
58	0.181	0.262	98.042						
59	0.174	0.252	98.295						
60	0.166	0.240	98.535						
61	0.152	0.220	98.755						
62	0.141	0.204	98.958						
63	0.136	0.197	99.155						
64	0.115	0.167	99.322						

Table 4.26 (continued).

65	0.104	0.151	99.474						
66	0.102	0.148	99.621						
67	0.097	0.141	99.762						
68	0.089	0.129	99.891						
69	0.075	0.109	100.000						

Extraction Method: Principal Component Analysis.

4.5.11 Step 11: Defining and Analyzing Factors and Items per Factors

Bare minimum for number of items per factor is two, and recommended minimum is three. That is, there should be at least two items for each construct. This research also met this requirement, as shown in Table 4.27.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.12.11.

Additionally, as a result, there were 18 factors (components) determined. Component numbers, component names, component IDs, number of related items and related item IDs for the components are provided in Table 4.27.

Here, a special point is to note is that as the designed and proposed items for RD and OQ collected on the same factor, these two were combined as a new factor and named this factor (component) as Outputs & Results (OR).

This was evaluated quite normal as RD and OQ address very similar concepts and concerns with respect to process acceptance content and context.

Therefore, this new combined OR construct was defined to include items for RD and OQ. Definition for this new construct (OR) and revised hypotheses are given below:

- ***Outputs & Results (OR)***: OR deals with both the degree to which a person rely on that the results of using a system are concrete, noticeable, and communicable, and the degree to which a person have confidence in that the system performs his or her job tasks well and in an expected manner.

- ***Revised Hypotheses***:
    - (H.1012.a) Outputs & Results positively influences Perceived Usefulness in favor of the context for the acceptance of processes.)
    - (H.1012.b) Outputs & Results positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
    - (H.1012.c) Outputs & Results positively influences Behavioral Intention in favor of the context for the acceptance of processes.

Table 4.27: Component (Factor) Numbers, Component Names, Component IDs, Number of Related Items and Related Item IDs for the Components

Component Number	Component Name	Component ID	Number of Related Items	Related Items
1	Perceived Ease of Use	***PEOU***	6	PEOU2 PEOU3 PEOU1 PEOU6 PEOU4 PEOU5
2	Perceived Usefulness	***PU***	5	PU4 PU3 PU5 PU2 PU1
3	Subjective Norm	***SN***	4	SN3 SN2 SN4 SN1

Table 4.27 (continued).

4	Outputs & Results	***OR***	6	OQ2 RD1 OQ3 OQ1 RD3 RD2
5	Tailoring	***TLR***	4	TLR4 TLR3 TLR1 TLR2
6	Modeling	***MDL***	4	MDL3 MDL2 MDL1 MDL4
7	Medium	***MED***	5	MED3 MED1 MED4 MED5 MED2
8	Training	***TRN***	4	TRN1 TRN2 TRN3 TRN4
9	Behavioral Intention	***BI***	3	BI2 BI1 BI3
10	Operations & Maintenance	***OM***	4	OM2 OM1 OM4 OM3
11	Organizational Culture	***OC***	4	OC3 OC4 OC2 OC1
12	Audit	***AUD***	3	AUD1 AUD2 AUD3

Table 4.27 (continued).

13	Granularity	***GRN***	3	GRN2 GRN1 GRN3
14	Stability	***STB***	3	STB2 STB3 STB1
15	Participation in Development	***PD***	3	PD2 PD1 PD3
16	Facilitating Conditions	***FC***	3	FC2 FC1 FC3
17	Job Relevance	***JR***	3	JR2 JR1 JR3
18	Objective Usability	***OU***	2	OU2 OU1

4.6 Confirmatory Factor Analysis (CFA) and Results for the Initial Model

In this section, data analysis and results for the first applied CFA in the context of this study are provided. For the each step of the applied CFA, related data analyses and results are provided in the following sections throughout Section 4.6.1 to 4.6.7. At this juncture, a special point, something different from the results of the applied EFA, is to note is that MDL construct with four items is divided into two constructs with two items for each, as MDLA and MDLB. MDLA refers to descriptive process modeling and MDLB refers to prescriptive process modeling.

4.6.1 Step 1: Drawing Model with SmartPLS

Model was drawn with the SmartPLS. Drawn model is given in Figure 4.4 and Figure 4.5. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.1.

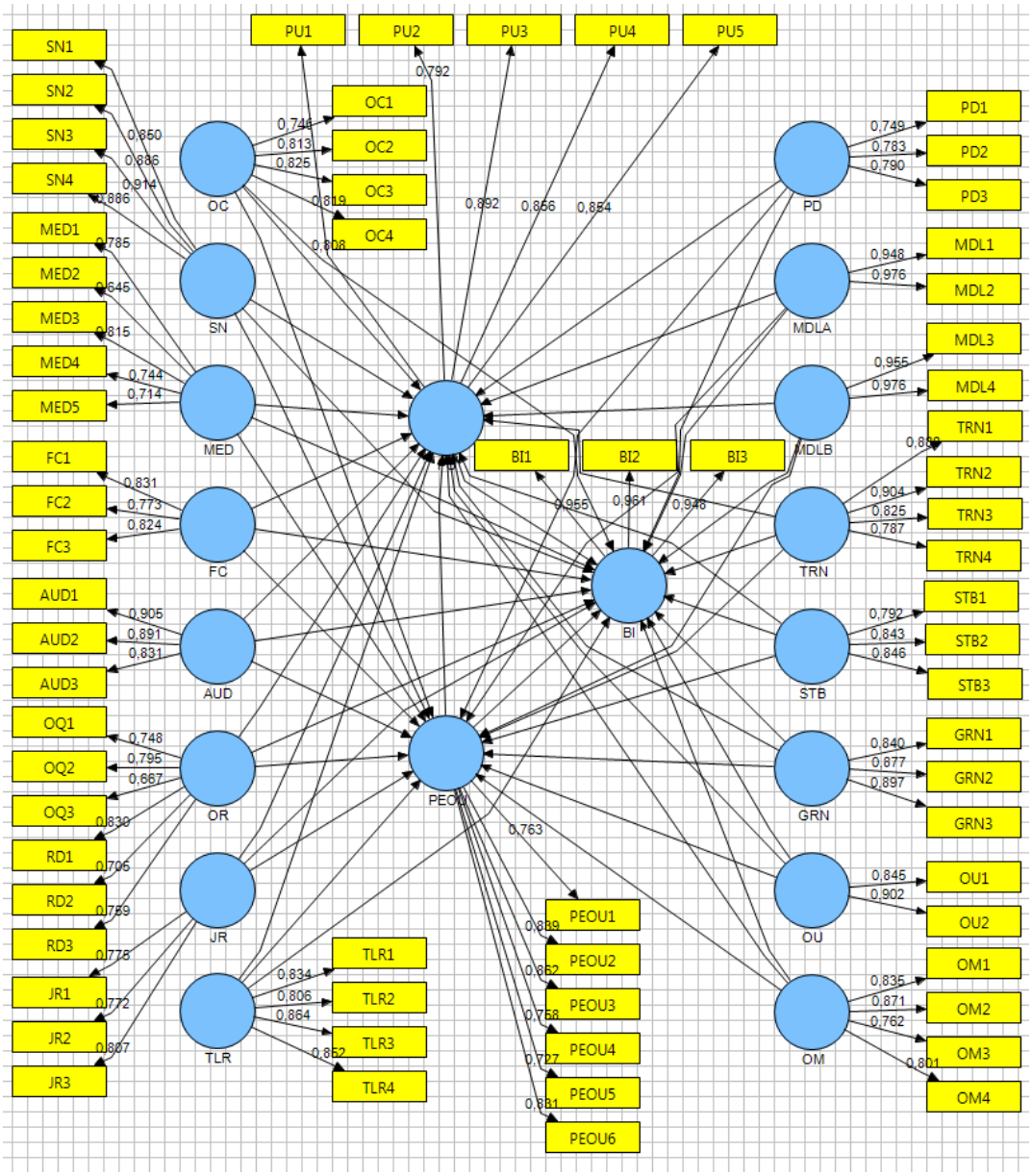


Figure 4.4: Drawn Model (Initial) with Measurement Model

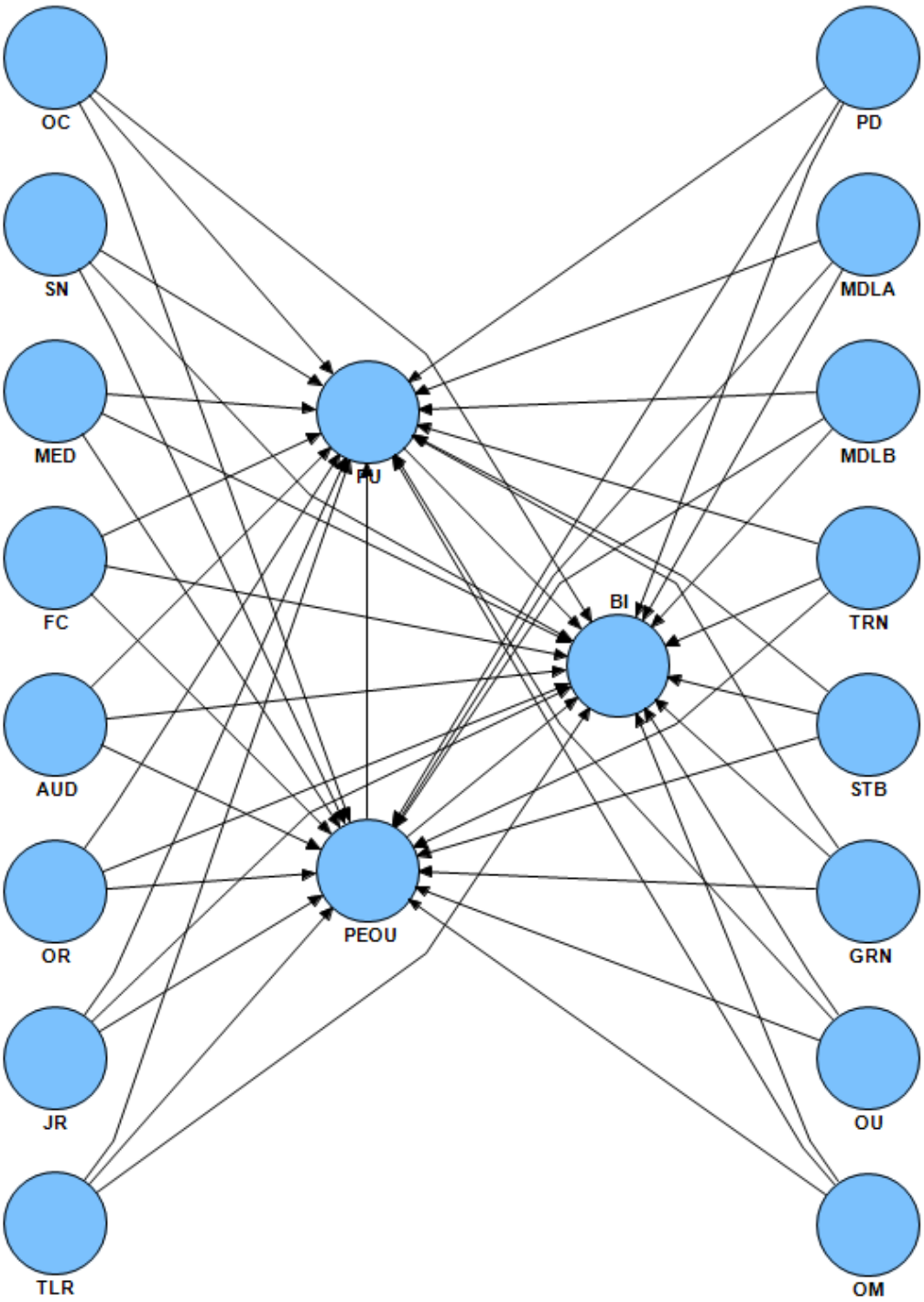


Figure 4.5: Drawn Model (Initial) without Measurement Model

4.6.2 Step 2: Running PLS Algorithm

After drawing the model, PLS algorithm was run in order to check the convergent validity and the discriminant validity of the model. Results of PLS algorithm run are given in Figure 4.6 and Figure 4.7.

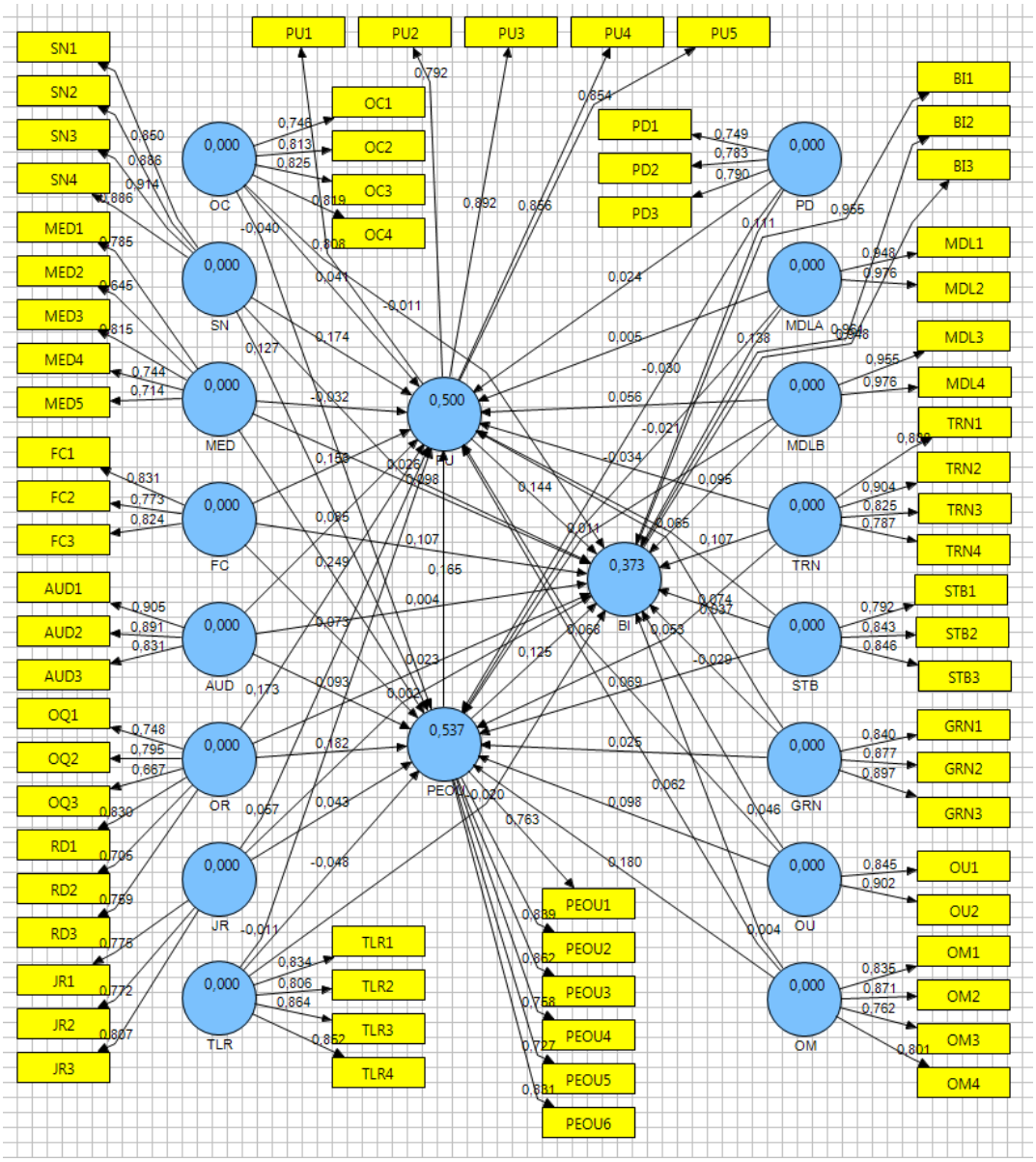


Figure 4.6: Results of PLS Algorithm Run for Drawn Model (Initial) with Measurement Model

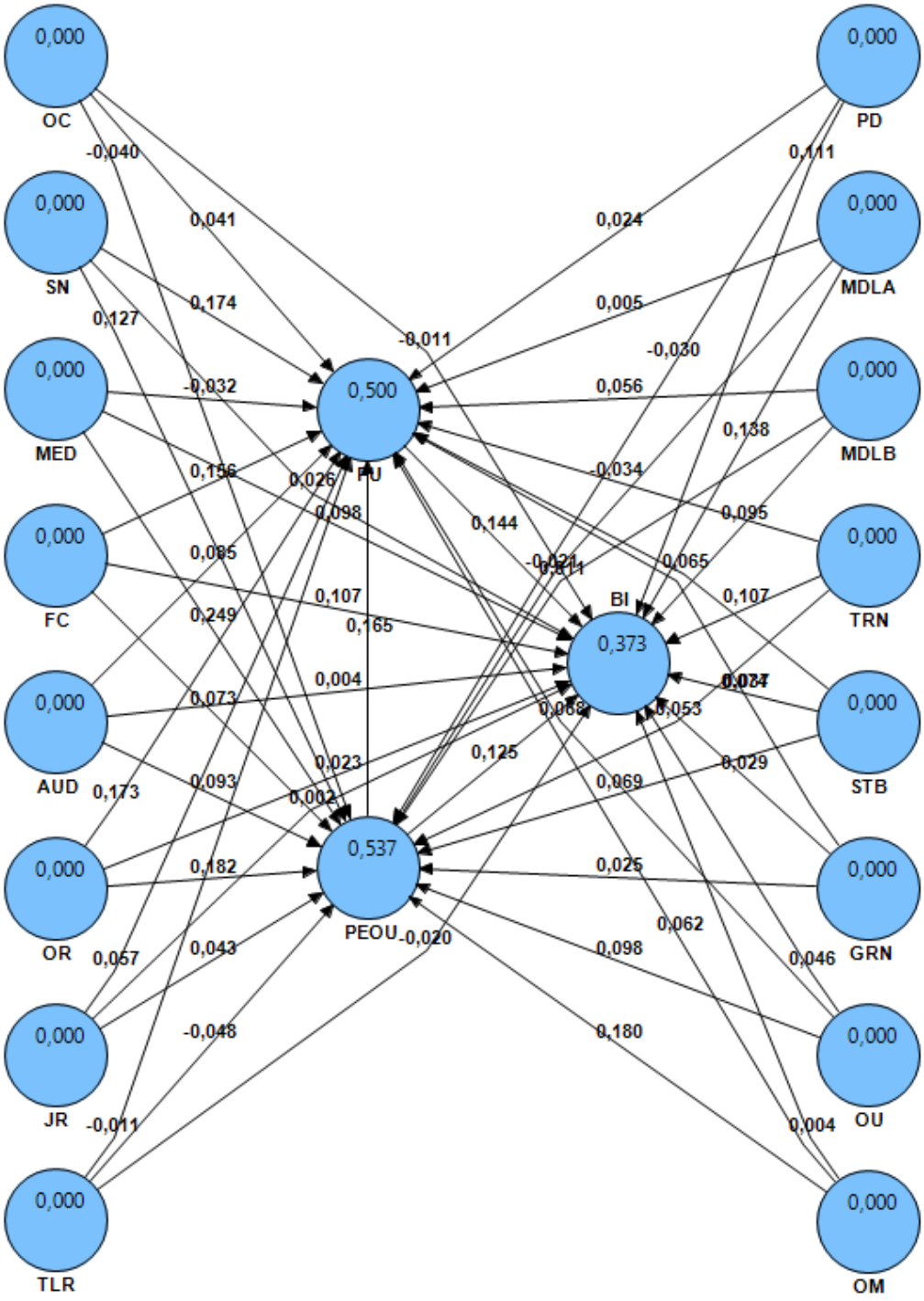


Figure 4.7: Results of PLS Algorithm Run for Drawn Model (Initial) without Measurement Model

4.6.3 Step 3: Checking Factor Loadings

For CFA, factor loadings should be greater than 0.6, or should be 0.7 or greater.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.3.

Factor loadings are given as three parts in Table 4.28, Table 4.29, and Table 4.30, since whole table is a bit wide concerning the page sizes, and to improve readability and interpretability.

As shown in Table 4.28, Table 4.29, and Table 4.30, all factor loadings were greater than the recommended 0.6 value. Hence, the factor loadings requirement of the applied CFA was accurately met.

Table 4.28: Factor Loadings (Initial Model) – Part 1

	AUD	BI	FC	GRN	JR	MDLA	MDLB
AUD1	0.904815						
AUD2	0.891136						
AUD3	0.831103						
BI1		0.955227					
BI2		0.961118					
BI3		0.948351					
FC1			0.830973				
FC2			0.772726				
FC3			0.824353				
GRN1				0.839875			
GRN2				0.877195			
GRN3				0.896655			
JR1					0.77492		
JR2					0.771879		
JR3					0.807008		
MDL1						0.948436	
MDL2						0.976278	
MDL3							0.955402
MDL4							0.97555

Table 4.29: Factor Loadings (Initial Model) – Part 2

	MED	OC	OM	OR	OU	PD
MED1	0.784873					
MED2	0.644712					
MED3	0.815047					
MED4	0.744023					
MED5	0.714499					
OC1		0.746243				
OC2		0.813146				
OC3		0.825081				
OC4		0.819063				
OM1			0.834624			
OM2			0.870678			
OM3			0.762478			
OM4			0.800724			
OQ1				0.747995		
OQ2				0.795244		
OQ3				0.666571		
OU1					0.84487	
OU2					0.901797	
PD1						0.74904
PD2						0.783382
PD3						0.789719
RD1				0.830241		
RD2				0.704876		
RD3				0.758869		

Table 4.30: Factor Loadings (Initial Model) – Part 3

	PEOU	PU	SN	STB	TLR	TRN
PEOU1	0.76254					
PEOU2	0.839455					
PEOU3	0.862422					
PEOU4	0.757877					
PEOU5	0.726908					
PEOU6	0.831383					
PU1		0.808145				
PU2		0.791805				

Table 4.30 (continued).

PU3		0.891806				
PU4		0.855835				
PU5		0.854356				
SN1			0.849968			
SN2			0.885745			
SN3			0.914372			
SN4			0.886254			
STB1				0.791879		
STB2				0.843037		
STB3				0.845897		
TLR1					0.833801	
TLR2					0.806268	
TLR3					0.863572	
TLR4					0.851628	
TRN1						0.887823
TRN2						0.903899
TRN3						0.825495
TRN4						0.786943

4.6.4 Step 4: Checking Composite Reliabilities (CR)

CR values larger than 0.6 are normally judged as satisfactory and a block is considered homogenous as long as the CR is larger than 0.7. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.4. CR values calculated for each construct are given in Table 4.31. As shown in Table 4.31, all CR values were larger than the recommended 0.7 value. Hence, the CR requirement of the applied CFA was also correctly met.

Table 4.31: Composite Reliability (CR) Values (Initial Model)

	Composite Reliability
AUD	0.908336
BI	0.968785
FC	0.850927
GRN	0.904518
JR	0.82781
MDLA	0.961746
MDLB	0.964931

Table 4.31 (continued).

MED	0.859594
OC	0.877679
OM	0.889822
OR	0.886317
OU	0.865782
PD	0.817773
PEOU	0.913061
PU	0.923517
SN	0.934853
STB	0.866686
TLR	0.90486
TRN	0.913737

4.6.5 Step 5: Checking Average Variance Extracted (AVE) Values

AVE values less than 0.5 are considered unsatisfactory. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.5. AVE values calculated for each construct are given in Table 4.32. As shown in Table 4.32, all AVE values were higher than the recommended 0.5 value. Therefore, the AVE requirement of the applied CFA was also appropriately met.

Table 4.32: Average Variance Extracted (AVE) Values (Initial Model)

	AVE
AUD	0.767849
BI	0.911859
FC	0.655727
GRN	0.759617
JR	0.615854
MDLA	0.926324
MDLB	0.932245
MED	0.552012
OC	0.642427
OM	0.669303
OR	0.566376
OU	0.763521
PD	0.599468
PEOU	0.637316
PU	0.70755
SN	0.782128
STB	0.684442
TLR	0.704079
TRN	0.726496

4.6.6 Step 6: Ensuring Convergent Validity

Convergent validity was checked and ensured by the steps 3, 4, and 5, explained above. Specifically, factor loadings, CR values, and AVE values were calculated and evaluated to check and ensure convergent validity.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.6.

As this research truly met the factor loadings, CR values, and AVE values requirements, convergent validity was also revealed.

4.6.7 Step 7: Checking and Ensuring Discriminant Validity

In this study, discriminant validity was revealed in a correlation matrix comprising the correlations among the constructs in the lower left off-diagonal components of the matrix, and the square roots of the AVE values calculated for each of the constructs along the diagonal of the matrix. With the purpose of ensuring the discriminant validity, the square roots of the AVE values for each construct must be larger than the correlations among the constructs.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.7.

The square roots of the AVE values calculated for each of the constructs is given in Table 4.33. Moreover, the correlation matrix comprising the correlations among the constructs in the lower left off-diagonal components of the matrix, and the square roots of the AVE values calculated for each of the constructs along the diagonal of the matrix are given as three parts in Table 4.34, 4.35, and 4.36, since whole table is a bit wide concerning the page sizes, and to improve readability and interpretability.

As given in Tables 4.34, 4.35, and 4.36, all the square roots of the AVE values for each construct were greater than the correlations among constructs. Consequently, the discriminant validity was also properly revealed and ensured.

Table 4.33: Square Roots of Average Variance Extracted (AVE) Values (Initial Model)

	AVE	SQRT of AVE
AUD	0.767849	**0.876269936**
BI	0.911859	**0.954913085**
FC	0.655727	**0.80976972**
GRN	0.759617	**0.871560095**
JR	0.615854	**0.784763659**
MDLA	0.926324	**0.962457272**
MDLB	0.932245	**0.965528353**
MED	0.552012	**0.742975101**
OC	0.642427	**0.80151544**
OM	0.669303	**0.818109406**
OR	0.566376	**0.752579564**
OU	0.763521	**0.873796887**
PD	0.599468	**0.774253189**
PEOU	0.637316	**0.798320738**
PU	0.70755	**0.841159913**
SN	0.782128	**0.884380009**
STB	0.684442	**0.827310099**
TLR	0.704079	**0.839094154**
TRN	0.726496	**0.852347347**

Table 4.34: Correlation Matrix Showing the Square Roots of the AVE Values for Constructs and Correlations among Constructs (Initial Model) – Part 1

	AUD	BI	FC	GRN	JR	MDLA	MDLB
AUD	**0.87627**						
BI	0.29558	**0.95491**					
FC	0.343141	0.45116	**0.80977**				
GRN	0.236923	0.173735	0.287676	**0.87156**			
JR	0.314738	0.343311	0.418095	0.207348	**0.78476**		
MDLA	0.029953	0.148334	0.162639	0.11432	0.030925	**0.96246**	
MDLB	0.115122	0.09173	0.05573	-0.03814	0.116228	-0.57483	**0.96553**
MED	0.34307	0.417875	0.515935	0.206075	0.384197	0.110114	0.054792
OC	0.35594	0.320778	0.358889	0.16304	0.4039	-0.0047	0.193594
OM	0.386037	0.405185	0.512139	0.252656	0.414882	0.088884	0.099767

Table 4.34 (continued).

OR	0.383579	0.44142	0.517907	0.211649	0.561309	0.103867	0.191269
OU	0.113251	0.254868	0.18699	0.040261	0.302651	0.084191	0.054705
PD	0.320669	0.367118	0.367711	0.194684	0.348852	0.071273	0.099533
PEOU	0.396988	0.4767	0.510525	0.243887	0.443651	0.069683	0.109569
PU	0.377663	0.468002	0.515013	0.25449	0.447727	0.060095	0.15112
SN	0.215143	0.342007	0.379257	0.180658	0.317379	0.07575	0.054113
STB	0.199878	0.310299	0.302585	0.304885	0.291735	0.064578	0.007276
TLR	0.359372	0.298379	0.361688	0.236756	0.462546	0.119664	0.145398
TRN	0.451841	0.417824	0.466762	0.202051	0.418911	0.03674	0.110746

Table 4.35: Correlation Matrix Showing the Square Roots of the AVE Values for Constructs and Correlations among Constructs (Initial Model) – Part 2

	MED	**OC**	**OM**	**OR**	**OU**	**PD**
AUD						
BI						
FC						
GRN						
JR						
MDLA						
MDLB						
MED	**0.74298**					
OC	0.33005	**0.80152**				
OM	0.474879	0.423465	**0.81811**			
OR	0.425126	0.53595	0.518345	**0.75258**		
OU	0.222856	0.21149	0.22859	0.296349	**0.8738**	
PD	0.288311	0.427431	0.404349	0.461765	0.257925	**0.77425**
PEOU	0.568215	0.374261	0.558955	0.557884	0.31057	0.338564
PU	0.399076	0.421225	0.489605	0.576519	0.29749	0.379253
SN	0.3101	0.368929	0.379396	0.446106	0.234032	0.30112
STB	0.302933	0.222359	0.34622	0.305803	0.176192	0.222063
TLR	0.311237	0.375496	0.452104	0.49012	0.209764	0.344763
TRN	0.422213	0.451811	0.50294	0.505608	0.180242	0.365866

Table 4.36: Correlation Matrix Showing the Square Roots of the AVE Values for Constructs and Correlations among Constructs (Initial Model) – Part 3

	PEOU	PU	SN	STB	TLR	TRN
AUD						
BI						
FC						
GRN						
JR						
MDLA						
MDLB						
MED						
OC						
OM						
OR						
OU						
PD						
PEOU	**0.7983207**					
PU	0.557443	**0.8411599**				
SN	0.442762	0.481857	**0.88438**			
STB	0.363795	0.340061	0.25773	**0.8273101**		
TLR	0.353839	0.370012	0.292564	0.217356	**0.8390942**	
TRN	0.482925	0.42823	0.406957	0.343678	0.425412	**0.8523473**

4.7 Estimation and Evaluation of the Initial Model

Bootstrapping technique was used to estimate the significance (*t*-values) of the paths with 5000 bootstrap samples value and 368 cases value. Model fit was tested with significant path coefficients, high R square values, and composite reliabilities for each construct/factor. Theoretical and methodological information and justifications pertaining to these are provided in Section 3.15.4 and Section 3.15.5.

Estimated *t* statistics values (the significance of the paths) for the initially set hypotheses are given in Table 4.37. R square values for the initial model are given in Table 4.38. Composite reliabilities for the constructs are addressed in Section 4.6.4. Additionally, hypotheses testing results based on the initial model and

initially set hypotheses with respect to *t* statistics values and significance values are given in Table 4.39.

Table 4.37: T Statistics Values for the Hypotheses (Initial Model)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
AUD -> BI	0.003529	0.043162	0.032949	0.032949	0.107115
AUD -> PEOU	0.092596	0.093096	0.046972	0.046972	1.971321
AUD -> PU	0.084537	0.086246	0.048806	0.048806	1.732122
FC -> BI	0.106595	0.109855	0.059754	0.059754	1.783887
FC -> PEOU	0.072553	0.076088	0.046289	0.046289	1.567397
FC -> PU	0.15612	0.156629	0.063211	0.063211	2.469845
GRN -> BI	-0.02942	-0.04424	0.033112	0.033112	0.888442
GRN -> PEOU	0.025001	0.042725	0.031732	0.031732	0.78787
GRN -> PU	0.037359	0.047986	0.032867	0.032867	1.136671
JR -> BI	0.0025	0.043317	0.03302	0.03302	0.075704
JR -> PEOU	0.042586	0.051521	0.03718	0.03718	1.145422
JR -> PU	0.056986	0.066791	0.044151	0.044151	1.290721
MDLA -> BI	0.137934	0.137427	0.055271	0.055271	2.495573
MDLA -> PEOU	-0.02143	-0.04208	0.031423	0.031423	0.681826
MDLA -> PU	0.004709	0.04083	0.03073	0.03073	0.153233
MDLB -> BI	0.095235	0.099538	0.055003	0.055003	1.731469
MDLB -> PEOU	0.011342	0.039234	0.029526	0.029526	0.384139
MDLB -> PU	0.055938	0.064434	0.041734	0.041734	1.340338
MED -> BI	0.098059	0.103873	0.057353	0.057353	1.70974
MED -> PEOU	0.248726	0.250692	0.059237	0.059237	4.198851
MED -> PU	-0.03224	-0.04991	0.037211	0.037211	0.866372
OC -> BI	-0.01055	-0.04309	0.033546	0.033546	0.314433
OC -> PEOU	-0.0401	-0.05321	0.037495	0.037495	1.069519
OC -> PU	0.04081	0.056076	0.042014	0.042014	0.971346
OM -> BI	0.003833	0.048199	0.036717	0.036717	0.1044
OM -> PEOU	0.180293	0.181326	0.056585	0.056585	3.186264
OM -> PU	0.061616	0.067173	0.043789	0.043789	1.407114
OR -> BI	0.022893	0.059057	0.044187	0.044187	0.518109
OR -> PEOU	0.181881	0.184921	0.061383	0.061383	2.963056
OR -> PU	0.173094	0.172821	0.062444	0.062444	2.771991
OU -> BI	0.046403	0.053951	0.037033	0.037033	1.253026

Table 4.37 (continued).

OU -> PEOU	0.09818	0.095565	0.040725	0.040725	2.410814
OU -> PU	0.068191	0.073183	0.046687	0.046687	1.460593
PD -> BI	0.111107	0.110424	0.052241	0.052241	2.126798
PD -> PEOU	-0.03025	-0.04424	0.033042	0.033042	0.915498
PD -> PU	0.024235	0.043487	0.032093	0.032093	0.75513
PEOU -> BI	0.124927	0.125489	0.064502	0.064502	1.936791
PEOU -> PU	0.165164	0.165662	0.063313	0.063313	2.6087
PU -> BI	0.144166	0.141917	0.060268	0.060268	2.392098
SN -> BI	0.025681	0.04766	0.035157	0.035157	0.730455
SN -> PEOU	0.127455	0.125606	0.044782	0.044782	2.846095
SN -> PU	0.174219	0.174401	0.057477	0.057477	3.03112
STB -> BI	0.073877	0.078804	0.046166	0.046166	1.600236
STB -> PEOU	0.069093	0.072844	0.040629	0.040629	1.700563
STB -> PU	0.065111	0.068338	0.041492	0.041492	1.569228
TLR -> BI	-0.02032	-0.04858	0.03592	0.03592	0.565756
TLR -> PEOU	-0.04824	-0.05393	0.036615	0.036615	1.317544
TLR -> PU	-0.01064	-0.04036	0.031208	0.031208	0.340775
TRN -> BI	0.107342	0.106994	0.056981	0.056981	1.883802
TRN -> PEOU	0.052607	0.062014	0.043636	0.043636	1.205583
TRN -> PU	-0.03363	-0.05053	0.036695	0.036695	0.916557

Table 4.38: R Square Values (Initial Model)

	R Square
BI	0.373462
PEOU	0.537259
PU	0.499672

Table 4.39: Hypothesis Testing Results (Initial Model)

#	Relation	Related Hypothesis ID	T Statistics Value	Significance Value	Result of Hypothesis Test
1	AUD -> BI	H.1.c	0.107115	-	Rejected
2	**AUD -> PEOU**	**H.1.b**	**1.971321**	**0.025**	**Accepted**
3	**AUD -> PU**	**H.1.a**	**1.732122**	**0.05**	**Accepted**

Table 4.39 (continued).

4	**FC -> BI**	**H.2.c**	**1.783887**	**0.05**	**Accepted**
5	FC -> PEOU	H.2.b	1.567397	-	Rejected
6	**FC -> PU**	**H.2.a**	**2.469845**	**0.01**	**Accepted**
7	GRN -> BI	H.3.c	0.888442	-	Rejected
8	GRN -> PEOU	H.3.b	0.78787	-	Rejected
9	GRN -> PU	H.3.a	1.136671	-	Rejected
10	JR -> BI	H.4.c	0.075704	-	Rejected
11	JR -> PEOU	H.4.b	1.145422	-	Rejected
12	JR -> PU	H.4.a	1.290721	-	Rejected
13	**MDLA -> BI**	**H.6.c**	**2.495573**	**0.01**	**Accepted**
14	MDLA -> PEOU	H.6.b	0.681826	-	Rejected
15	MDLA -> PU	H.6.a	0.153233	-	Rejected
16	**MDLB -> BI**	**H.6.c**	**1.731469**	**0.05**	**Accepted**
17	MDLB -> PEOU	H.6.b	0.384139	-	Rejected
18	MDLB -> PU	H.6.a	1.340338	-	Rejected
19	**MED -> BI**	**H.5.c**	**1.70974**	**0.05**	**Accepted**
20	**MED -> PEOU**	**H.5.b**	**4.198851**	**0.0005**	**Accepted**
21	MED -> PU	H.5.a	0.866372	-	Rejected
22	OC -> BI	H.9.c	0.314433	-	Rejected
23	OC -> PEOU	H.9.b	1.069519	-	Rejected
24	OC -> PU	H.9.a	0.971346	-	Rejected

Table 4.39 (continued).

25	OM -> BI	H.8.c	0.1044	-	Rejected
26	**OM -> PEOU**	**H.8.b**	**3.186264**	**0.005**	**Accepted**
27	OM -> PU	H.8.a	1.407114	-	Rejected
28	OR -> BI	H.1012.c	0.518109	-	Rejected
29	**OR -> PEOU**	**H.1012.b**	**2.963056**	**0.005**	**Accepted**
30	**OR -> PU**	**H.1012.a**	**2.771991**	**0.005**	**Accepted**
31	OU -> BI	H.7.c	1.253026	-	Rejected
32	**OU -> PEOU**	**H.7.b**	**2.410814**	**0.01**	**Accepted**
33	OU -> PU	H.7.a	1.460593	-	Rejected
34	**PD -> BI**	**H.11.c**	**2.126798**	**0.025**	**Accepted**
35	PD -> PEOU	H.11.b	0.915498	-	Rejected
36	PD -> PU	H.11.a	0.75513	-	Rejected
37	**PEOU -> BI**	**H.18.b**	**1.936791**	**0.05**	**Accepted**
38	**PEOU -> PU**	**H.18.a**	**2.6087**	**0.005**	**Accepted**
39	**PU -> BI**	**H.17**	**2.392098**	**0.01**	**Accepted**
40	SN -> BI	H.14.c	0.730455	-	Rejected
41	**SN -> PEOU**	**H.14.b**	**2.846095**	**0.005**	**Accepted**
42	**SN -> PU**	**H.14.a**	**3.03112**	**0.005**	**Accepted**
43	STB -> BI	H.13.c	1.600236	-	Rejected
44	**STB -> PEOU**	**H.13.b**	**1.700563**	**0.05**	**Accepted**
45	STB -> PU	H.13.a	1.569228	-	Rejected

Table 4.39 (continued).

46	TLR -> BI	H.15.c	0.565756	-	Rejected
47	TLR -> PEOU	H.15.b	1.317544	-	Rejected
48	TLR -> PU	H.15.a	0.340775	-	Rejected
49	**TRN -> BI**	**H.16.c**	**1.883802**	**0.05**	**Accepted**
50	TRN -> PEOU	H.16.b	1.205583	-	Rejected
51	TRN -> PU	H.16.a	0.916557	-	Rejected

As seen in Table 4.38, R square values for the initial model varied between 0.25 and 0.75 values. Therefore, the model fit can be treated as moderate level with respect to R square values.

Additionally, as explained in Section 4.6.4, CR values were all above recommended 0.7 value. Hence, the CR dimension of the model fit was also secured. However, as seen in Table 3.37 and 4.39, there were some insignificant path loadings for some constructs, and some of the initially set hypotheses were not accepted as results of hypotheses testing.

Under these circumstances, it was decided to apply model modification by freeing and/or setting parameters to achieve the best-fitting model, as it is also explicitly required by the applied SEM. Theoretical and methodological information and justifications pertaining to this are provided in Section 3.15.6.

In the related step of the SEM, the model was iteratively and consciously modified, as required by the SEM to accomplish the best-fitting model. CFA and results for the modified final model are provided in Section 4.8, and estimation and evaluation of the modified final model are given in Section 4.9.

4.8 Confirmatory Factor Analysis (CFA) and Results for the Modified Final Model

In this section, provides data analysis and results for the final applied CFA in the context of this study are provided. For each step of the applied CFA, related data analyses and results are provided in the following section throughout Section 4.8.1 to 4.8.11.

4.8.1 Step 1: Drawing Model with SmartPLS

Modified final model was drawn with the SmartPLS. Drawn model is given in Figure 4.8 and Figure 4.9.

Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.1.

4.8.2 Step 2: Running PLS Algorithm

After drawing the model, PLS algorithm was run with the aim of checking the convergent validity and the discriminant validity of the modified final model.

Results of PLS algorithm run are given in Figure 4.10 and Figure 4.11.

4.8.3 Step 3: Checking Factor Loadings

For CFA, factor loadings should be greater than 0.6, or should be 0.7 or greater. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.3.

Factor loadings are given as three parts in Tables 4.40, 4.41, and 4.42, since whole table is a bit wide concerning the page sizes, and to improve readability and interpretability.

As shown in Tables 4.40, 4.41, and 4.42, all factor loadings were greater than the recommended 0.6 value. Hence, the factor loadings requirement of the applied CFA was accurately met.

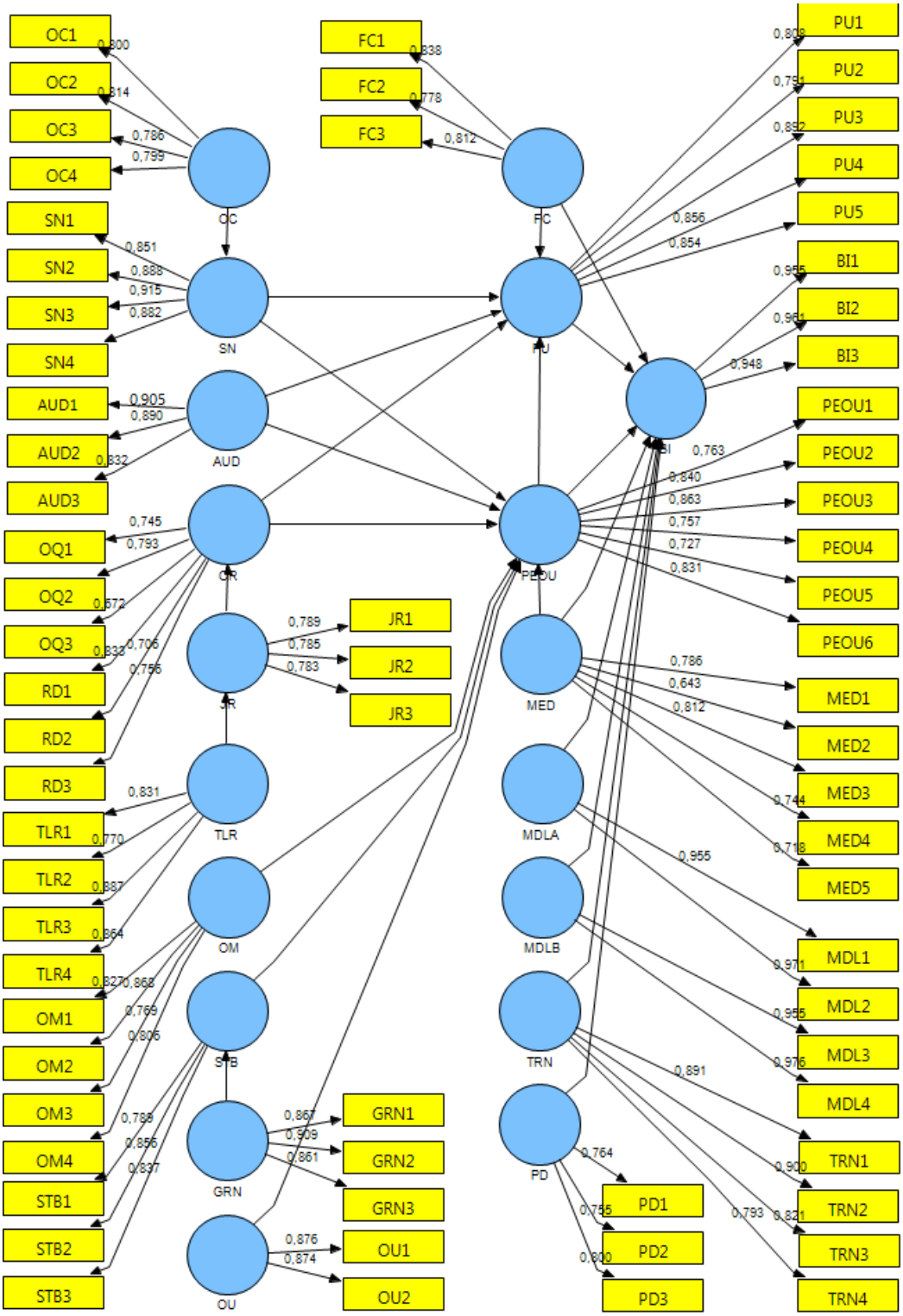


Figure 4.8: Drawn Model (Modified Final) with Measurement Model

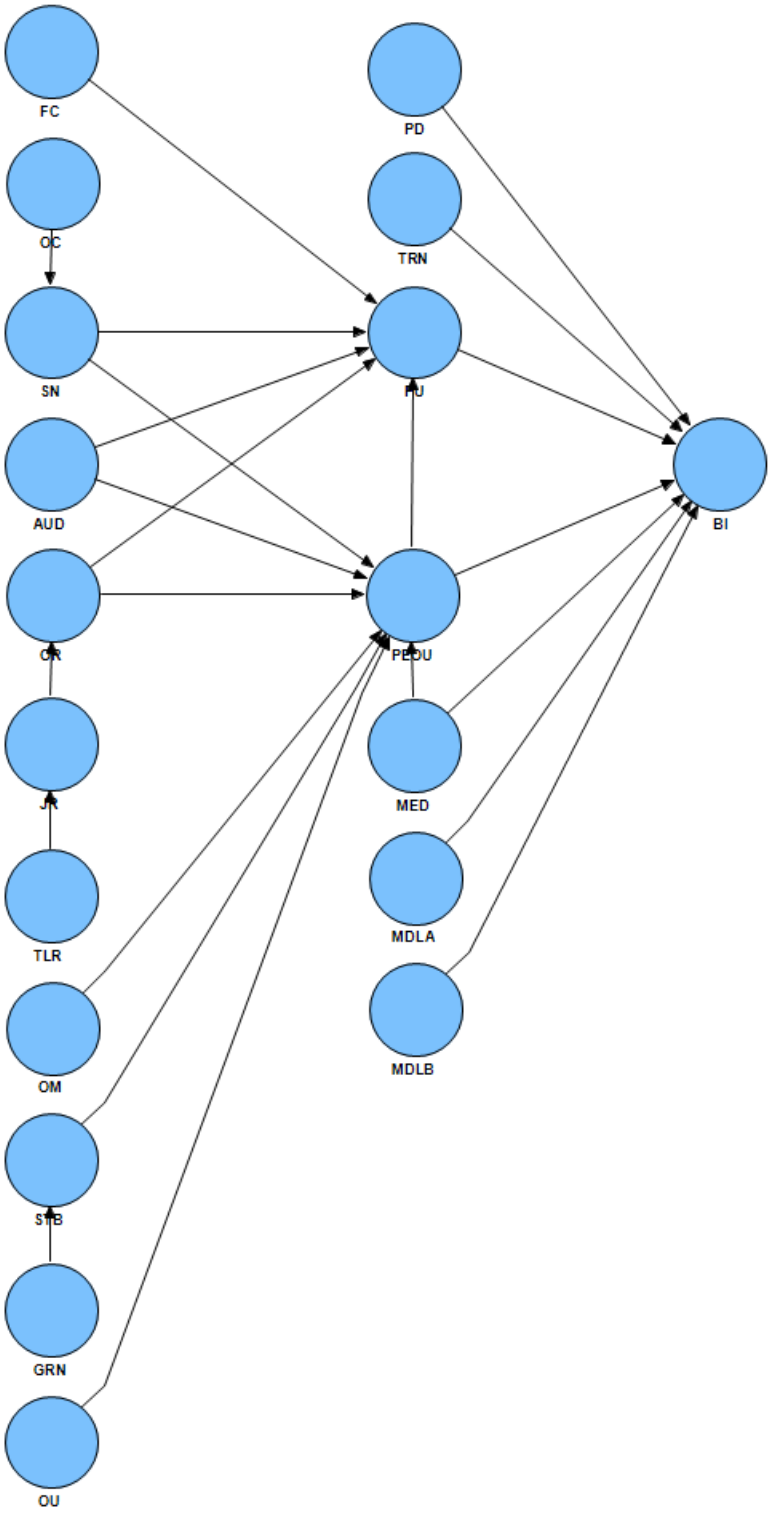


Figure 4.9: Drawn Model (Modified Final) without Measurement Model

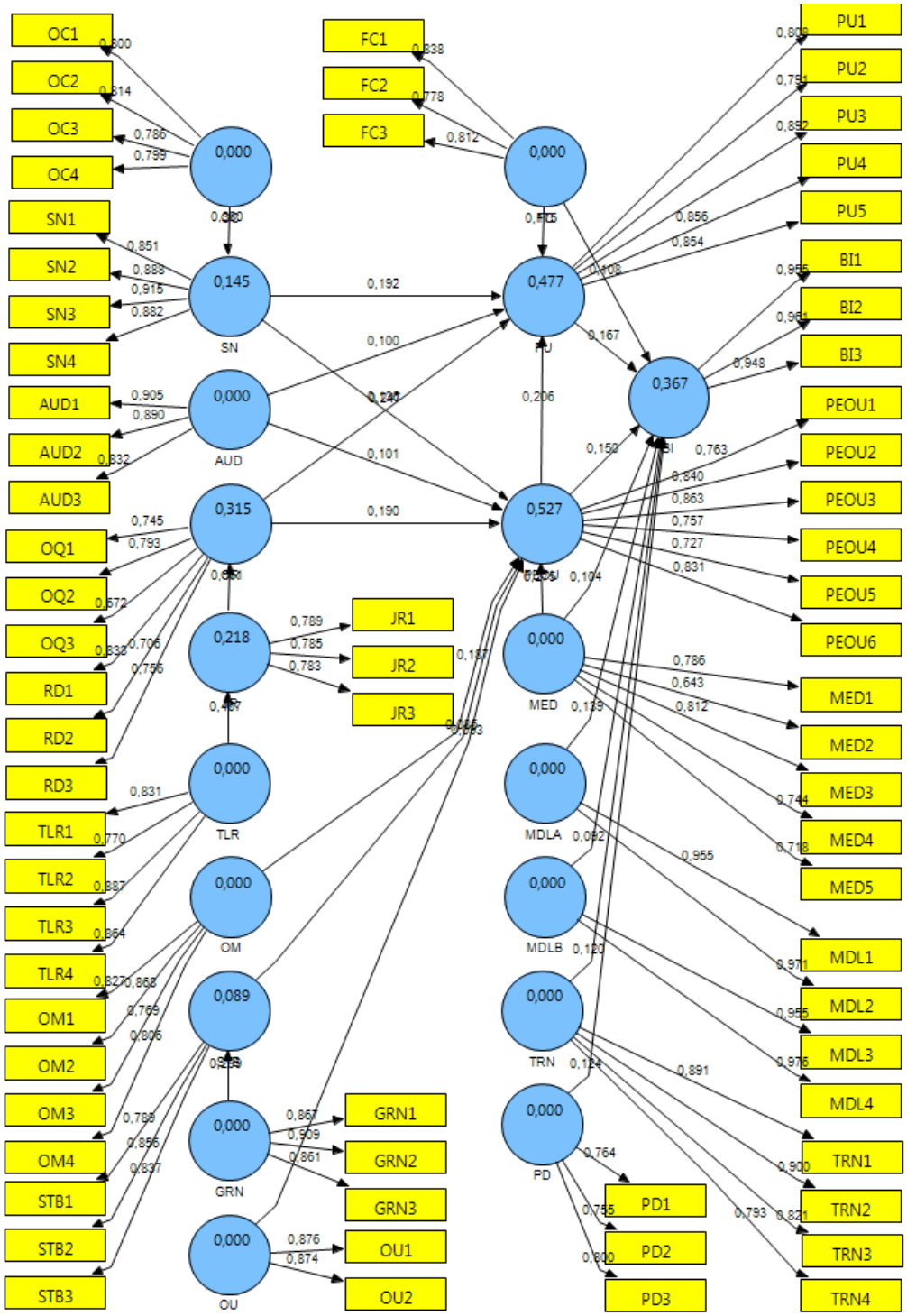


Figure 4.10: Results of PLS Algorithm Run for Drawn Model (Modified Final) with Measurement Model

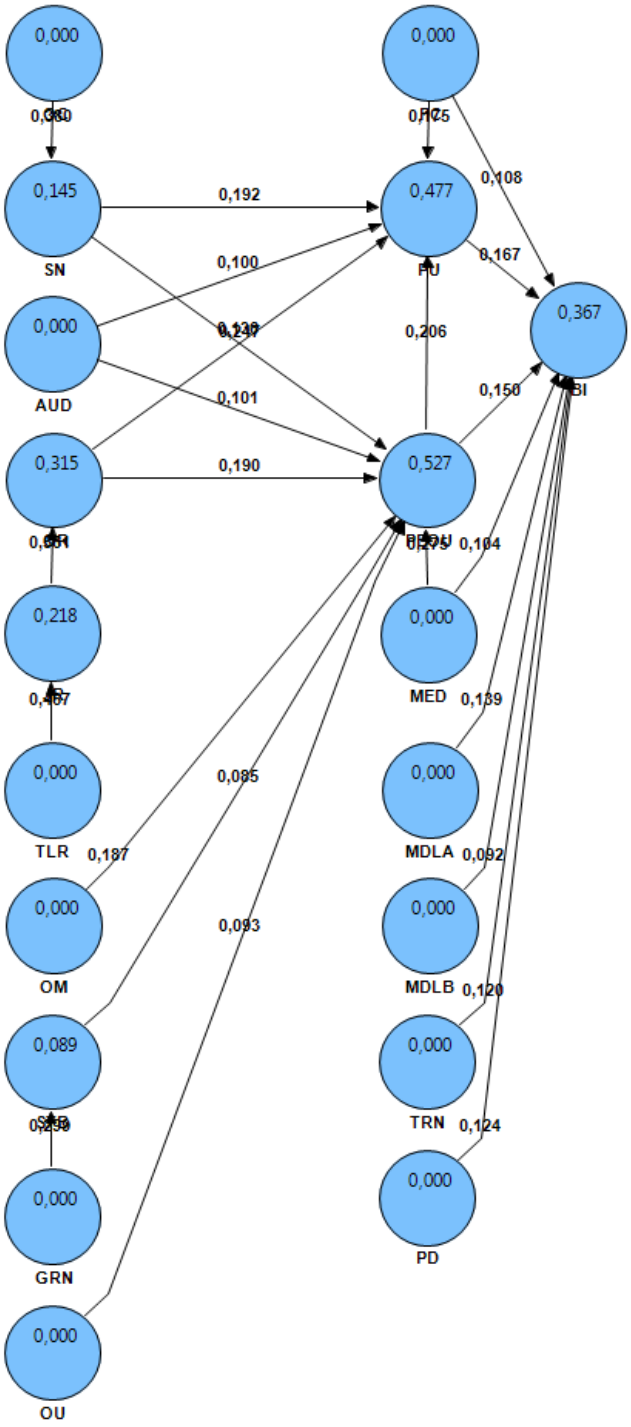


Figure 4.11: Results of PLS Algorithm Run for Drawn Model (Modified Final) without Measurement Model

Table 4.40: Factor Loadings (Modified Final Model) – Part 1

	AUD	BI	FC	GRN	JR	MDLA	MDLB
AUD1	0.904647						
AUD2	0.890111						
AUD3	0.832314						
BI1		0.955312					
BI2		0.960882					
BI3		0.9485					
FC1			0.838382				
FC2			0.777517				
FC3			0.812342				
GRN1				0.867462			
GRN2				0.908538			
GRN3				0.860938			
JR1					0.789353		
JR2					0.784754		
JR3					0.783192		
MDL1						0.955157	
MDL2						0.971296	
MDL3							0.955362
MDL4							0.975579

Table 4.41: Factor Loadings (Modified Final Model) – Part 2

	MED	OC	OM	OR	OU	PD
MED1	0.786264					
MED2	0.643005					
MED3	0.812119					
MED4	0.744159					
MED5	0.717635					
OC1		0.800429				
OC2		0.813687				
OC3		0.785849				
OC4		0.799095				
OM1			0.827151			
OM2			0.868234			

Table 4.41 (continued).

OM3			0.768695			
OM4			0.805827			
OQ1				0.744802		
OQ2				0.793022		
OQ3				0.671816		
OU1					0.875976	
OU2					0.873709	
PD1						0.763902
PD2						0.755075
PD3						0.799916
RD1				0.832757		
RD2				0.706169		
RD3				0.756242		

Table 4.42: Factor Loadings (Modified Final Model) – Part 3

	PEOU	**PU**	**SN**	**STB**	**TLR**	**TRN**
PEOU1	0.763156					
PEOU2	0.840141					
PEOU3	0.862621					
PEOU4	0.756939					
PEOU5	0.726607					
PEOU6	0.831015					
PU1		0.808266				
PU2		0.791455				
PU3		0.892067				
PU4		0.855926				
PU5		0.85422				
SN1			0.851205			
SN2			0.887843			
SN3			0.915398			
SN4			0.882266			
STB1				0.789115		
STB2				0.855668		
STB3				0.836997		

Table 4.42 (continued).

TLR1					0.831264	
TLR2					0.769524	
TLR3					0.886929	
TLR4					0.864228	
TRN1						0.890823
TRN2						0.899905
TRN3						0.82098
TRN4						0.79304

4.8.4 Step 4: Checking Composite Reliabilities (CR)

CR values larger than 0.6 are normally judged as satisfactory and a block is considered homogenous as long as the CR is larger than 0.7. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.4. CR values calculated for each construct are given in Table 4.31. As shown in Table 4.31, all CR values were larger than the recommended 0.7 value. Hence, the CR requirement of the applied CFA was also correctly met.

Table 4.43: Composite Reliability (CR) Values (Modified Final Model)

	Composite Reliability
AUD	0.908323
BI	0.968783
FC	0.850963
GRN	0.910816
JR	0.828819
MDLA	0.962583
MDLB	0.964926
MED	0.859591
OC	0.876565
OM	0.889984
OR	0.886391
OU	0.867081
PD	0.816752
PEOU	0.913056
PU	0.923518
SN	0.934911
STB	0.867034
TLR	0.904717
TRN	0.913788

4.8.5 Step 5: Checking Average Variance Extracted (AVE) Values

AVE values less than 0.5 are considered unsatisfactory. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.5. AVE values calculated for each construct are given in Table 4.44.

As shown in Table 4.44, all AVE values were higher than the recommended 0.5 value. Consequently, the AVE values requirement of the applied CFA was also appropriately met.

Table 4.44: Average Variance Extracted (AVE) Values (Modified Final Model)

	AVE
AUD	0.76781
BI	0.911855
FC	0.655772
GRN	0.773048
JR	0.617436
MDLA	0.92787
MDLB	0.932236
MED	0.551995
OC	0.639721
OM	0.669565
OR	0.566502
OU	0.765351
PD	0.59785
PEOU	0.63731
PU	0.707556
SN	0.78229
STB	0.685144
TLR	0.704175
TRN	0.726578

4.8.6 Step 6: Ensuring Convergent Validity

Convergent validity was checked and ensured by the steps 3, 4, and 5, explained above. Specifically, factor loadings, CR values, and AVE values were calculated and evaluated to check and ensure convergent validity. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.6. As this research truly met the factor loadings, CR values, and AVE values requirements, convergent validity was also revealed.

4.8.7 Step 7: Checking and Ensuring Discriminant Validity

In this study, discriminant validity was revealed in a correlation matrix that includes the correlations among constructs in the lower left off-diagonal elements of the matrix, and the square roots of the AVE values calculated for each of the constructs along the diagonal. In order to ensure discriminant validity, the square roots of the AVE values for each construct should be greater than the correlations among constructs. Theoretical and methodological information and justifications pertaining to this step are provided in Section 3.14.7. The square roots of the AVE values calculated for each of the constructs is given in Table 4.45. Additionally, correlation matrix that includes the correlations among constructs in the lower left off-diagonal elements of the matrix, and the square roots of the AVE values calculated for each of the constructs along the diagonal are given as three parts in Tables 4.46, 4.47, and 4.48, since whole table is a bit wide concerning the page sizes, and to improve readability and interpretability. As shown in Tables 4.46, 4.47, and 4.48, all the square roots of the AVE values for each construct were greater than the correlations among constructs. Therefore, the discriminant validity was also properly revealed and ensured.

Table 4.45: Square Roots of Average Variance Extracted (AVE) Values (Modified Final Model)

	AVE	SQRT of AVE
AUD	0.76781	**0.876247682**
BI	0.911855	**0.954910991**
FC	0.655772	**0.809797506**
GRN	0.773048	**0.879231483**
JR	0.617436	**0.785770959**
MDLA	0.92787	**0.963260089**
MDLB	0.932236	**0.965523692**
MED	0.551995	**0.74296366**
OC	0.639721	**0.799825606**
OM	0.669565	**0.818269516**
OR	0.566502	**0.752663271**
OU	0.765351	**0.874843415**

Table 4.45 (continued).

PD	0.59785	**0.773207605**
PEOU	0.63731	**0.79831698**
PU	0.707556	**0.84116348**
SN	0.78229	**0.884471594**
STB	0.685144	**0.827734257**
TLR	0.704175	**0.839151357**
TRN	0.726578	**0.852395448**

Table 4.46: Correlation Matrix Showing the Square Roots of the AVE Values for Constructs and Correlations among Constructs (Modified Final Model) – Part 1

	AUD	BI	FC	GRN	JR	MDLA	MDLB
AUD	**0.876248**						
BI	0.295626	**0.954911**					
FC	0.342827	0.453101	**0.809798**				
GRN	0.235399	0.165926	0.279801	**0.879232**			
JR	0.314011	0.341861	0.414147	0.197059	**0.785771**		
MDLA	0.028571	0.147274	0.162236	0.116977	0.032033	**0.963260**	
MDLB	0.115139	0.091712	0.055889	-0.043227	0.118061	-0.575796	**0.965524**
MED	0.342782	0.41793	0.512968	0.19981	0.381832	0.108947	0.054939
OC	0.354151	0.316744	0.352033	0.149284	0.400452	-0.0108	0.194181
OM	0.386778	0.403336	0.510668	0.243093	0.412124	0.085182	0.100986
OR	0.382527	0.440785	0.516544	0.202513	0.561466	0.101294	0.190726
OU	0.109639	0.248884	0.185751	0.033849	0.303314	0.084904	0.050841
PD	0.319219	0.369863	0.368469	0.187702	0.346603	0.070544	0.100957
PEOU	0.397046	0.47684	0.508461	0.23382	0.441828	0.068254	0.109439
PU	0.377769	0.467988	0.514109	0.239398	0.443573	0.057843	0.151172
SN	0.215083	0.341198	0.378391	0.174426	0.318153	0.073649	0.053774
STB	0.198538	0.308351	0.303842	0.299149	0.28578	0.066344	0.007495
TLR	0.351385	0.297251	0.355204	0.22702	0.467038	0.12144	0.138621
TRN	0.45209	0.418193	0.464338	0.194173	0.416348	0.033645	0.111672

Table 4.47: Correlation Matrix Showing the Square Roots of the AVE Values for Constructs and Correlations among Constructs (Modified Final Model) – Part 2

	MED	OC	OM	OR	OU	PD
AUD						
BI						
FC						
GRN						
JR						
MDLA						
MDLB						
MED	**0.742964**					
OC	0.328855	**0.7998256**				
OM	0.475596	0.427245	**0.8182695**			
OR	0.42534	0.534527	0.518921	**0.7526633**		
OU	0.222182	0.208362	0.231867	0.294814	**0.8748434**	
PD	0.283135	0.432427	0.405835	0.460621	0.252695	**0.7732076**
PEOU	0.568406	0.374201	0.558749	0.557436	0.3111	0.33707
PU	0.398733	0.415894	0.488947	0.576102	0.293525	0.37753
SN	0.310315	0.380379	0.378896	0.445965	0.230906	0.303179
STB	0.300369	0.225335	0.345813	0.305013	0.17213	0.21681
TLR	0.303217	0.357227	0.445521	0.484783	0.212662	0.34379
TRN	0.423008	0.460488	0.502861	0.504594	0.176451	0.366386

Table 4.48: Correlation Matrix Showing the Square Roots of the AVE Values for Constructs and Correlations among Constructs (Modified Final Model) – Part 3

	PEOU	PU	SN	STB	TLR	TRN
AUD						
BI						
FC						
GRN						
JR						
MDLA						
MDLB						
MED						
OC						

Table 4.48 (continued).

OM						
OR						
OU						
PD						
PEOU	**0.798317**					
PU	0.557448	**0.841163**				
SN	0.442411	0.480962	**0.884472**			
STB	0.361903	0.339049	0.25895	**0.827734**		
TLR	0.348746	0.365173	0.289495	0.216404	**0.839151**	
TRN	0.481675	0.427383	0.408607	0.342812	0.420836	**0.852395**

4.9 Estimation and Evaluation of the Modified Final Model

Bootstrapping technique was used to estimate the significance (*t*-values) of the paths with 5000 bootstrap samples value and 368 cases value.

Model fit was tested with significant path coefficients, high R square values, and composite reliabilities for each construct/factor.

Theoretical and methodological information and justifications pertaining to these are provided in Section 3.15.4 and Section 3.15.5.

Estimated *t* statistics values (the significance of the paths) for the finally set hypotheses are given in Table 4.49.

R square values for the modified final model are given in Table 4.50. Composite reliabilities for the constructs are addressed in Section 4.8.4.

Additionally, hypotheses testing results based on the modified final model and finally set hypotheses with respect to *t* statistics values and significance values are given in Table 4.51.

Table 4.49: T Statistics Values for the Hypotheses (Modified Final Model)

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)
AUD -> PEOU	0.101031	0.10038	0.045316	0.045316	2.229483
AUD -> PU	0.100242	0.099585	0.047942	0.047942	2.090902
FC -> BI	0.108444	0.109683	0.057678	0.057678	1.88016
FC -> PU	0.174683	0.179121	0.05652	0.05652	3.090622
GRN -> STB	0.299149	0.305781	0.056523	0.056523	5.292544
JR -> OR	0.561466	0.563797	0.040536	0.040536	13.850943
MDLA -> BI	0.138755	0.140256	0.052228	0.052228	2.656718
MDLB -> BI	0.092267	0.095777	0.052566	0.052566	1.755266
MED -> BI	0.104455	0.105828	0.055524	0.055524	1.88127
MED -> PEOU	0.275204	0.277575	0.056159	0.056159	4.900418
OC -> SN	0.380379	0.386014	0.056547	0.056547	6.726822
OM -> PEOU	0.187476	0.189302	0.051923	0.051923	3.610631
OR -> PEOU	0.190474	0.191906	0.052216	0.052216	3.647828
OR -> PU	0.246962	0.245488	0.056424	0.056424	4.376938
OU -> PEOU	0.093271	0.093371	0.040972	0.040972	2.276482
PD -> BI	0.123687	0.126021	0.04893	0.04893	2.527817
PEOU -> BI	0.150397	0.150722	0.062909	0.062909	2.390711
PEOU -> PU	0.206256	0.206608	0.059661	0.059661	3.457146
PU -> BI	0.166982	0.165191	0.05693	0.05693	2.933096
SN -> PEOU	0.135743	0.134424	0.043284	0.043284	3.136113
SN -> PU	0.191917	0.19132	0.055182	0.055182	3.477861
STB -> PEOU	0.085048	0.084186	0.041199	0.041199	2.064337
TLR -> JR	0.467038	0.470944	0.04618	0.04618	10.113425
TRN -> BI	0.119556	0.120995	0.053945	0.053945	2.216268

Table 4.50: R Square Values (Modified Final Model)

	R Square
BI	0.367294
PEOU	0.52732
PU	0.477232
OR	0.315244
JR	0.218125
SN	0.144688
STB	0.08949

Table 4.51: Hypothesis Testing Results (Modified Final Model)

#	Relation	Related Hypothesis ID	T Statistics Value	Significance Value	Result of Hypothesis Test
1	**AUD -> PEOU**	**H.1.b**	**2.229483**	**0.025**	**Accepted**
2	**AUD -> PU**	**H.1.a**	**2.090902**	**0.025**	**Accepted**
3	**FC -> BI**	**H.2.c**	**1.88016**	**0.05**	**Accepted**
4	**FC -> PU**	**H.2.a**	**3.090622**	**0.005**	**Accepted**
5	**GRN -> STB**	**H.n.1**	**5.292544**	**0.0005**	**Accepted**
6	**JR -> OR**	**H.n.2**	**13.850943**	**0.0005**	**Accepted**
7	**MDLA -> BI**	**H.6.c**	**2.656718**	**0.005**	**Accepted**
8	**MDLB -> BI**	**H.6.c**	**1.755266**	**0.05**	**Accepted**
9	**MED -> BI**	**H.5.c**	**1.88127**	**0.05**	**Accepted**
10	**MED -> PEOU**	**H.5.b**	**4.900418**	**0.0005**	**Accepted**
11	**OC -> SN**	**H.n.3**	**6.726822**	**0.0005**	**Accepted**
12	**OM -> PEOU**	**H.8.b**	**3.610631**	**0.0005**	**Accepted**
13	**OR -> PEOU**	**H.1012.b**	**3.647828**	**0.0005**	**Accepted**
14	**OR -> PU**	**H.1012.a**	**4.376938**	**0.0005**	**Accepted**
15	**OU -> PEOU**	**H.7.b**	**2.276482**	**0.025**	**Accepted**
16	**PD -> BI**	**H.11.c**	**2.527817**	**0.01**	**Accepted**
17	**PEOU -> BI**	**H.18.b**	**2.390711**	**0.01**	**Accepted**
18	**PEOU -> PU**	**H.18.a**	**3.457146**	**0.0005**	**Accepted**
19	**PU -> BI**	**H.17**	**2.933096**	**0.005**	**Accepted**
20	**SN -> PEOU**	**H.14.b**	**3.136113**	**0.005**	**Accepted**

Table 4.51 (continued).

21	**SN -> PU**	**H.14.a**	**3.477861**	**0.0005**	**Accepted**
22	**STB -> PEOU**	**H.13.b**	**2.064337**	**0.025**	**Accepted**
23	**TLR -> JR**	**H.n.4**	**10.113425**	**0.0005**	**Accepted**
24	**TRN -> BI**	**H.16.c**	**2.216268**	**0.025**	**Accepted**

During the model modification, new hypotheses were defined based on the analyzed data results and interpretations.

These new defined hypotheses are given in Table 4.52.

Table 4.52: New Defined Hypotheses during Model Modification

ID	Hypotheses
H.n.1	Granularity positively influences Stability in favor of the context for the acceptance of processes.
H.n.2	Job Relevance positively influences Outputs & Results in support of the context for the acceptance of processes.
H.n.3	Organizational Culture positively influences Subjective Norm in support of the context for the acceptance of processes.
H.n.4	Tailoring positively influences Job Relevancy in support of the context for the acceptance of processes.

As seen in Table 4.50, R square values of BI, PEOU and PU constructs for the modified final model varied between 0.25 and 0.75 values. Therefore, the model fit can be treated as moderate level with respect to R square values. Additionally, as explained in Section 4.8.4, CR values were all above recommended 0.7 value. Therefore, the CR dimension of the model fit was also secured. Moreover, as seen

in Table 4.53, all listed hypotheses tests resulted as accepted owing to significant t statistics values.

As a result, the final accepted hypotheses (24 in total) based on the modified final model are given in Table 4.53.

Table 4.53: List of Accepted Hypotheses Based on the Modified Final Model

#	Related Hypothesis ID	Accepted Hypotheses
1	H.1.a	Audit positively influences Perceived Usefulness in favor of the context for the acceptance of processes.
2	H.1.b	Audit positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
3	H.2.c	Facilitating Conditions positively influences Behavioral Intention in support of the context for the acceptance of processes.
4	H.2.a	Facilitating Conditions positively influences Perceived Usefulness in support of the context for the acceptance of processes.
5	H.n.1	Granularity positively influences Stability in favor of the context for the acceptance of processes.
6	H.n.2	Job Relevance positively influences Outputs & Results in support of the context for the acceptance of processes.
7	H.6.c	Descriptive Process Modeling positively influences Behavioral Intention in support of the context for the acceptance of processes.

Table 4.53 (continued).

8	H.6.c	Prescriptive Process Modeling positively influences Behavioral Intention in support of the context for the acceptance of processes.
9	H.5.c	Medium positively influences Behavioral Intention in support of the context for the acceptance of processes.
10	H.5.b	Medium positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
11	H.n.3	Organizational Culture positively influences Subjective Norm in support of the context for the acceptance of processes.
12	H.8.b	Operation and Maintenance positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
13	H.1012.b	Outputs & Results positively influences Perceived Ease of Use in favor of the context for the acceptance of processes.
14	H.1012.a	Outputs & Results positively influences Perceived Usefulness in favor of the context for the acceptance of processes.)
15	H.7.b	Objective Usability positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
16	H.11.c	Participation in Development positively influences Behavioral Intention in favor of the context for the acceptance of processes.

Table 4.53 (continued).

17	H.18.b	Perceived Ease of Use positively influences the Behavioral Intention meant for the acceptance of processes.
18	H.18.a	Perceived Ease of Use positively influences the Perceived Usefulness meant for the acceptance of processes.
19	H.17	Perceived Usefulness positively influences the Behavioral Intention meant for the acceptance of processes.
20	H.14.b	Subjective Norm positively influences the Perceived Ease of Use meant for the acceptance of processes.
21	H.14.a	Subjective Norm positively influences the Perceived Usefulness meant for the acceptance of processes.
22	H.13.b	Stability positively influences Perceived Ease of Use in support of the context for the acceptance of processes.
23	H.n.4	Tailoring positively influences Job Relevancy in support of the context for the acceptance of processes.
24	H.16.c	Training positively influences Behavioral Intention in favor of the context for the acceptance of processes.

4.10 Additional Findings based on Descriptive Statistics and *t*-Tests

In this part, additional findings that are obtained and/or verified by making use of descriptive and inferential statistics based on the gathered data from 368 participants are provided.

In addition to data analyses and results provided in previous sections, these additional findings were provided to reflect some attention-grabbing and imperative points additionally discovered in the course of data analyses.

Is there a need of an easily accessible guideline about processes?

Participants were asked whether there is a need of an easily accessible guideline about process system, structure, and interactions available to the personnel, or not.

Table 4.54: Frequency Statistics for Item TRN3 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	7	1.9	1.9	1.9
	4	160	43.5	43.5	45.4
	5	201	54.6	54.6	100.0
	Total	368	100.0	100.0	

Results showed that 98.1% of the participants either strongly agree or agree with the statement that an easily accessible guideline about process system, structure, and interactions should be available to the personnel.

Is there a need for tools regarding processes?

Participants were asked whether there should be tools to access processes easily and to use them as they want, or not.

Table 4.55: Frequency Statistics for Item FC3 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	0.3	0.3	0.3
	3	8	2.2	2.2	2.4
	4	165	44.8	44.8	47.3
	5	194	52.7	52.7	100.0
	Total	368	100.0	100.0	

Results showed that 97.5% of the participants either strongly agree or agree with the statement that in the organization, there should be tools to access processes easily and to use them as they want.

What should be the language for documenting processes?

Participants were asked, "whether processes should be documented in users' native language or a language in which users are proficient," or not.

Participants were also asked, "whether processes should not be documented in a foreign language for the users or a language in which users are not proficient," or not.

Table 4.56: Frequency Statistics for Item MED3 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	0.3	0.3	0.3
	3	4	1.1	1.1	1.4
	4	170	46.2	46.2	47.6
	5	193	52.4	52.4	100.0
	Total	368	100.0	100.0	

Table 4.57: Frequency Statistics for Item MED4 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	0.3	0.3	0.3
	2	3	0.8	0.8	1.1
	3	9	2.4	2.4	3.5
	4	187	50.8	50.8	54.3
	5	168	45.7	45.7	100.0
	Total	368	100.0	100.0	

Results showed that 98.6% of the participants either strongly agree or agree with the statement that processes should be documented in users' native language or a language in which users are proficient.

Results also showed that 96.5% of the participants either strongly agree or agree with the statement that processes should not be documented in a foreign language for the users or a language in which users are not proficient.

Is just text is enough for process definitions?

Participants are asked whether there should be well-refined and meaningful visual elements, flows, and diagrams in the processes, or not.

Participants are also asked whether processes should not be composed of only texts, or not.

Table 4.58: Frequency Statistics for Item MED1 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	0.3	0.3	0.3
	3	11	3.0	3.0	3.3
	4	174	47.3	47.3	50.5
	5	182	49.5	49.5	100.0
	Total	368	100.0	100.0	

Table 4.59: Frequency Statistics for Item MED2 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	0.8	0.8	0.8
	2	4	1.1	1.1	1.9
	3	12	3.3	3.3	5.2
	4	167	45.4	45.4	50.5
	5	182	49.5	49.5	100.0
	Total	368	100.0	100.0	

Results showed that 96.7% of the participants either strongly agree or agree with the statement that there should be well-refined and meaningful visual elements, flows, and diagrams in the processes

Results also showed that 94.8% of the participants either strongly agree or agree with the statement that processes should not be composed of only texts.

Is there a need to compose a devoted-group for process activities?

Participants were asked whether a group should be composed for the activities for deployment, operations, and maintenance of processes, and this group should be composed of competent people who are directly responsible for their work, and have adequate theoretical and practical knowledge in the field, or not.

Table 4.60: Frequency Statistics for Item OM4 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	3	0.8	0.8	0.8
	3	5	1.4	1.4	2.2
	4	197	53.5	53.5	55.7
	5	163	44.3	44.3	100.0
	Total	368	100.0	100.0	

Results showed that 98.8% of the participants either strongly agree or agree with the statement that a group should be composed for the activities for deployment, operations, and maintenance of processes, and this group should be composed of competent people who are directly responsible for their work, and have adequate theoretical and practical knowledge in the field.

Is there a need of consultants for processes?

Participants were asked whether there is a need of active, competent, and professional consultants in the organizations, who are to be contacted with in cases regarding use and implementation of processes, or not.

Table 4.61: Frequency Statistics for Item FC2 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	16	4.3	4.3	4.3
	4	197	53.5	53.5	57.9
	5	155	42.1	42.1	100.0
	Total	368	100.0	100.0	

Results showed that 97.6% of the participants either strongly agree or agree with the statement that there should be active, competent, and professional consultants in the organizations, who are to be contacted with in cases regarding use and implementation of processes.

How much information or details should a process include?

97.1% of the participants think that processes should neither be high-level nor include many details, they should just include required and enough information.

Table 4.62: Frequency Statistics for Item GRN3 of Questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	4	1.1	1.1	1.1
	3	7	1.9	1.9	3.0
	4	196	53.3	53.3	56.3
	5	161	43.8	43.8	100.0
	Total	368	100.0	100.0	

This means that granularity of the processes is important. To be exact, level of details of the processes and information to be included in the processes should be well-adjusted wisely to provide that just required and enough information is included; nothing more or less.

Does gender make any difference for preference regarding the modeling type of processes based on the purposes?

A *t*-test (independent-samples) was applied to analyze and evaluate the views of female and male participants on the "Depending on the purposes of the processes, some processes should be defined so that they just direct 'what to do' information, and some processes should be defined so that they also direct 'how to do' information." statement.

Table 4.63: Gender - Group Statistics for Item MDL5 of Questionnaire

Gender		N	Mean	Std. Deviation	Std. Error Mean
MDL5	Female	140	3.74	0.964	0.081
	Male	227	3.96	0.970	0.064

Table 4.64: Gender - Independent Samples Test Results for Item MDL5 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MDL5	Assumed (Equal Var.)	1.624	0.203	-2.160	365	0.031	-0.225	0.104	-0.429	-0.020
	Not Assumed (Equal Var.)			-2.163	295.801	0.031	-0.225	0.104	-0.429	-0.020

As a result of the applied t-test, a statistically significant difference was identified in the values for female (M = 3.74; SD = 0.96) and male (M = 3.96; SD = 0.97) participants; t (365) = –2.16; p = 0.03.

These results suggest that gender really does have an effect on the view regarding the "Depending on the purposes of the processes, some processes should be defined so that they just direct 'what to do' information, and some processes should be defined so that they also direct 'how to do' information." statement. Explicitly, results of this research suggest that when compared to females, males more rigorously think that the type of process modeling should be shaped and determined by the purposes of the processes.

Does gender make any difference for preference regarding outputs of processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the opinions of female and male participants on the "The outputs or results of processes should be applicable to use for certain purposes." statement.

Table 4.65: Gender - Group Statistics for Item RD2 of Questionnaire

Gender		N	Mean	Std. Deviation	Std. Error Mean
RD2	Female	140	4.44	0.527	0.045
	Male	227	4.32	0.621	0.041

Table 4.66: Gender - Independent Samples Test Results for Item RD2 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RD2	Assumed (Equal Var.)	0.228	0.633	1.993	365	0.047	0.126	0.063	0.002	0.250
	Not Assumed (Equal Var.)			2.072	330.279	0.039	0.126	0.061	0.006	0.245

As a result of the applied t-test, a statistically significant difference was identified in the values for female (M = 4.44; SD = 0.53) and male (M = 4.32; SD = 0.62) participants; t (365) = 1.99; p = 0.05.

These results suggest that gender really does have an effect on the opinion regarding the "The outputs or results of processes should be applicable to use for certain purposes." statement. Openly, results of this research suggest that when compared to males, females more strictly think that outputs or results of processes should be applicable to use for certain purposes.

Does gender make any difference for preference regarding deployment and stability of processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the judgments of female and male participants on the "Processes should be deployed once they

are mature enough, and by this way, more stable and mature processes should be generated." statement.

Table 4.67: Gender - Group Statistics for Item STB2 of Questionnaire

Gender		N	Mean	Std. Deviation	Std. Error Mean
STB2	Female	140	4.47	0.555	0.047
	Male	227	4.26	0.708	0.047

Table 4.68: Gender - Independent Samples Test Results for Item STB2 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
STB2	Assumed (Equal Var.)	1.302	0.255	3.073	365	0.002	0.216	0.070	0.078	0.354
	Not Assumed (Equal Var.)			3.251	344.351	0.001	0.216	0.066	0.085	0.347

As a result of the applied t-test, a statistically significant difference was identified in the values for female (M = 4.47; SD = 0.56) and male (M = 4.26; SD = 0.71) participants; t (365) = 3.07; p = 0.01.

These results suggest that gender really does have an effect on the judgment regarding the "Processes should be deployed once they are mature enough, and by this way, more stable and mature processes should be generated." statement. Definitely, results of this research suggest that when compared to males, females more firmly think that processes should be deployed once they are mature enough, and by this way, more stable and mature processes should be generated.

<u>Does gender make any difference for preference regarding stability of processes?</u>

A *t*-test (independent-samples) was applied to analyze and evaluate the decisions of female and male participants on the stability-related items (Items STB1, STB2, and STB3) in the questionnaire. Here, the average values of stability-related items (Items STB1, STB2, and STB3) in the questionnaire are calculated, and the comparison is made on that average values.

Table 4.69: Gender - Group Statistics for STB_AVR Values

Gender		N	Mean	Std. Deviation	Std. Error Mean
STB_AVR	Female	140	4.45	0.479	0.041
	Male	227	4.34	0.551	0.037

Table 4.70: Gender - Independent Samples Test Results for STB_AVR Values

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
STB_AVR	Assumed (Equal Var.)	0.087	0.769	1.974	365	0.049	0.111	0.056	0.000	0.222
	Not Assumed (Equal Var.)			2.040	325.119	0.042	0.111	0.055	0.004	0.219

As a result of the applied t-test, a statistically significant difference was identified in the values for female (M = 4.45; SD = 0.48) and male (M = 4.34; SD = 0.55) participants; t (365) = 1.97; p = 0.05.

These results suggest that gender really does have an effect on the decision regarding the preference for the stability of the processes. Definitely, results of this

research suggest that when compared to males, females more decisively think that processes should be stable, and stability should be provided, rather than the frequent changes in the processes.

<u>Does gender make any difference for preference regarding how much text there should be in the processes?</u>

A *t*-test (independent-samples) was applied to analyze and evaluate the opinions of female and male participants on the "Processes should not be composed of only texts." statement.

Table 4.71: Gender - Group Statistics for Item MED2 of Questionnaire

Gender		N	Mean	Std. Deviation	Std. Error Mean
MED2	Female	140	4.51	0.569	0.048
	Male	227	4.36	0.748	0.050

Table 4.72: Gender - Independent Samples Test Results for Item MED2 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MED2	Assumed (Equal Var.)	2.364	0.125	1.982	365	0.048	,146	0.074	0.001	0.291
	Not Assumed (Equal Var.)			2.111	349.188	0.035	0.146	0.069	0.010	0.282

As a result of the applied t-test, a statistically significant difference was identified in the values for female (M = 4.51; SD = 0.57) and male (M = 4.36; SD = 0.75) participants; t (365) = 1.99; p = 0.05.

These results suggest that gender really does have an effect on the judgment regarding the "Processes should not be composed of only texts." statement. Noticeably, results of this research suggest that when compared to males, females more resolutely think that processes should not be composed of only texts. That is, for females, processes just including texts are not satisfactory, and there should be other elements, not just texts in the processes.

Does gender make any difference for preference regarding how much complex the interaction with the processes should be?

A t-test (independent-samples) was applied to analyze and evaluate the thoughts of female and male participants on the "My interaction with the processes should not require too much mental effort, and it should not be too complex." statement.

Table 4.73: Gender - Group Statistics for Item PEOU4 of Questionnaire

Gender		N	Mean	Std. Deviation	Std. Error Mean
PEOU4	Female	140	4.49	0.543	0.046
	Male	227	4.33	0.610	0.041

Table 4.74: Gender - Independent Samples Test Results for Item PEOU4 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PEOU4	Assumed (Equal Var.)	0.015	0.902	2.581	365	0.010	0.162	0.063	0.039	0.286
	Not Assumed (Equal Var.)			2.654	320.392	0.008	0.162	0.061	0.042	0.283

As a result of the applied t-test, a statistically significant difference was identified in the values for female (M = 4.49; SD = 0.54) and male (M = 4.33; SD = 0.61) participants; t (365) = 2.58; p = 0.01.

These results suggest that gender really does have an effect on the conclusion regarding the "My interaction with the processes should not require too much mental effort, and it should not be too complex." statement. Visibly, results of this research suggest that when compared to males, females more steadily think that the interaction with the processes should not require too much mental effort, and it should not be too complex. To be exact, for females the complexity of the interaction of the processes matters more when compared to males.

Does maturity level make any difference for preference regarding the modeling type of processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the views of participants working in high-mature companies regarding processes or having relationship with high-maturity process practices, and working in mature companies regarding processes or having relationship with mature process practices, on the "Depending on the purposes of the processes, some processes should be defined so that they just direct 'what to do' information, and some processes should be defined so that they also direct 'how to do' information." statement. More clearly, participants from/with CMMI Level 5 and/or ISO 15504 Level 5 are compared to the participants from/with CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

Table 4.75: Maturity Level - Group Statistics for Item MDL5 of Questionnaire

Maturity Level		N	Mean	Std. Deviation	Std. Error Mean
MDL5	5	137	4.10	0.942	0.080
	3	231	3.74	0.966	0.064

Table 4.76: Maturity Level - Independent Samples Test Results for Item MDL5 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MDL5	Assumed (Equal Var.)	1.595	0.207	3.508	366	0.001	0.362	0.103	0.159	0.565
	Not Assumed (Equal Var.)			3.531	291.491	0.000	0.362	0.103	0.160	0.564

As a result of the applied t-test, a statistically significant difference was identified in the values for participants of high-mature members (participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices) (M = 4.10; SD = 0.94) and mature members (participants working in mature organizations regarding processes or having relationship with mature process practices) (M = 3.74; SD = 0.97); t (366) = 3.51; p = 0.001.

These results suggest that maturity level truly does have an effect on the view regarding the "Depending on the purposes of the processes, some processes should be defined so that they just direct 'what to do' information, and some processes should be defined so that they also direct 'how to do' information." statement. Noticeably, results of this research suggest that when compared to mature members, high-mature members more rigorously think that depending on the purposes of the processes, some processes should be defined so that they just direct 'what to do' information, and some processes should be defined so that they also direct 'how to do' information.

Is there a statistically significant relationship between maturity level and process modeling type?

A *t*-test (independent-samples) was applied to analyze and evaluate the views of participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices, and working in mature organizations regarding processes or having relationship with mature process practices, on the "Processes should be defined so that they just direct 'what to do' information." statement. More clearly, participants from/with CMMI Level 5 and/or ISO 15504 Level 5 are compared to the participants from/with CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

Table 4.77: Maturity Level - Group Statistics for Item MDL1 of Questionnaire

Maturity Level		N	Mean	Std. Deviation	Std. Error Mean
MDL1	5	137	4.14	1.009	0.086
	3	231	2.60	1.075	0.071

Table 4.78: Maturity Level - Independent Samples Test Results for Item MDL1 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MDL1	Assumed (Equal Var.)	6.300	0.013	13.606	366	0.000	1.541	0.113	1.319	1.764
	Not Assumed (Equal Var.)			13.827	300.254	0.000	1.541	0.111	1.322	1.761

As a result of the applied t-test, a statistically significant difference was identified in the values for participants of high-mature members (participants working in

high-mature organizations regarding processes or having relationship with high-maturity process practices) (M = 4.14; SD = 1.01) and mature members (participants working in mature organizations regarding processes or having relationship with mature process practices) (M = 2.60; SD = 1.08) participants; t (300) = 13.83; p = 0.001.

These results suggest that maturity level truly does have an effect on the view regarding the "Processes should be defined so that they just direct 'what to do' information." statement. Obviously, results of this research suggest that when compared to mature members, high-mature members more severely think that processes should be defined so that they just direct 'what to do' information. That is, participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices favor descriptive process modeling, rather than prescriptive process modeling.

Furthermore, A *t*-test (independent-samples) was applied to analyze and evaluate the views of participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices, and working in mature organizations regarding processes or having relationship with mature process practices, on the "In addition to 'what to do' information, processes should be defined so that they also direct 'how to do' information." statement. More openly, participants from/with CMMI Level 5 and/or ISO 15504 Level 5 are compared to the participants from/with CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

Table 4.79: Maturity Level - Group Statistics for Item MDL3 of Questionnaire

	Maturity Level	N	Mean	Std. Deviation	Std. Error Mean
MDL3	5	137	3.17	1.040	0.089
	3	231	4.12	0.825	0.054

Table 4.80: Maturity Level - Independent Samples Test Results for Item MDL3 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
MDL3	Assumed (Equal Var.)	25.879	0.000	-9.704	366	0.000	-0.953	0.098	-1.147	-0.760
	Not Assumed (Equal Var.)			-9.154	236.952	0.000	-0.953	0.104	-1.158	-0.748

As a result of the applied t-test, a statistically significant difference was identified in the values for participants of high-mature members (participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices) (M = 3.17; SD = 1.05) and mature members (participants working in mature organizations regarding processes or having relationship with mature process practices) (M = 4.12; SD = 0.83); t (237) = 9.15; p = 0.001.

These results suggest that maturity level truly does have an effect on the view regarding the "In addition to 'what to do' information, processes should be defined so that they also direct 'how to do' information." statement. Obviously, results of this research suggest that when compared to high-mature members, mature members more severely think that in addition to what to do information, processes should be defined so that they also direct how to do information. To be precise, participants working in mature organizations regarding processes or having relationship with mature process practices wish prescriptive process modeling, instead of descriptive process modeling.

<u>Does maturity level make any difference for preference regarding outputs or results of processes?</u>

A *t*-test (independent-samples) was applied to analyze and evaluate the views of participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices, and working in mature organizations regarding processes or having relationship with mature process practices, on the "For processes, there should be defined and meaningful outputs or results, and these should be easily recognizable and noticeable." statement. More visibly, participants from/with CMMI Level 5 and/or ISO 15504 Level 5 are compared to the participants from/with CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

Table 4.81: Maturity Level - Group Statistics for Item RD3 of Questionnaire

Maturity Level		N	Mean	Std. Deviation	Std. Error Mean
RD3	5	137	4.42	0.539	0.046
	3	231	4.30	0.585	0.039

Table 4.82: Maturity Level - Independent Samples Test Results for Item RD3 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
RD3	Assumed (Equal Var.)	0.061	0.806	1.963	366	0.050	0.120	0.061	0.000	0.241
	Not Assumed (Equal Var.)			2.005	304.819	0.046	0.120	0.060	0.002	0.238

As a result of the applied t-test, a statistically significant difference was identified in the values for participants of high-mature members (participants working in high-mature organizations regarding processes or having relationship with high-

maturity process practices) (M = 4.42; SD = 0.54) and mature members (participants working in mature organizations regarding processes or having relationship with mature process practices) (M = 4.30; SD = 0.59); t (366) = 1.96; p = 0.05.

These results suggest that maturity level truly does have an effect on the view regarding the "For processes, there should be defined and meaningful outputs or results, and these should be easily recognizable and noticeable." statement. Noticeably, results of this research suggest that when compared to mature members, high-mature members more firmly think that for processes, there should be defined and meaningful outputs or results, and these should be easily recognizable and noticeable.

Is there a statistically significant relationship between maturity level and tailoring of processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the views of participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices, and working in mature organizations regarding processes or having relationship with mature process practices, on the "Some processes should be tailored in accordance with defined rules, with respect to project realities, rather than using them as they are." statement. More clearly, participants from/with CMMI Level 5 and/or ISO 15504 Level 5 are compared to the participants from/with CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

As a result of the applied t-test, a statistically significant difference was identified in the values for participants of high-mature members (participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices) (M = 4.50; SD = 0.54) and mature members (participants working in mature organizations regarding processes or having

relationship with mature process practices) (M = 4.37; SD = 0.59); t (366) = 2.13; p = 0.03.

These results suggest that maturity level truly does have an effect on the view regarding the "Some processes should be tailored in accordance with defined rules, with respect to project realities, rather than using them as they are." statement. Explicitly, results of this research suggest that when compared to mature members, high-mature members more decisively think that some processes should be tailored in accordance with defined rules, with respect to project realities, rather than using them as they are. To be precise, participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices favor tailoring of processes, rather than using them as is.

Moreover, another *t*-test (independent-samples) was applied to analyze and evaluate the views of participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices, and working in mature organizations regarding processes or having relationship with mature process practices, on the "As the projects' realities or priorities may differ from each other, not every project should be expected to implement all organizational processes as they are, tailoring should be permitted." statement. More clearly, participants from/with CMMI Level 5 and/or ISO 15504 Level 5 are compared to the participants from/with CMMI Level 3, ISO 15504 Level 3, ISO 9001, NATO-AQAP 160, NATO-AQAP 2110, ISO 27001, and/or AS 9100.

Table 4.83: Maturity Level - Group Statistics for Items TLR3 and TLR4 of Questionnaire (for Maturity Level)

Maturity Level		N	Mean	Std. Deviation	Std. Error Mean
TLR3	5	137	4.50	0.544	0.046
	3	231	4.37	0.590	0.039
TLR4	5	137	4.52	0.595	0.051
	3	231	4.38	0.583	0.038

Table 4.84: Maturity Level - Independent Samples Test Results for Items TLR3 and TLR4 of Questionnaire (for Maturity Level)

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TLR3	Assumed (Equal Var.)	0.214	0.644	2.125	366	0.034	0.131	0.062	0.010	0.253
	Not Assumed (Equal Var.)			2.170	304.237	0.031	0.131	0.061	0.012	0.250
TLR4	Assumed (Equal Var.)	0.231	0.631	2.235	366	0.026	0.142	0.063	0.017	0.266
	Not Assumed (Equal Var.)			2.223	281.034	0.027	0.142	0.064	0.016	0.267

As a result of the applied t-test, a statistically significant difference was identified in the values for participants of high-mature members (participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices) (M = 4.52; SD = 0.60) and mature members (participants working in mature organizations regarding processes or having relationship with mature process practices) (M = 4.38; SD = 0.58); t (366) = 2.24; p = 0.03.

These results suggest that maturity level truly does have an effect on the view regarding the "As the projects' realities or priorities may differ from each other, not every project should be expected to implement all organizational processes as they are, tailoring should be permitted." statement. Explicitly, results of this research suggest that when compared to mature members, high-mature members more decisively think that as the projects' realities or priorities may differ from each other, not every project should be expected to implement all organizational processes as they are, tailoring should be permitted. Specifically, participants

working in high-mature organizations regarding processes or having relationship with high-maturity process practices desire tailoring of processes based on project realities, rather than using them as is or being forced to implement them as is without tailoring.

Does continent (Asia or Europe) make any difference for preference regarding that commitments of people about processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the views of people from Asia and Europe on the "Commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes." statement.

Table 4.85: Continent - Group Statistics for Item PD3 of Questionnaire

Continent		N	Mean	Std. Deviation	Std. Error Mean
PD3	Asia	210	4.37	0.582	0.040
	Europe	111	4.54	0.584	0.055

Table 4.86: Continent - Independent Samples Test Results for ItemPD3 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PD3	Assumed (Equal Var.)	0.442	0.507	-2.543	319	0.011	-0.174	0.068	-0.308	-0.039
	Not Assumed (Equal Var.)			-2.539	223.232	0.012	-0.174	0.068	-0.309	-0.039

As a result of the applied t-test, a statistically significant difference was identified in the values of participants from Asia (M = 4.37; SD = 0.58) and Europe (M = 4.54; SD = 0.58); t (319) = –2.54; p = 0.01.

These results suggest that continent indeed does have an effect on the interpretation regarding the "Commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes." statement. Clearly, results of this research suggest that when compared to people from Asia, people from Europe more strictly think that commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes.

Does continent (Asia or Europe) make any difference for preference regarding the organizational culture about processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the opinions of people from Asia and Europe on the organizational culture-related items (Items OC1, OC2, OC3, and OC4) in the questionnaire. Here, the average values of organizational culture-related items (Items OC1, OC2, OC3, and OC4) in the questionnaire are calculated, and the comparison is made on that average values.

Table 4.87: Continent - Group Statistics for OC_AVR Values

Continent		N	Mean	Std. Deviation	Std. Error Mean
OC_AVR	Asia	210	4.331	0.4354	0.0300
	Europe	111	4.462	0.3891	0.0369

Table 4.88: Continent - Independent Samples Test Results for OC_AVR Values

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
OC_AVR	Assumed (Equal Var.)	1.901	0.169	-2.653	319	0.008	-0.1308	0.0493	-0.2277	-0.0338
	Not Assumed (Equal Var.)			-2.747	246.908	0.006	-0.1308	0.0476	-0.2245	-0.0370

As a result of the applied t-test, a statistically significant difference was identified in the values of participants from Asia (M = 4.33; SD = 0.58) and Europe (M = 4.46; SD = 0.58); t (319) = –2.65; p = 0.01.

These results state that continent indeed does have an effect on the interpretation regarding the preference concerning the influence of organizational culture about processes. Obviously, results of this research suggest that when compared to people from Asia, people from Europe more firmly think that organizational culture has main contribution for providing the use of processes.

Does continent (Asia or Europe) make any difference for preference regarding the tailoring of processes?

A *t*-test (independent-samples) was applied to analyze and evaluate the opinions of people from Asia and Europe on the tailoring-related items (Items TLR1, TLR2, TLR3, and TLR4) in the questionnaire. At this point, the average values of tailoring-related items (Items TLR1, TLR2, TLR3, and TLR4) in the questionnaire are calculated, and the comparison is made on that average values.

Table 4.89: Continent - Group Statistics for TLR_AVR Values

Continent		N	Mean	Std. Deviation	Std. Error Mean
TLR_AVR	Asia	210	4.36	0.467	0.032
	Europe	111	4.52	0.469	0.045

Table 4.90: Continent - Independent Samples Test Results for TLR_AVR Values

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TLR_AVR	Assumed (Equal Var.)	0.385	0.535	-2.904	319	0.004	-0.159	0.055	-0.267	-0.051
	Not Assumed (Equal Var.)			-2.901	223.344	0.004	-0.159	0.055	-0.268	-0.051

As a result of the applied t-test, a statistically significant difference was identified in the values of participants from Asia (M = 4.36; SD = 0.47) and Europe (M = 4.52; SD = 0.47); t (319) = –2.90; p = 0.01.

These results state that continent truly does have an influence on the explanation regarding the preference about tailoring of processes. Deceptively, results of this research propose that when compared to people from Asia, people from Europe more decisively consider that processes should be tailored for specific needs or realities of projects.

Is there a statistically significant difference between undergraduate and graduate people regarding trainings?

A *t*-test (independent-samples) was applied to analyze and evaluate the opinions of undergraduate participants and graduate participants on the "If I am given trainings

regarding processes, I possibly will implement processes more productively." statement.

Table 4.91: Education Level - Group Statistics for Item TRN4 of Questionnaire

Education Level		N	Mean	Std. Deviation	Std. Error Mean
TRN4	Undergraduate	110	4.57	0.515	0.049
	Graduate	204	4.40	0.616	0.043

Table 4.92: Education Level - Independent Samples Test Results for Item TRN4 of Questionnaire

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
TRN4	Assumed (Equal Var.)	2.047	0.153	2.477	312	0.014	0.171	0.069	0.035	0.306
	Not Assumed (Equal Var.)			2.613	259.196	0.010	0.171	0.065	0.042	0.299

As a result of the applied t-test, a statistically significant difference was identified in the values of undergraduate participants (M = 4.57; SD = 0.52) and graduate participants (M = 4.40; SD = 0.62); t (312) = 2.48; p = 0.01.

These results advocate that education level (either undergraduate or graduate) actually does have an effect on the inclination regarding the "If I am given trainings regarding processes, I possibly will implement processes more productively." statement. Plainly, results of this research submit that when compared to undergraduate participants, graduate participants less rigorously think that trainings regarding processes are to provide more productive implementation of processes. That is to say, undergraduate ones more firmly support the "If I am

given trainings regarding processes, I possibly will implement processes more productively." statement.

Is there a statistically significant difference between engineering and quality assurance/process people for preference regarding the constructs?

A *t*-test (independent-samples) was applied to analyze and evaluate the thoughts of people working in engineering and quality assurance/process departments on the related items for participation in development, organizational culture, outputs & results, tailoring, audit, training, operations and maintenance, and behavioral intention constructs. At this point, the average values of related items for each construct in the questionnaire are calculated, and the comparison is made on that average values.

Table 4.93: Field Working in - Group Statistics for PD_AVR, OC_AVR, OR_AVR, TLR_AVR, AUD_AVR, TRN_AVR, OM_AVR and BI_AVR Values

Field Working in		N	Mean	Std. Deviation	Std. Error Mean
PD_AVR	Engineering	144	4.47	0.410	0.034
	QA and Process	90	4.64	0.388	0.041
OC_AVR	Engineering	144	4.30	0.406	0.0338
	QA and Process	90	4.45	0.401	0.0423
OR_AVR	Engineering	144	4.31	0.390	0.032
	QA and Process	90	4.44	0.426	0.045
TLR_AVR	Engineering	144	4.33	0.450	0.037
	QA and Process	90	4.54	0.476	0.050
AUD_AVR	Engineering	144	4.43	0.485	0.040
	QA and Process	90	4.61	0.432	0.045
TRN_AVR	Engineering	144	4.45	0.496	0.04131
	QA and Process	90	4.61	0.398	0.04199
OM_AVR	Engineering	144	4.40	0.431	0.03593
	QA and Process	90	4.53	0.380	0.04010
BI_AVR	Engineering	144	4.45	0.480	0.040
	QA and Process	90	4.59	0.479	0.051

Table 4.94: Field Working in - Independent Samples Test Results for PD_AVR, OC_AVR, OR_AVR, TLR_AVR, AUD_AVR, TRN_AVR, OM_AVR and BI_AVR Values

		Equality of Var. Test (Levene's)		Equality of Means (t-test)						
									The Difference's Confidence Interval [95%]	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PD_AVR	Assumed (Equal Var.)	2.799	0.096	-3.163	232	0.002	-0.171	0.054	-0.277	-0.064
	Not Assumed (Equal Var.)			-3.205	197.121	0.002	-0.171	0.053	-0.276	-0.066
OC_AVR	Assumed (Equal Var.)	0.024	0.876	-2.801	232	0.006	-0.1521	0.0543	-0.2591	-0.0451
	Not Assumed (Equal Var.)			-2.809	190.852	0.005	-0.1521	0.0541	-0.2589	-0.0453
OR_AVR	Assumed (Equal Var.)	0.236	0.627	-2.473	232	0.014	-0.134	0.054	-0.241	-0.027
	Not Assumed (Equal Var.)			-2.422	176.292	0.016	-0.134	0.055	-0.244	-0.025
TLR_AVR	Assumed (Equal Var.)	0.980	0.323	-3.484	232	0.001	-0.215	0.062	-0.337	-0.094
	Not Assumed (Equal Var.)			-3.438	180.956	0.001	-0.215	0.063	-0.339	-0.092
AUD_AVR	Assumed (Equal Var.)	7.822	0.006	-2.864	232	0.005	-0.179	0.063	-0.302	-0.056
	Not Assumed (Equal Var.)			-2.943	205.475	0.004	-0.179	0.061	-0.299	-0.059
TRN_AVR	Assumed (Equal Var.)	6.412	0.012	-2.574	232	0.011	-0.159	0.062	-0.281	-0.037
	Not Assumed (Equal Var.)			-2.706	217.728	0.007	-0.159	0.059	-0.275	-0.043
OM_AVR	Assumed (Equal Var.)	6.481	0.012	-2.424	232	0.016	-0.134	0.055	-0.244	-0.025

Table 4.94 (continued).

	Not Assumed (Equal Var.)			-2.496	206.461	0.013	-0.134	0.054	-0.241	-0.028
BI_AVR	Assumed (Equal Var.)	0.056	0.813	-2.205	232	0.028	-0.142	0.064	-0.269	-0.015
	Not Assumed (Equal Var.)			-2.206	189.180	0.029	-0.142	0.064	-0.269	-0.015

For participation in development, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.47; SD = 0.41) and quality assurance (QA) and process participants (M = 4.64; SD = 0.39); t (232) = –3.16; p = 0.01.

For organizational culture, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.30; SD = 0.41) and quality assurance (QA) and process participants (M = 4.45; SD = 0.40); t (232) = –2.80; p = 0.01.

For outputs & results, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.31; SD = 0.39) and quality assurance (QA) and process participants (M = 4.44; SD = 0.43); t (232) = –2.47; p = 0.01.

For tailoring, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.33; SD = 0.45) and quality assurance (QA) and process participants (M = 4.54; SD = 0.48); t (232) = –3.48; p = 0.01.

For audit, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.43; SD = 0.49) and quality assurance (QA) and process participants (M = 4.61; SD = 0.43); t (232) = –2.86; p = 0.01.

For training, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.45; SD = 0.50) and quality assurance (QA) and process participants (M = 4.61; SD = 0.40); t (232) = –2.57; p = 0.01.

For operations and maintenance, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.40; SD = 0.43) and quality assurance (QA) and process participants (M = 4.53; SD = 0.38); t (232) = –2.42; p = 0.02.

For behavioral intention, As a result of the applied t-test, a statistically significant difference was identified in the values of engineering participants (M = 4.45; SD = 0.48) and quality assurance (QA) and process participants (M = 4.59; SD = 0.48); t (232) = –2.21; p = 0.03.

These results say that field/department in which personnel work actually does have an effect on the explanation regarding the preference about participation in development, organizational culture, outputs & results, tailoring, audit, training, operations and maintenance, and behavioral intention. Specifically, results of this research suggest that when compared to people working in engineering departments, people working in quality assurance/process departments more conclusively consider that participation in development, organizational culture, outputs & results, tailoring, audit, training, operations and maintenance, and behavioral intention are significant and imperative regarding processes.

4.11 Additional Findings based on Qualitative Data Analysis and Results

As noted before, there were 368 participants took part in this research. However, for qualitative part of the questionnaire 158 of 368 participants (42.9%) provided answers (even a single word, ignoring its quality or content), since this part of the questionnaire to collect qualitative data was set as non-compulsory to fill-out by the participants. Nonetheless, after analyzing the content and context of the

answers, it is evaluated that 27 of 158 (17.1%) answers were somehow irrelevant or lack with respect to quality, content or context. Consequently, it was comprehended that there were 131 usable answers out of 368 total sample size (35.6%) for the qualitative part of the study.

Meant for qualitative data analysis, a table was composed to list and manage the qualitative data gathered. After populating the table, the quasi-statistics were used to determine the possible additional factors for process acceptance. To do so, a descriptive statistics-frequency table (Table 4.95) is created to observe and analyze the initial frequencies of assigned codes. Additionally, another descriptive statistics-frequency table (Table 4.96) is created to detect and analyze the final frequencies of assigned codes, once somehow irrelevant or lacking with respect to quality, content or context qualitative data are excluded.

The assigned codes written in “Title Case” format were overlooked in this part of data analysis, since these are specifically and in detail addressed, and analyzed quantitatively in previous sections.

On the other hand, for the ones written in ALL CAPS format, as these were new-discovered constructs or dimensions, explanations are provided in the following sections (throughout Section 4.11.1 to Section 4.11.4) for each new-discovered construct.

At this time, a criterion was set to include the new ones: including ones have frequency equal to or more than seven; in order to deal with repetitive and shared concerns for the context, more willingly than dealing with the individual or distinctive concerns or comments. The seven was determined as seven counts nearly 5% of the whole usable samples (131) providing qualitative answers.

Table 4.95: Initial Frequency Statistics for Assigned Codes – Including Unusable Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	* MANAGEMENT COMMITMENT AND SPONSORSHIP	41	14.9	14.9	14.9
	-	27	9.8	9.8	24.7
	* Training	23	8.4	8.4	33.1
	* Organizational Culture	21	7.6	7.6	40.7
	* Outputs and Results	19	6.9	6.9	47.6
	* Participation in Development	11	4.0	4.0	51.6
	* Facilitating Conditions	10	3.6	3.6	55.3
	* MEASUREMENT	10	3.6	3.6	58.9
	* Medium	9	3.3	3.3	62.2
	* Modeling	9	3.3	3.3	65.5
	* Operations and Maintenance	9	3.3	3.3	68.7
	* Perceived Usefulness	9	3.3	3.3	72.0
	* Audit	8	2.9	2.9	74.9
	* Granularity	8	2.9	2.9	77.8
	* Tailoring	8	2.9	2.9	80.7
	* ROLE IN PERFORMANCE EVALUATION	7	2.5	2.5	83.3
	* Perceived Ease of Use	6	2.2	2.2	85.5
	* AUTOMATION	5	1.8	1.8	87.3
	* FEEDBACK BY USERS	5	1.8	1.8	89.1
	* Subjective Norm	5	1.8	1.8	90.9
	* PERSONAL FACTORS	3	1.1	1.1	92.0
	* PROCESS OWNERSHIP	3	1.1	1.1	93.1
	* CUSTOMER EXPECTATIONS	2	0.7	0.7	93.8
	* Job Relevance	2	0.7	0.7	94.5
	* NATIONAL CULTURE	2	0.7	0.7	95.3
	* PUNISHMENT	2	0.7	0.7	96.0
	* AGILITY	1	0.4	0.4	96.4
	* COMPETITION	1	0.4	0.4	96.7
	* DISCUSSION	1	0.4	0.4	97.1
	* INCREMENTAL DEPLOYMENT	1	0.4	0.4	97.5
	* LOW-COUPLING	1	0.4	0.4	97.8
	* Organization Culture	1	0.4	0.4	98.2
	* REGULATORY REQUIREMENTS	1	0.4	0.4	98.5
	* SIZE	1	0.4	0.4	98.9
	* Stability	1	0.4	0.4	99.3
	* TEAM FACTORS	1	0.4	0.4	99.6
	* TYPE OF PROJECT	1	0.4	0.4	100.0
	Total	275	100.0	100.0	

Table 4.96: Final Frequency Statistics for Assigned Codes – Excluding Unusable Responses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	* MANAGEMENT COMMITMENT AND SPONSORSHIP	41	16.5	16.5	16.5
	* Training	23	9.3	9.3	25.8
	* Organizational Culture	21	8.5	8.5	34.3
	* Outputs and Results	19	7.7	7.7	41.9
	* Participation in Development	11	4.4	4.4	46.4
	* Facilitating Conditions	10	4.0	4.0	50.4
	* MEASUREMENT	10	4.0	4.0	54.4
	* Medium	9	3.6	3.6	58.1
	* Modeling	9	3.6	3.6	61.7
	* Operations and Maintenance	9	3.6	3.6	65.3
	* Perceived Usefulness	9	3.6	3.6	69.0
	* Audit	8	3.2	3.2	72.2
	* Granularity	8	3.2	3.2	75.4
	* Tailoring	8	3.2	3.2	78.6
	* ROLE IN PERFORMANCE EVALUATION	7	2.8	2.8	81.5
	* Perceived Ease of Use	6	2.4	2.4	83.9
	* AUTOMATION	5	2.0	2.0	85.9
	* FEEDBACK BY USERS	5	2.0	2.0	87.9
	* Subjective Norm	5	2.0	2.0	89.9
	* PERSONAL FACTORS	3	1.2	1.2	91.1
	* PROCESS OWNERSHIP	3	1.2	1.2	92.3
	* CUSTOMER EXPECTATIONS	2	0.8	0.8	93.1
	* Job Relevance	2	0.8	0.8	94.0
	* NATIONAL CULTURE	2	0.8	0.8	94.8
	* PUNISHMENT	2	0.8	0.8	95.6
	* AGILITY	1	0.4	0.4	96.0
	* COMPETITION	1	0.4	0.4	96.4
	* DISCUSSION	1	0.4	0.4	96.8
	* INCREMENTAL DEPLOYMENT	1	0.4	0.4	97.2
	* LOW-COUPLING	1	0.4	0.4	97.6
	* Organization Culture	1	0.4	0.4	98.0
	* REGULATORY REQUIREMENTS	1	0.4	0.4	98.4
	* SIZE	1	0.4	0.4	98.8
	* Stability	1	0.4	0.4	99.2
	* TEAM FACTORS	1	0.4	0.4	99.6
	* TYPE OF PROJECT	1	0.4	0.4	100.0
	Total	248	100.0	100.0	

4.11.1 Management Commitment and Sponsorship as an Additional Construct

Results of the qualitative analysis showed that management commitment and sponsorship (MCS) is an additional factor that is evaluated by the participants (41 participants) as a contributing element for the acceptance of processes. Indeed, this point had been, not explicitly but implicitly, addressed in subjective norm (SN) and organizational culture (OC) contexts and constructs. Nevertheless, as there was a clear and explicit statement by 41 participants, the MCS was included as a new construct, as results of qualitative analysis.

Consequently, a new defined construct was named as Management Commitment and Sponsorship (MCS), and regarding this construct, two fundamental statements are elicited to reflect the meaning of this construct on the subject of the process acceptance context. These are:

- Management and/or senior management commitment and sponsorship should be continuously there.
- Management and/or senior management should enthusiastically take part in and provide contribution for processes.

Accordingly, the MCS was defined as a factor influencing the acceptance of processes, in consequences of the qualitative data analysis for the sake of this research.

4.11.2 Measurement as an Additional Construct

Even though indirectly covered in the outputs and results (OR) and perceived usefulness (PU) constructs as a dimension to highlight the actual benefits of the processes, 10 of the participants qualitatively noted that measurement (MEAS) may be evaluated as a new construct for the acceptance of processes. They remarked that benefits of the processes should be measured and communicated to the personnel to provide and/or support the acceptance of processes by individuals in organizations. Furthermore, the related participants noted that by measuring the

performance of the processes, it is to be possible to monitor and control the processes, and this will help the acceptance of processes, because people come to appreciate that you cannot control what you do not measure. That is, people are to have control over processes by measurement, and this is somehow to provide or add to the acceptance of processes by individuals in organizations. Henceforth, measurement of process performances, and measurement and communication of actual benefits are evaluated as essential, in consequence of qualitative data analysis.

Subsequently, a new defined construct was named as Measurement (MEAS), and regarding this construct, two central statements are elicited to reveal the meaning of this construct on the subject of the process acceptance context. These are:

- Concrete and tangible benefits of the processes should be measured and publicized to the personnel.
- Process performances should be measured and communicated to the related personnel.

Therefore, the MEAS was delineated as a factor persuading the acceptance of processes, in consequences of the qualitative data analysis.

4.11.3 Role in Performance Evaluation as an Additional Construct

Seven of the participants providing qualitative answers for the optional part of the questionnaire stated that people's behaviors on the subject of processes should have a role in their performance evaluations. That is, role in performance evaluation (RPE) may be an additional factor that was evaluated by the participants (7 participants) as a contributing aspect for the acceptance of processes. They clearly noted that people who are not following processes firmly and completely, or even ones who do not take the processes seriously should be taken into account in the performance evaluations of the personnel. Furthermore, ones trying to work absolutely in accordance with the defined processes should also be taken into account during performance evaluations of the personnel. More

explicitly, participants stated that behavior of personnel regarding the implementation and/or improvements of processes should be one of the main factors that influence the performance evaluation results of the personnel in the organizations.

Accordingly, a new defined construct was named as Role in Performance Evaluations (RPE), and regarding this construct, two fundamental statements are stimulated to reveal the meaning of this construct on the subject of the process acceptance context. These are:

- Personnel's behaviors regarding process implementations should be taken into account during performance evaluations of the personnel.
- Personnel's comportments on the subject of process improvements should be considered in the course of performance evaluations of the personnel.

As a result, the RPE was defined as a factor influencing the acceptance of processes, in consequences of the qualitative data analysis for the sake of this research.

4.11.4 Other Possible Factors as Additional Constructs

Along with the three new constructs explained above in detail, there were also other possible factors influencing the acceptance of processes, provided by the participants, in consequences of the qualitative data analysis for the sake of this research. Even though these were not that repeatedly mentioned when compared to the three fundamental elicited and explained ones above, the details of these were concisely provided in one more two sentences for each additional possible factor.

- ***Automation***. Participants stated that more automation is to provide the acceptance of processes. People come to implement the processes even if they are not aware of it. Thus, not only to lessen implementation costs of processes, but to provide easy implementation of processes as well, automation matters.

- ***Feedback by Users.*** Participants remarked that as long as it is possible to provide feedback by real doers of the processes, processes are to become more acceptable and usable. Thus, it should be definitely possible to provide feedback by users.
- ***National Culture.*** Participants stated that in addition to the organizational culture, national culture might also have a role in acceptance of processes. Therefore, it may be a good idea to analyze the national culture of the target personnel before definition or deployments to provide low-cost acceptance of the processes.
- ***Punishment.*** Participants noted that there should be punishments for the personnel who do not implement the processes as planned, to provide the acceptance of processes.
- ***Agility.*** Participants pointed out that agility of the process system may also be additional factor for the acceptance of the processes.
- ***Competition.*** Participants claimed that competition among project members of teams might also lead to the acceptance of processes.
- ***Incremental Deployment.*** Participants noted that if there is an incremental deployment of processes, then people come to accept the processes gradually, and easily.
- ***Low Coupling.*** Participants reported that low coupling of processes might also matter for the acceptance. Namely, independence of processes from each other may be a causative factor, as this is to lessen involvedness and complexity.
- ***Regulatory Requirements***. Participants said that regulatory requirements might also affect the acceptance of processes, since some regulations may enforce the full compliance, and this will add to the acceptance in a certain content and context.
- ***Size***. Participants noted that size of projects or teams or organizations may also positively or negatively influence the acceptance of processes

- ***Team Factors***. Participants indicated that characteristics of the teams also might provide or hinder the acceptance of processes.
- ***Type of Project***. Participants stated that type of project might also have relation with the acceptance of processes. Hence, apposite arrangement based on the project type, like research and development projects, customer projects, or etc., of processes is important to provide acceptance.
- ***Personal Factors.*** Participants reported that personality may also matters. Personality factors of the people should be taken into account to provide acceptance of processes.
- ***Process Ownership.*** Participants said that if processes are owned by the real practitioners for each discipline, this is to lead to the acceptance also. Thus, processes ownership should be left to the real practitioners of each discipline or department in the organizations.
- ***Customer Expectations.*** Participants claimed that customer expectations are also to shape the acceptance of the processes. Provided that customer enforces full compliance to the processes then it is more likely to make the acceptance happen easier.

CHAPTER 5

CONCLUSIONS

In this chapter, overall conclusions of this research are provided.
In this context,

- Section 5.1 gives conclusions based on the quantitative analyses,
- Section 5.2 provides conclusions based on the qualitative analyses,
- Section 5.3 presents conclusions based on descriptive statistics and *t*-tests,
- Section 5.4 provides a checklist for the acceptance of processes,
- Section 5.5 provides this research's boundaries and the recommendations on future works, and
- Section 5.6 comprises the contribution of the subject study.

Even though general information for the above-mentioned aspects is provided in this chapter, further comprehensive information is included in the CHAPTER 4.

5.1 Conclusions based on the Quantitative Analysis Findings

As results of quantitative data analyses and interpretations, there are 18 factors determined for the content and context of the acceptance of processes: Perceived Usefulness, Perceived Ease of Use, Behavioral Intention, Facilitating Conditions, Subjective Norm, Outputs & Results, Job Relevance, Objective Usability, Organizational Culture, Audit, Tailoring, Operations and Maintenance, Stability, Granularity, Participation in Development, Training, Medium, and Modeling.

These factors were further analyzed and interpreted quantitatively, and the process acceptance model (PAM) was developed and given in Figure 5.1, with below listed relations in favor of the content and context for the acceptance of processes:

- Audit positively affects Perceived Ease of Use,
- Audit positively affects Perceived Usefulness,
- Facilitating Conditions positively affects Behavioral Intention,
- Facilitating Conditions positively affects Perceived Usefulness,
- Granularity positively affects Stability,
- Job Relevance positively affects Outputs & Results,
- Modeling positively affects Behavioral Intention,
- Medium positively affects Behavioral Intention,
- Medium positively affects Perceived Ease of Use,
- Organizational Culture positively affects Subjective Norm,
- Operation and Maintenance positively affects Perceived Ease of Use,
- Outputs & Results positively affects Perceived Ease of Use,
- Outputs & Results positively affects Perceived Usefulness,
- Objective Usability positively affects Perceived Ease of Use,
- Participation in Development positively affects Behavioral Intention,
- Perceived Ease of Use positively affects the Behavioral Intention,
- Perceived Ease of Use positively affects the Perceived Usefulness,
- Perceived Usefulness positively affects the Behavioral Intention,
- Subjective Norm positively affects the Perceived Ease of Use,
- Subjective Norm positively affects the Perceived Usefulness,
- Stability positively affects Perceived Ease of Use,
- Tailoring positively affects Job Relevancy, and
- Training positively affects Behavioral Intention.

Related additional details on the subject of the conclusions based on quantitative analysis findings are completely addressed in Section 4.5, Section 4.6, Section 4.7, Section 4.8, and Section 4.9 of the CHAPTER 4.

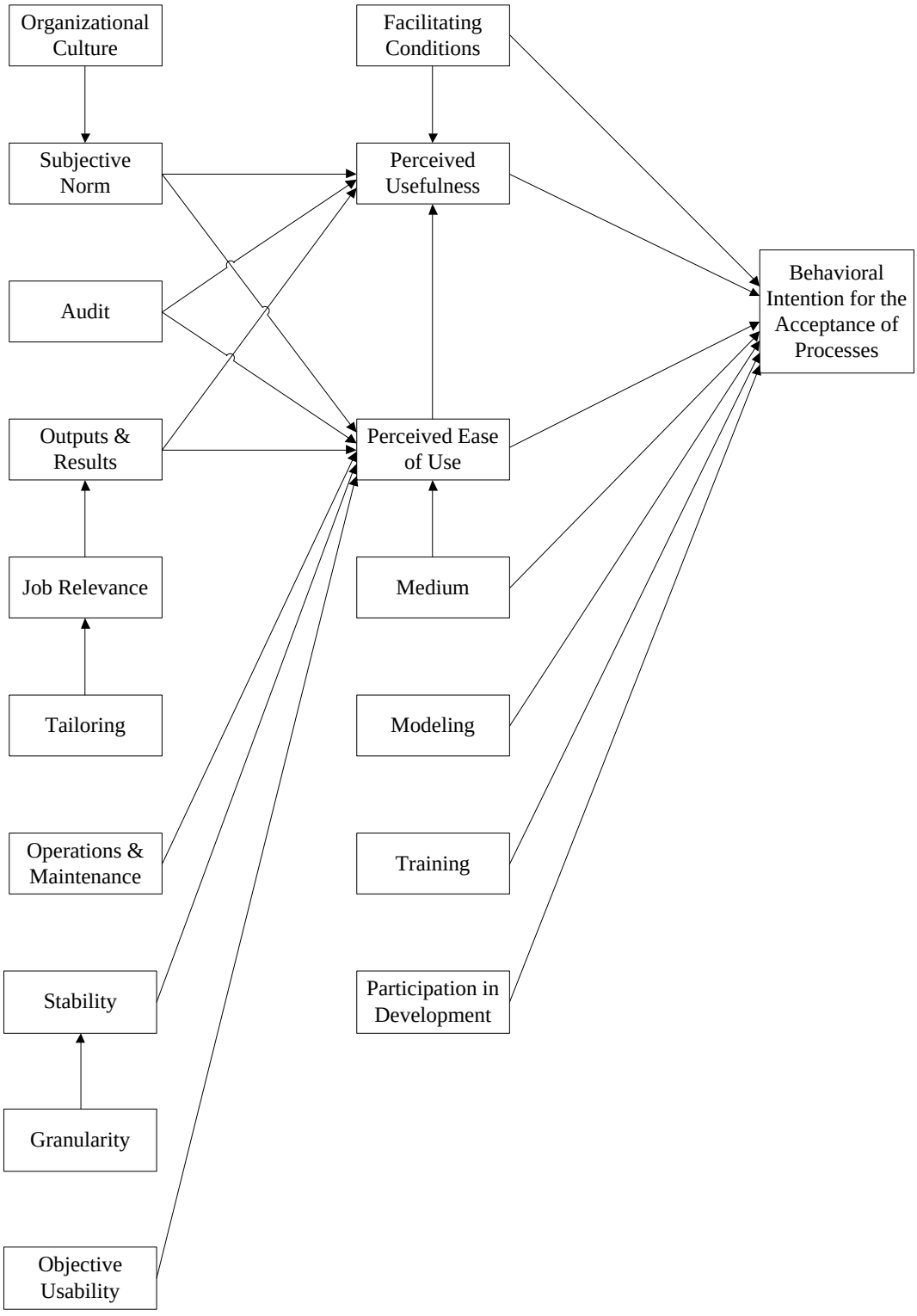


Figure 5.1: Process Acceptance Model (PAM) – Quantitative

5.2 Conclusions based on Qualitative Analysis Findings

Qualitative findings showed that in addition to the factors explained in the quantitative part, Management Commitment and Sponsorship, Measurement, and Role in Performance Evaluation are supplementary three major factors to be taken into account to promote and/or ensure the acceptance of processes.

There are also other rare factors noted by the participants, in the qualitative analyses (Figure 5.2).

Occupied additional details on the subject of the conclusions based qualitative findings are utterly addressed in Section 4.11 of the CHAPTER 4.

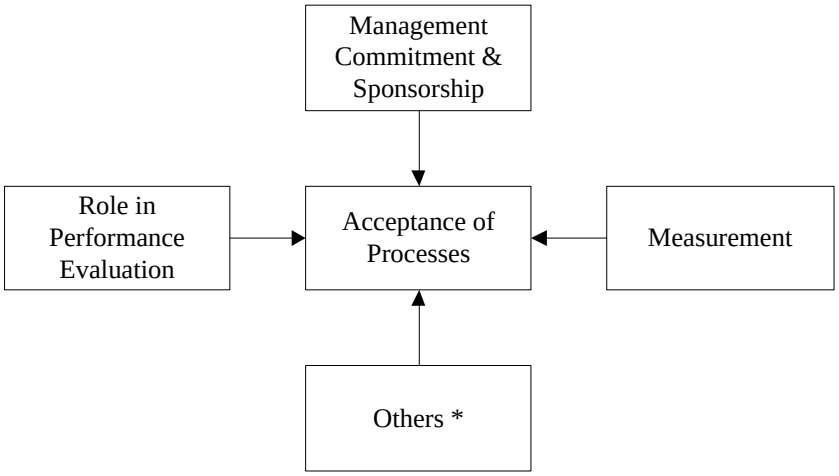


Figure 5.2: Additional Factors for Process Acceptance – Qualitative Findings

5.3 Conclusions based on Descriptive Statistics and *t*-Tests

Conclusions attained through descriptive and inferential statistics based on the gathered data are provided below as bulleted items. These were provided to reflect some attention-grabbing and imperative points to be kept in mind to promote or ensure the acceptance of processes.

Results of this study showed:

- 98.1% of the participants either strongly agree or agree with the statement that an easily accessible guideline about process system, structure, and interactions ought to be available to the personnel. This is a notable point for the organizations, as they are expected to provide the required facilities for the process acceptance context. The solution may even be a guiding handbook, tutorial, etc. about process system, structure, and interactions.
- 97.5% of the participants either strongly agree or agree with the statement that in organizations, there should be tools to access processes easily and to use them as they want. This clarifies and necessitates the right proper tool solutions for required cases.
- 98.6% of the participants either strongly agree or agree with the statement that processes should be documented in users' native language or a language in which users are proficient. Namely, if the system is documented in a foreign language in which the users are not satisfactorily proficient, there are to be probable problems in the context of acceptance of process.
- 96.7% of the participants either strongly agree or agree with the statement that there should be well-refined and meaningful visual elements, flows, and diagrams in the processes. This points out that it is a good idea to include visual elements, flows, and diagrams in the processes, as required, to promote the acceptance of the processes.
- 98.8% of the participants either strongly agree or agree with the statement that a group should be composed for the activities for deployment,

operations, and maintenance of processes, and this group should be composed of competent people who are directly responsible for their work, and have adequate theoretical and practical knowledge in the field. Therefore, it is not a good idea to ask free people to deal with process related activities; instead, more professional and devoted approach is needed to stimulate the acceptance of processes.

- 97.6% of the participants either strongly agree or agree with the statement that there should be active, competent, and professional consultants in the organizations, who are to be contacted with in cases regarding use and implementation of processes. People want active, competent, and professional consultancy, as they need to accept processes.
- 97.1% of the participants think that processes should neither be high-level nor include many details, they should just include required and enough information. This means that granularity of the processes is important. To be exact, level of details of the processes and information to be included in the processes should be well-adjusted wisely to provide that just required and enough information is included; nothing more or less.
- When compared to females, males more rigorously think that the type of process modeling should be shaped and determined by the purposes of the processes.
- When compared to males, females more strictly think that outputs or results of processes should be applicable to use for certain purposes.
- When compared to males, females more firmly think that processes should be deployed once they are mature enough, and by this way, more stable and mature processes should be generated.
- When compared to males, females more decisively think that processes should be stable, and stability should be provided, rather than frequent changes in processes.
- When compared to males, females more resolutely think that processes should not be composed of only texts. That is, for females, processes just

including texts are not satisfactory, and there should be other elements, not just texts in the processes.

- When compared to males, females more steadily think that the interaction with the processes should not require too much mental effort, and it should not be too complex. To be exact, for females the complexity of the interaction of the processes matters more when compared to males.
- When compared to mature (organization) members, high-mature (organization) members more severely think that processes should be defined so that they just direct what to do information. That is, participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices favor descriptive process modeling, rather than prescriptive process modeling.
- When compared to high-mature (organization) members, mature (organization) members more severely think that in addition to what to do information, processes should be defined so that they also direct how to do information. To be precise, participants working in mature organizations regarding processes or having relationship with mature process practices wish prescriptive process modeling, instead of descriptive process modeling.
- When compared to mature (organization) members, high-mature (organization) members more firmly think that for processes, there should be defined and meaningful outputs or results, and these should be easily recognizable and noticeable.
- When compared to mature (organization) members, high-mature (organization) members more decisively think that some processes should be tailored in accordance with defined rules, with respect to project realities, rather than using them as they are. To be precise, participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices favor tailoring of processes, rather than using them as is.

- When compared to mature (organization) members, high-mature (organization) members more decisively think that as the projects' realities or priorities may differ from each other, not every project should be expected to implement all organizational processes as they are, tailoring should be permitted. Specifically, participants working in high-mature organizations regarding processes or having relationship with high-maturity process practices desire tailoring of processes based on project realities, rather than using them as is or being forced to implement them as is without tailoring.
- When compared to people from Asia, people from Europe more strictly think that commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes.
- When compared to people from Asia, people from Europe more firmly think that organizational culture has main contribution for providing the use of processes.
- When compared to people from Asia, people from Europe more decisively consider that processes should be tailored for specific needs or realities of projects.
- When compared to undergraduate participants, graduate participants less rigorously think that trainings regarding processes are to provide more productive implementation of processes. That is to say, undergraduate ones more firmly support the "If I am given trainings regarding processes, I possibly will implement processes more productively." statement.
- When compared to people working in engineering departments, people working in quality assurance/process departments more conclusively consider that participation in development, organizational culture, outputs & results, tailoring, audit, training, operations and maintenance, and behavioral intention are significant and imperative regarding the acceptance of processes.

5.4 Other Conclusions

In addition to the above listed conclusions, a checklist was developed and provided to test and/or promote the acceptance of processes by the individuals in the organizations. Related checklist was composed as based on the results of quantitative and qualitative data analyses and interpretations of this study.

It can be suggested that as processes are accepted and thereby implemented by the individuals in the organizations, all the efforts to institutionalize managed and defined processes with the purpose of giving rise to improvements in schedule and cost performance, product quality, return on investment, and other measures of performance outcome are going to be well-intentioned.

Therefore, the way in which organizations would refer while defining and maintaining their processes to provide stress-free and low-cost acceptances for the individuals is important. Naturally, during deployment, operations, and maintenance of processes, there are certain things to take into account to provide the acceptance of processes by the individuals in the organizations.

Below checklist was composed as based on the results of quantitative and qualitative analyses of this study. Therefore, it is proposed that the more “yes” answers in the below checklist are to ensure and/or promote the acceptance of the processes.

Readers of this study may take the advantage of the below checklist to test and/or promote the acceptance of processes for certain purposes. On the other hand, it is firmly recommended readers to read and derive benefit from the distilled and justified information and research results provided in the previous parts of this study with the aim of having the full details of derived and distilled research findings to arrange and/or regulate an environment that ensures the acceptance of processes designed for particular purposes.

Checklist to Test and/or Promote the Acceptance of Processes		
#	***Item***	***Yes No N/A***
1.	Processes are defined so that they just direct "what to do" information. *(This item is only valid for high-mature organizations, say N/A if you are other than high-mature organization.)*	
2.	Processes are defined so that they direct both "what to do" and "how to do" information. *(This item is not valid for high-mature organizations, say N/A if you are a high-mature organization.)*	
3.	Processes are defined and designed so that they are useful and easy to use.	
4.	Processes do not create extra costs or paperwork while performing a work; instead, they are defined to eliminate all non-value adding costs or paperwork.	
5.	Processes are defined to provide usefulness for all, independent from the personnel whoever implements the process.	
6.	People who have knowledge about processes and their practices and have experience in these have taken part in during the phases for definition or update of processes.	
7.	People directly using or implementing the processes have actively taken part in during the phases for definition or update of processes.	

Checklist to Test and/or Promote the Acceptance of Processes		
#	***Item***	***Yes No N/A***
8.	Commitments of especially people to directly implement the processes, of processes owners, and of management representatives have been ensured during definition and before deployment of processes.	
9.	There is active use of processes as an established organizational culture in the organization.	
10.	Encouragement and awarding are there for use of processes as organizational culture.	
11.	Processes are directly related to the work to be performed.	
12.	Processes are applicable in real life conditions (concerning project/department realities).	
13.	Processes are defined so that outputs, produced as result of implementation of processes, meet the expected quality performance.	
14.	Processes are defined to let personnel do their work better.	
15.	Processes are defined so that outputs produced as results of implementation of processes are important, beneficial, and meaningful.	
16.	The outputs or results of processes are applicable to use for certain purposes.	

Checklist to Test and/or Promote the Acceptance of Processes		
#	***Item***	***Yes No N/A***
17.	It is permitted to tailor processes for specific needs, realities and priorities of projects, and use tailored processes.	
18.	There are meaningful defining rules for process tailoring.	
19.	Implementations of processes are actively audited by the competent people.	
20.	Outputs of processes are enthusiastically reviewed by the competent people.	
21.	Trainings are delivered to the personnel by the competent people regarding processes or process updates, process system, structure, and interactions, and these trainings are repeated as necessary.	
22.	An easily accessible guide about process system, structure, and interactions are provided to the personnel.	
23.	There are no frequent/disturbing changes in the processes.	
24.	Processes are deployed once they are mature enough.	
25.	There is active use of processes by the people whose thoughts and behaviors are paid importance	
26.	Processes are designed to provide usefulness/benefits.	
27.	Processes are designed to provide performance improvement.	

Checklist to Test and/or Promote the Acceptance of Processes		
#	***Item***	***Yes No N/A***
28.	Processes are designed and defined to provide productivity, efficiency, and effectiveness improvement.	
29.	Processes are not too detailed.	
30.	Processes do not include too many steps.	
31.	Processes just include required and enough information, nothing more or less.	
32.	There are effective and efficient systems / tools to provide processes to the people.	
33.	There are active, competent, and professional consultants who are to be contacted with in cases regarding use and implementation of processes.	
34.	There are tools to access and use processes easily.	
35.	In addition to the texts, there are well-refined and meaningful visual elements, flows, and diagrams in the processes.	
36.	Processes are documented in users' native language or a language in which users are adequately proficient.	
37.	Processes are online and easily searchable.	

Checklist to Test and/or Promote the Acceptance of Processes		
#	***Item***	***Yes No N/A***
38.	Interaction with the processes does not require too much mental effort, and interaction with the processes is clear and plausible	
39.	Active, competent, and professional people have taken part in during deployment, maintenance, and operations of processes.	
40.	Updates of processes are performed by the people who are competent enough regarding processes and process system, and field knowledge.	
41.	Activities for deployment, operations, and maintenance of processes are performed in accordance with a plan or program, and parallel to the organization's business and strategic objectives.	
42.	A group is there for deployment, operations, and maintenance of processes, and this group is composed of competent people who are directly responsible for their work, and have adequate theoretical and practical knowledge in the field.	
43.	There is active and continuous management commitment and sponsorship.	
44.	Benefits and performances of the processes are measured and communicated.	
45.	People's acts on the subject of processes and usage are taken into consideration in their performance evaluations.	

5.5 Limitations and Recommended Future Works

The first limitation for this study may be that more participants may have been included from America continent. In addition to providing plausible increases in the representative power of the participants and results generalizability aspects, this may have provided a chance to compare, analyze, and interpret the results pertaining to America continent, just like done for Asia and Europe. Current research's most of the participants were from Asia (57.1%) and Europe (30.2%), whereas 11.4% were from America.

The second limitation for this study may be that qualitative analyses and results part of the study may have been enhanced. As this study concentrated more and mostly on quantitative analyses and results for model development and other additional conclusions, scope, content, and context of the qualitative analyses and results part were less primarily engaged.

The first suggestion for the future work is applying and utilizing the developed acceptance model (PAM) and findings, and appreciating or repudiating the promised benefits in some organizations and reporting the results. Although the model was developed via number of statistical analyses and techniques, based on the authentic, real, and reliable data, this sort of deployment and testing of the model is to provide appreciation or repudiation for the promised benefits.

The second suggestion for the future work is improving the quantitatively developed model by adding the new constructs, discovered during qualitative analyses, (like management commitment and sponsorship, measurement, role in performance evaluation, etc.) to the quantitatively developed model, and refining and re-applying the model development quantitatively to achieve a more powerful quantitatively developed model. That is, it is recommended to revisit and address the new discovered constructs by defining items for each, and treating and exploiting them for quantitative analyses and results to attain an extended PAM, developed quantitatively.

5.6 Contribution of the Study

The subsequent garden-fresh and unique contributions to the body of knowledge are noted. Details for these are given and elucidated throughout the previous parts, yet the main points are listed below:

- A wholesome, quantitatively developed, acceptance model for process content and context (process acceptance model [PAM]) comprising 18 factors covering different dimensions of process acceptance content and context.
- Additional qualitatively determined factors (3 factors) defined as results of the qualitative analyses and interpretations to address the process acceptance meant for supplementary dimensions.
- A checklist, quantitatively and qualitatively developed, to test and/or ensure the acceptance of processes.
- The accompanying revised and refined items ensuring the factors influencing the acceptance of processes.
- The interactions of the factors influencing the acceptance of processes.
- The descriptive and inferential findings, and statistically significant relationships discovered in the course of the development of the PAM aimed at determining factors influencing the acceptance of processes.

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APPENDICES

APPENDIX A: QUESTIONNAIRE IN ENGLISH (PRINTED-FORM)

Factors Influencing the Acceptance of Processes

QUESTIONNAIRE

The belief that process improvement using the process-based standards or models can give rise to improvements in schedule and cost performance, product quality, return on investment, and other measures of performance outcome is now verified. That is why, today, many organizations compose their defined processes, and they work in accordance with a process-based approach. Additionally, the process management premise "The quality of a system or product is highly influenced by the quality of the process used to develop and maintain it," has been taken by the SEI (Software Engineering Institute, Carnegie Mellon University). Consequently, processes are invaluable assets for the organizations. Nevertheless, unless these processes are accepted by the personnel in the organizations, all the efforts for processes are going to be nothing more than wasting of time and money. Since the ultimate goal is that acceptance of the processes by the personnel and with the help of this full implementation of processes, and thereby achieving targeted cost, quality, and schedule objectives. Hence, personnel's acceptances of processes are invaluable as well. The purpose of this study is to identify the factors influencing the acceptance of processes by the personnel in the organizations.

This study is being carried out in the scope of master's thesis by **Mustafa DEGERLI**, a graduate student in Information Systems, Informatics Institute, Middle East Technical University, with **Assoc. Prof. Dr. Sevgi OZKAN**, as advisor for the thesis. This questionnaire is prepared to provide input to the related study, and you are, **as voluntarily**, expected to provide contribution to this study by filling out this questionnaire. You can quit the questionnaire whenever you like, or you may not complete it at all.

Questionnaire consists of three parts. First part (***General***) is to gather some non-personal data regarding the participants. Second part (***Main***) is to let participants reflect their opinions regarding some expressions and thoughts by means of a Likert scale (marking numbers from five to one regarding whether participant agrees or disagrees with the statement). Third and the last part (***Other***) is to let participants note their additional other comments.

Full completion (filling out completely) of first two parts of the questionnaire by the participants is extremely crucial to provide that both study is to reach its intended goals and results are meaningful. Therefore, please fill out the first two parts completely and fully. There is no direct or indirect intention, in the questionnaire, to gather descriptive data for any specific person or specific organization. **It is estimated that it will take no more than 12 minutes to completely fill out the questionnaire.**

All data gathered as result of the study is to be interpreted and evaluated cumulatively, and all gathered data are to be used just for scientific purposes. Interested participants may use the below given e-mail address to know about the results of the study; and once the study is completed, results will be shared with the ones who ask for via e-mail.

As the questions in the questionnaire are prepared to identify factors influencing the acceptance of processes by the personnel in the organizations, so please do provide your answers accordingly.

Explanatory information for how you are expected to fill out each part of the questionnaire is provided at the beginning of each part as "***Direction***."

You may contact me regarding any questions, information or suggestions related with the study, via the below contact information.

I thank you for your contribution, time, and attention in advance.

Mustafa DEGERLI

mustafadegerli@me.com ||| 0090 533 698 0522

PART 1 (GENERAL)

Direction: *In the table below, for each line, please do mark the alternative that best suits you by putting X mark on the boxes, like ☒, which are on the left-near of the choices. Please do fill out the below table completely by marking at least one box with X for each line of the table. It is estimated that it will take no more than one minute to completely fill out this part.*

Education Level:
☐ High School ☐ Associate Degree ☐ Undergraduate
☐ Graduate ☐ Doctorate

Age Range:
☐ 18-25 ☐ 26-33 ☐ 34-41 ☐ 42-49 ☐ 50 or Over

Gender:
☐ Female ☐ Male ☐ Other

Total Work Experience:
☐ 0-3 Years ☐ 3-6 Years ☐ 6-9 Years ☐ 9-12 Years ☐ 12 Years or More

Field in which You Work:
☐ Engineering ☐ Acquisition/Contract/Purchasing
☐ Administrative Affairs
☐ Finance ☐ Human Resources or Training ☐ Consultancy
☐ Management ☐ Quality Assurance or Process ☐ Marketing
☐ Independent Auditing and Certification ☐ Other

Field from which You Graduated:
☐ Engineering ☐ Science ☐ Economics and Administrative Sciences
☐ Social Sciences ☐ Informatics ☐ Other

Certificates Hold by the Organization You Work for: *(You may check more than one box.)*
☐ ISO 9001 ☐ ISO 27001
☐ NATO-AQAP 160 ☐ NATO-AQAP 2110
☐ CMMI Level 5 ☐ CMMI Level 3
☐ ISO 15504 Level 5 ☐ ISO 15504 Level 3
☐ AS 9100 ☐ None ☐ Other

Certifications for which You Have/Had Auditor/Appraiser/Contributor Role: *(You may check more than one box.)* ☐ ISO 9001 ☐ ISO 27001 ☐ NATO-AQAP 160 ☐ NATO-AQAP 2110 ☐ CMMI Level 5 ☐ CMMI Level 3 ☐ ISO 15504 Level 5 ☐ ISO 15504 Level 3 ☐ AS 9100 ☐ None ☐ Other
Type of Organization You Work for: ☐ Public Organization ☐ Private Sector Organization
Continent You Live in: ☐ Asia ☐ Africa ☐ America ☐ Antarctica ☐ Europe ☐ Australia

PART 2 (MAIN)

Direction: *Regarding each expression given in the each line of below table, please mark your choices in accordance with your views or thoughts by putting X mark in the correspondent only one cell for the related line.*
Regarding an expression given in the each line of below table, if you;

- *strongly agree or* ***are of the same mind****, put X mark in the* ***Strongly Agree*** [**5**] *cell of related line,*
- *generally agree or* ***are of similar mind****, put X mark in the* ***Agree*** [**4**] *cell of related line,*
- ***neither agree nor disagree, or don't express an opinion,*** *put X mark in the* ***Undecided*** [**3**] *cell of related line,*
- *generally disagree or* ***are not of the similar mind****, put X mark in the* ***Disagree*** [**2**] *cell of related line, or*
- *strongly agree or* ***have opposite view,*** *put X mark in the* ***Strongly Disagree*** [**1**] *cell of related line.*

Please, do mark for each line in the below table to ensure that you have provided your views and thoughts for all expression in the lines. *It is estimated that it will take no more than ten minutes to completely fill out this part.*

Expression	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
	5	4	3	2	1
Processes should be defined so that they just direct "what to do" information.	☐	☐	☐	☐	☐
In addition to "what to do" information, processes should be defined so that they also direct "how to do" information.	☐	☐	☐	☐	☐
Processes directing just "what to do" information provides that personnel's creativity/capability are not restricted in a way.	☐	☐	☐	☐	☐
If processes are defined so that in addition to "what to do," they direct "how to do" information, this is to bring about that personnel do not have to discover America, again and again.	☐	☐	☐	☐	☐
Depending on the purposes of the processes, some processes should be defined so that they just direct "what to do" information, and some processes should be defined so that they also direct "how to do" information.	☐	☐	☐	☐	☐
If processes are defined and designed so that they are useful and easy to use for me, I use processes.	☐	☐	☐	☐	☐
Processes should not create extra costs or paperwork while performing a work; instead, they should be defined to eliminate all non-value adding costs or paperwork.	☐	☐	☐	☐	☐
Independent from the personnel whoever implements the process, processes should be defined to provide usefulness for all.	☐	☐	☐	☐	☐
During the phases for definition or update of processes, people who have knowledge about processes and their practices and have experience in these should take part in.	☐	☐	☐	☐	☐
During the phases for definition or update of processes, people directly using or implementing the processes should also actively take part in.	☐	☐	☐	☐	☐
Commitments of especially people to directly implement the processes, of processes owners, and of management representatives should be ensured during definition and before deployment of processes.	☐	☐	☐	☐	☐

Expression	5	4	3	2	1
If there is active use of processes as an established culture by everybody in the organization, this motivates me to use processes actively too.	☐	☐	☐	☐	☐
Encouragement should be there for use of processes as organizational culture to provide that everybody in the organization use processes.	☐	☐	☐	☐	☐
Existence of an organizational culture for use of processes positively influences the use behavior for process of the people in the organization whose thoughts and behaviors are paid importance in the organization.	☐	☐	☐	☐	☐
I think organizational culture may influence the use behavior for processes of the people in the organization whose thoughts and behaviors are paid importance by me.	☐	☐	☐	☐	☐
Processes should be directly related to the work or practice to be performed.	☐	☐	☐	☐	☐
My intention to use processes is negatively influenced if processes are not relevant to the work that I do, or processes are not important for the work.	☐	☐	☐	☐	☐
When evaluated with respect to job or practice to be performed, processes should be applicable in real life (concerning project/department realities).	☐	☐	☐	☐	☐
Processes should be defined so that outputs produced as results of implementation of processes are more profitable regarding the quality when compared with the outputs that are results of a setting where there is no defined process used.	☐	☐	☐	☐	☐
Processes should be defined so that outputs produced as result of implementation of processes should meet the expected quality performance.	☐	☐	☐	☐	☐
My intention to use processes is negatively influenced if processes are not defined to let me do my work better.	☐	☐	☐	☐	☐
Processes should be defined so that outputs produced as result of implementation of processes are important, beneficial, and meaningful.	☐	☐	☐	☐	☐
The outputs or results of processes should be applicable to use for certain purposes.	☐	☐	☐	☐	☐

Expression	5	4	3	2	1
For processes, there should be defined and meaningful outputs or results, and these should be easily recognizable and noticeable.	☐	☐	☐	☐	☐
Some processes should be tailored for specific needs of projects, and tailored processes should be used.	☐	☐	☐	☐	☐
There should be defining rules for process tailoring.	☐	☐	☐	☐	☐
Some processes should be tailored in accordance with defined rules, with respect to project realities, rather than using them as they are.	☐	☐	☐	☐	☐
As the projects' realities or priorities may differ from each other, not every project should be expected to implement all organizational processes as they are, tailoring should be permitted.	☐	☐	☐	☐	☐
Implementation of processes should be actively audited by the competent people continuously.	☐	☐	☐	☐	☐
Work products that are outputs of processes should be actively reviewed by the competent people continuously.	☐	☐	☐	☐	☐
Good audits and reviews by competent people let me do my work better.	☐	☐	☐	☐	☐
Trainings should be delivered to the personnel by the competent people regarding processes or process updates, and these trainings should be repeated as necessary.	☐	☐	☐	☐	☐
Trainings should be delivered to the personnel by the competent people regarding process system, structure, and interactions; and these trainings should be repeated as necessary.	☐	☐	☐	☐	☐
An easily accessible guide about process system, structure, and interactions should be provided to the personnel.	☐	☐	☐	☐	☐
If I am given trainings regarding processes, I possibly will implement processes more productively.	☐	☐	☐	☐	☐
Continuous improvement of processes is important and required, yet for the means of continuous improvement, there should not be frequent/disturbing changes in the processes.	☐	☐	☐	☐	☐
Processes should be deployed once they are mature enough, and by this way, more stable and mature processes should be generated.	☐	☐	☐	☐	☐

Expression	5	4	3	2	1
I prefer to live with more stable and mature processes, rather than the ones that are frequently changed.	☐	☐	☐	☐	☐
As long as it is provided that processes are useful and easy to use, they are to be used by the personnel.	☐	☐	☐	☐	☐
Active use of processes by the people in the organization whose thoughts and behaviors are paid importance by me motivates me positively to use processes actively.	☐	☐	☐	☐	☐
If people who are good at their work use processes, this positively influences my intention to use processes.	☐	☐	☐	☐	☐
Active use of processes by the people in the organization whose thoughts and behaviors are paid importance by me positively support my thought "processes are useful."	☐	☐	☐	☐	☐
If people using the processes produce good works, I think, "processes are useful."	☐	☐	☐	☐	☐
To provide use of processes, processes should be useful or they should be designed in this manner.	☐	☐	☐	☐	☐
My intention to use processes positively increases provided that processes are designed to provide usefulness/benefits for me.	☐	☐	☐	☐	☐
Processes should be designed to provide performance improvement.	☐	☐	☐	☐	☐
Processes should be designed and defined to provide productivity improvement.	☐	☐	☐	☐	☐
Processes should be designed and defined to provide efficiency and effectiveness improvement of personnel.	☐	☐	☐	☐	☐
Processes should not be very/too detailed.	☐	☐	☐	☐	☐
Processes should not include so/too many steps.	☐	☐	☐	☐	☐
Processes should neither be high-level nor include many details, they should just include required and enough information.	☐	☐	☐	☐	☐
There should be effective and efficient systems to provide processes to the people in the organization.	☐	☐	☐	☐	☐
There should be active, competent, and professional consultants in the organizations, who are to be contacted with in cases regarding use and implementation of processes.	☐	☐	☐	☐	☐
In the organization, there should be tools to access processes easily and to use them as I want.	☐	☐	☐	☐	☐

Expression	5	4	3	2	1
There should be well-refined and meaningful visual elements, flows, and diagrams in the processes.	☐	☐	☐	☐	☐
Processes should not be composed of only texts.	☐	☐	☐	☐	☐
Processes should be documented in users' native language or a language in which users are proficient.	☐	☐	☐	☐	☐
Processes should not be documented in a foreign language for the users or a language in which users are proficient.	☐	☐	☐	☐	☐
Processes should be easily searchable and be online.	☐	☐	☐	☐	☐
Ease of use of the processes increases the usefulness of the processes.	☐	☐	☐	☐	☐
It should be easy to use processes.	☐	☐	☐	☐	☐
My interaction with the processes should be clear and understandable.	☐	☐	☐	☐	☐
My interaction with the processes should not require too much mental effort, and it should not be too complex.	☐	☐	☐	☐	☐
Processes should provide that intended work is done easily, and they should not create pointless paperwork.	☐	☐	☐	☐	☐
Ease of use of the processes positively influences the usefulness of the processes.	☐	☐	☐	☐	☐
For personnel to use processes, processes should be useful, and processes should be easy to use.	☐	☐	☐	☐	☐
Active, competent, and professional people should take part in during deployment, maintenance and operations of processes.	☐	☐	☐	☐	☐
Updates based on the improvements in the processes should be performed by the people who are competent enough regarding processes and process system, and field knowledge.	☐	☐	☐	☐	☐
Activities for deployment, operations, and maintenance of processes should be performed in accordance with a plan or program, and parallel to the organization's business and strategic objectives.	☐	☐	☐	☐	☐
A group should be composed for the activities for deployment, operations, and maintenance of processes, and this group should be composed of competent people who are directly responsible for their work, and have adequate theoretical and practical knowledge in the field.	☐	☐	☐	☐	☐

PART 3 (OTHER)

Direction: *Other than the ones stated above, please, do write down other potential factors that you think influence the acceptance of the processes by the people in the organization. Please, feel free to write down whatever comes to your mind in this context.*

Did you fully and completely fill out the first two parts of the questionnaire?
☐ Yes ☐ No

I thank you for your contribution, time, and attention.

APPENDIX B: QUESTIONNAIRE IN TURKISH (PRINTED-FORM)

Süreçlerin Benimsenmesini Etkileyen Faktörler

ANKET

Süreç temelli standartlar veya modeller kullanılarak yapılan süreç iyileştirmelerinin takvim ve maliyet performansı, ürün kalitesi, yatırım getirisi ve diğer performans çıktılarında iyileştirme sağlayabildiği artık doğrulanmıştır. Günümüzde birçok organizasyon bu nedenle tanımlı süreçlerini oluşturmakta ve süreç temelli çalışmaktadır. Ayrıca SEI (Carnegie Mellon Üniversitesi, Yazılım Mühendisliği Enstitüsü) tarafından "Bir sistem veya ürünün kalitesi, ilgili sistem veya ürünü üretmekte ve idame ettirmekte kullanılan süreçlerin kalitesi tarafından yüksek oranda etkilenir." öncülü alınmıştır. Bu nedenlerle, süreçler organizasyonlar açısından çok değerli varlıklardır. Ancak, bu süreçler organizasyonlardaki çalışanlar tarafından benimsenmedikçe, süreçler için gösterilen tüm çabalar zaman ve para israfından öteye gidemeyecektir. Çünkü asıl olan süreçlerin çalışanlar tarafından benimsenmesi ve bu sayede gereklerinin tam olarak yerine getirilmesi ki bu sayede de hedeflenen bütçe, kalite ve takvim hedeflerine ulaşılabilmesidir. Bu yüzden, çalışanların süreçleri benimsemesi çok önemlidir. Bu çalışmanın amacı süreçlerin organizasyonlardaki çalışanlar tarafından benimsenmesini etkileyen faktörleri belirlemektir.

Bu çalışma, Orta Doğu Teknik Üniversitesi, Enformatik Enstitüsü, Bilişim Sistemleri Bölümü Yüksek Lisans Öğrencisi **Mustafa DEĞERLİ** tarafından **Doç. Dr. Sevgi ÖZKAN** danışmanlığında yüksek lisans tezi kapsamında yürütülmektedir. Çalışmaya girdi oluşturmak üzere, bu anket hazırlanmıştır ve çalışmaya katkı sağlamak üzere **tamamen gönüllü** olarak bu anketi doldurmanız beklenmektedir. Anketi doldurmaktan istediğiniz zaman vazgeçebilir veya anketi tamamlamayabilirsiniz.

Anket üç bölümden oluşmaktadır. İlk bölüm (***Genel***) anket katılımcısı hakkında kişisel olmayan verilerin toplandığı bölümdür. İkinci bölüm (***Ana***) özel olarak anket katılımcısından çeşitli ifadeler veya düşünceler hakkındaki görüşlerini Likert ölçeğini baz alınarak yansıtması (verilen ifadeye katılma durumuna göre beşten bire kadar olan numaralardan birini işaretleyerek) beklenen bölümdür. Üçüncü ve

son bölüm (***Diğer***) ise ankete katılanların diğer düşüncelerini ve fikirlerini yazabilecekleri bir alan olarak ayrılmıştır.

Ankete katılanların, ilk iki bölümü eksiksiz ve tamamen doldurmaları, çalışmanın amacına ulaşabilmesi ve sonuçların anlamlılığı açısından çok önem taşımaktadır. Bu nedenle lütfen anketin ilk iki bölümünü eksiksiz ve tümüyle doldurunuz. Ankette kişisel veya kurumsal kimlik belirleyici bilgiler veya katılımcının özel/kişisel bilgileri hiç bir şekilde istenmemektedir. **Anketi tamamlamak tahminen 12 dakikanızı alacaktır.**

Çalışma sonucunda elde edilen veriler kümülatif yorumlanıp, değerlendirilecektir; ve elde edilen veriler sadece bilimsel amaçlarla kullanılacaktır. Çalışmanın sonuçları hakkında dileyen katılımcılar aşağıda verilen e-posta adresini kullanarak bilgi isteyebilecekler, bu durumda çalışma tamamlandığında çalışma sonuçları kendileriyle paylaşılacaktır.

Ankette yer alan sorular organizasyonlarda süreçlerin çalışanlar tarafından benimsenmesini etkileyen faktörleri belirlemek üzere hazırlandığı için, lütfen cevaplarınızı bu bağlamda veriniz.

Anket iki dilde, hem Türkçe hem de İngilizce olarak hazırlanmıştır. Şu an elinizdeki anket Türkçedir. Eğer anketi İngilizce doldurmak isterseniz lütfen araştırmacıdan anketin İngilizce sürümünü isteyiniz.

Anketin her bir bölümünün nasıl doldurulmasının beklendiği ile ilgili açıklamalar, ilgili her bölümün başında "***Yönerge***" olarak verilmiştir.

Çalışma ile ilgili her türlü soru, bilgi veya öneriniz için aşağıdaki iletişim bilgileriyle bana ulaşabilirsiniz.

Şimdiden sağlayacağınız katkı, ayıracağınız zaman ve göstereceğiniz ilgi için teşekkür ederim.

Mustafa DEĞERLİ
mustafadegerli@me.com ||| 0533 698 0522

1. BÖLÜM (GENEL)

Yönerge: *Lütfen, aşağıdaki tabloda her bir satıda yer alan seçeneklerden size en uygun olan seçeneği ilgili ifadelerin solunda ve yakınında yer alan kutucukların içine çarpı (X) işareti koyarak ☒ şeklinde işaretleyiniz. Lütfen, tüm satırları ilgili satırda en az bir kutucuk seçilecek şekilde eksiksiz olarak doldurunuz. Bu bölümü doldurmanız tahminen bir dakikanızı alacaktır.*

Öğrenim Durumunuz:
☐ Lise ☐ Ön Lisans ☐ Lisans ☐ Yüksek Lisans ☐ Doktora

Yaş Aralığınız:
☐ 18-25 ☐ 26-33 ☐ 34-41 ☐ 42-49 ☐ 50 Yaş veya Üzeri

Cinsiyetiniz:
☐ Kadın ☐ Erkek ☐ Diğer

Toplam İş Deneyiminiz:
☐ 0-3 Yıl ☐ 3-6 Yıl ☐ 6-9 Yıl ☐ 9-12 Yıl
☐ 12 Yıl veya Daha Fazla

Çalıştığınız Alan:
☐ Mühendislik ☐ Tedarik/Sözleşme/Satın Alma ☐ İdari İşler
☐ Finans ☐ İnsan Kaynakları veya Eğitim ☐ Danışmanlık
☐ Yöneticilik ☐ Kalite Güvence veya Süreç ☐ Pazarlama
☐ Bağımsız Denetim veya Sertifikasyon ☐ Diğer

Mezun Olduğunuz Alan:
☐ Mühendislik ☐ Fen Bilimleri ☐ İktisadi ve İdari Bilimler
☐ Sosyal Bilimler ☐ Enformatik ☐ Diğer

Çalıştığınız Organizasyonun Sahip Olduğu Sertifikalar: *(Birden fazla kutucuk işaretleyebilirsiniz.)*
☐ ISO 9001 ☐ ISO 27001
☐ NATO-AQAP 160 ☐ NATO-AQAP 2110
☐ CMMI Seviye 5 ☐ CMMI Seviye 3
☐ ISO 15504 Seviye 5 ☐ ISO 15504 Seviye 3
☐ AS 9100 ☐ Hiçbiri ☐ Diğer

Belgelendirmesinde Görev Aldığınız Sertifikalar: *(Birden fazla kutucuk işaretleyebilirsiniz.)*		
☐ ISO 9001	☐ ISO 27001	
☐ NATO-AQAP 160	☐ NATO-AQAP 2110	
☐ CMMI Seviye 5	☐ CMMI Seviye 3	
☐ ISO 15504 Seviye 5	☐ ISO 15504 Seviye 3	
☐ AS 9100	☐ Hiçbiri	☐ Diğer
Çalıştığınız Organizasyon Tipi:		
☐ Kamu Kuruluşu	☐ Özel Sektör Kuruluşu	
Yaşadığınız Kıta:		
☐ Asya	☐ Afrika	☐ Amerika
☐ Antarktika	☐ Avrupa	☐ Avustralya

2. BÖLÜM (ANA)

Yönerge: *Lütfen aşağıdaki tabloda her bir satıda yer alan ifadeleri dikkate alarak, o ifade hakkındaki görüş veya düşüncenize göre ilgili ifadenin yanındaki kutucuklarından yalnızca birini ilgili kutucuğa X işareti koyarak seçiniz.*
Herhangi bir satırda belirtilen ifadeye;

- *kesinlikle katılıyorsanız veya* ***tamamen aynı fikirdeyseniz, Kesinlikle Katılıyorum*** [**5**] *seçeneğini,*
- *genel olarak katılıyorsanız veya* ***benzer fikirdeyseniz, Katılıyorum*** [**4**] *seçeneğini,*
- ***ne katılıyor, ne katılmıyorsanız*** *veya* ***fikir yürütemiyorsanız, Kararsızım*** [**3**] *seçeneğini,*
- *genel olarak katılmıyorsanız veya* ***aynı fikirde değilseniz, Katılmıyorum*** [**2**] *seçeneğini, veya*
- *kesinlikle katılmıyorsanız veya* ***karşıt fikirdeyseniz, Kesinlikle Katılmıyorum*** [**1**] *seçeneğini işaretleyiniz.*

Lütfen hiçbir satır boş kalmayacak şekilde tüm ifadeler hakkındaki görüş veya düşüncenizi belirtiniz. *Bu bölümü doldurmanız tahminen on dakikanızı alacaktır.*

İfade	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
	5	4	3	2	1
Süreçler sadece "ne" yapılması gerektiğini anlatacak şekilde tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler "ne" yapılması gerektiğine ilave olarak, "nasıl" yapılması gerektiğini de anlatacak şekilde tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçlerin sadece "ne" yapılması gerektiğini anlatacak şekilde olması çalışanların yaratıcılığının/yeteneklerinin kısıtlanmasını önler.	☐	☐	☐	☐	☐
Süreçler "ne" yapılması gerektiğine ek olarak "nasıl yapılması" gerektiğini de anlatacak şekilde tanımlanırsa, çalışanlar her seferinde Amerika'yı yeniden keşfetmekten kurtulur.	☐	☐	☐	☐	☐
Amaçlarına bağlı olarak, bazı süreçlerin sadece "ne" yapılması gerektiğini anlatacak şekilde, bazılarınsa "nasıl" yapılması gerektiğini de anlatacak şekilde tanımlanması gerekir.	☐	☐	☐	☐	☐
Süreçler benim için yararlı (kullanışlı) ve kullanımları kolay olacak şekilde tanımlanırsa ve tasarlanırsa süreçleri kullanırım.	☐	☐	☐	☐	☐
Süreçler, bir işi yaparken ekstra maliyet veya bürokrasi getirmemeli, aksine mümkün olan tüm ekstra maliyetleri veya bürokrasiyi azaltacak şekilde tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler, süreci uygulayana bağlı olmaksızın yarar sağlayacak (kullanışlı olacak) şekilde tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler tanımlanırken veya güncellenirken, süreç ve pratikleri hakkında bilgi ve deneyim sahibi kişiler bu aşamalarda yer almalıdırlar.	☐	☐	☐	☐	☐
Süreçler tanımlanırken veya güncellenirken, sürecin doğrudan kullanıcısı veya uygulayıcısı olacak kişiler de bu aşamalarda aktif olarak yer almalıdırlar.	☐	☐	☐	☐	☐
Süreçlerin tanımlanması sırasında ve yaygınlaştırılmadan önce, özellikle süreci doğrudan uygulayacak kişilerin, süreç sahiplerinin ve yönetim temsilcilerinin taahhütleri alınmalıdır.	☐	☐	☐	☐	☐

İfade	5	4	3	2	1
Organizasyonda yerleşik bir kültür olarak süreçler herkes tarafından aktif bir şekilde kullanılırsa, bu yerleşik kültür beni de süreçleri aktif bir şekilde kullanmaya sevk eder.	☐	☐	☐	☐	☐
Süreçlerin herkes tarafından aktif bir şekilde kullanılması için, organizasyonda kurumsal kültür olarak süreçlerin kullanımının teşvik edilmesi gerekir.	☐	☐	☐	☐	☐
Süreçlerin kullanılması ile ilgili bir organizasyon kültürünün var olması, organizasyonda düşünce ve davranışlarına önem verilen kişilerin süreçlerin kullanımı hakkındaki davranışlarını olumlu yönde etkiler.	☐	☐	☐	☐	☐
Organizasyonda düşünce ve davranışlarına önem verdiğim kişilerin süreçlerin kullanımı ile ilgili davranışlarında, kurum kültürünün etkili olabileceğini düşünüyorum.	☐	☐	☐	☐	☐
Süreçler yapılan iş veya uygulanan pratik ile doğrudan alakalı olmalıdır.	☐	☐	☐	☐	☐
Süreçlerin yaptığım iş ile alakası olmazsa veya süreçler yaptığım iş açısından önemli olmazsa süreçleri kullanma niyetim olumsuz yönde etkilenir.	☐	☐	☐	☐	☐
Süreçler yapılan iş veya uygulanan pratik açısından değerlendirildiğinde gerçek hayatta (proje/bölüm gerçekleri açısından) uygulanabilir olmalıdır.	☐	☐	☐	☐	☐
Süreçler, uygulandıklarında üretilecek çıktılar açısından süreç kullanılmadan elde edilen çıktılarla kıyaslandığında kayda değer kalite artırımı sağlayacak şekilde tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler, uygulandıklarında üretilecek çıktılar hedeflenen kalite performansını sağlayacak şekilde tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler işimi daha iyi yapmamı sağlayacak şekilde tanımlanmazsa, süreçleri kullanma niyetim olumsuz yönde etkilenir.	☐	☐	☐	☐	☐
Süreçler uygulandıklarında sonuç olarak anlamlı ve kayda değer sonuçlar ortaya çıkarabilecek şeklide tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreç uyguladığında elde edilen çıktı veya sonuç bir amaç için kullanabilmelidir.	☐	☐	☐	☐	☐

İfade	5	4	3	2	1
Süreçlerin için tanımlı ve anlamlı çıktılar veya sonuçlar olmalı ve bunlar kolaylıkla ayırt edilebilir veya fark edilebilir olmalıdır.	☐	☐	☐	☐	☐
Bazı süreçler projelerin özel durumlarına göre uyarlanmalı ve uyarlanan süreçler kullanılmalıdır.	☐	☐	☐	☐	☐
Süreçlerin uyarlanması ile ilgili tanımlayıcı kurallar olmalıdır.	☐	☐	☐	☐	☐
Bazı süreçler olduğu gibi uygulanmak yerine, ilgili kurallara uyarak proje gerçeklerine göre uyarlanmalıdır.	☐	☐	☐	☐	☐
Her projenin gerçekleri veya öncelikleri farklı olabileceği için organizasyon seviyesindeki tüm süreçleri her projenin olduğu gibi uygulaması beklenmemeli, kurallara uygun uyarlamalara izin verilmelidir.	☐	☐	☐	☐	☐
Süreçlerin uygulanması etkin bir şekilde yetkin kişiler tarafından sürekli denetlenmelidir.	☐	☐	☐	☐	☐
Süreçlerin çıktıları olan iş ürünleri etkin bir şekilde yetkin kişiler tarafından sürekli gözden geçirilmelidir.	☐	☐	☐	☐	☐
Yetkin kişiler tarafından iyi yapılan denetim ve gözden geçirmeler işimi daha iyi yapmamı sağlar.	☐	☐	☐	☐	☐
Süreçlerle veya süreçlerdeki güncellemelerle ilgili olarak çalışanlara yetkin kişiler tarafından eğitimler verilmeli ve bu eğitimler ihtiyaç duyuldukça tekrarlanmalıdır.	☐	☐	☐	☐	☐
Süreç sistemi, yapısı ve etkileşimleriyle ilgili olarak çalışanlara yetkin kişiler tarafından eğitimler verilmeli ve bu eğitimler ihtiyaç duyuldukça tekrarlanmalıdır.	☐	☐	☐	☐	☐
Süreçler, süreç sistemi, yapısı ve etkileşimleriyle ilgili olarak çalışanlara her zaman başvurabilecekleri kılavuz bilgiler sağlanmalıdır.	☐	☐	☐	☐	☐
Süreçlerle ilgili eğitimler alırsam, süreçleri uygularken daha verimli olabilirim.	☐	☐	☐	☐	☐
Süreçlerin sürekli iyileştirilmesi önemli ve gereklidir ancak süreçler sürekli iyileştirmek adına, sık sık/rahatsız edecek şekilde değiştirilmemelidir.	☐	☐	☐	☐	☐
Süreçler ancak yeteri kadar olgunlaştıktan sonra yaygınlaştırılmalı ve bu sayede daha kararlı ve olgun süreçler oluşturulmalıdır.	☐	☐	☐	☐	☐

İfade	5	4	3	2	1
Sık sık değişen değil, daha kararlı, olgun ve planlı değişen süreçlerle yaşamayı tercih ederim.	☐	☐	☐	☐	☐
Süreçlerin yararlı (kullanışlı) olması ve kullanımlarının kolay olması sağlanırsa süreçler çalışanlar tarafından kullanılır.	☐	☐	☐	☐	☐
Organizasyonda düşünce ve davranışlarına önem verdiğim kişilerin süreçleri etkin bir şekilde kullanması, beni de süreçleri etkin bir şekilde kullanmaya olumlu yönde sevk eder.	☐	☐	☐	☐	☐
İşinde iyi olanlar süreçleri kullanıyorsa, bu benim süreçleri kullanma niyetimi olumlu yönde etkiler.	☐	☐	☐	☐	☐
Organizasyonda düşünce ve davranışlarına önem verdiğim kişilerin süreçleri etkin bir şekilde kullanması, süreçlerin yararlılığı (kullanışlılığı) hakkındaki düşüncemi olumlu yönde destekler.	☐	☐	☐	☐	☐
Süreçleri kullanan kişiler sonunda iyi işler çıkarıyorsa, ben de süreçlerin yararlı olduğunu düşünürüm.	☐	☐	☐	☐	☐
Süreçlerin kullanılması için, süreçlerin yararlı (kullanışlı) olması veya bu şekilde tasarlanması gerekir.	☐	☐	☐	☐	☐
Süreçler işimi yapmamda bana yarar sağlayacak şekilde tasarlanırsa, süreçleri kullanma niyetim olumlu yönde artar.	☐	☐	☐	☐	☐
Süreçler performansı arttıracak (iyileştirecek) şekilde tasarlanmalı ve tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler verimliliği arttıracak (iyileştirecek) şekilde tasarlanmalı ve tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçler çalışanların etkinliğini ve etkililiğini arttıracak şekilde tasarlanmalı ve tanımlanmalıdır.	☐	☐	☐	☐	☐
Süreçlerin çok fazla detaylı olmaması gerekir.	☐	☐	☐	☐	☐
Süreçlerin çok fazla sayıda adımdan oluşmaması gerekir.	☐	☐	☐	☐	☐
Süreçler ne çok üst seviye olmalı, ne de fazlaca detay içermelidir, sadece gerekli ve yeterli bilgi içermelidir.	☐	☐	☐	☐	☐
Organizasyonda süreçlerin kişilere sağlanacağı etkin ve verimli sistemler bulunmalıdır.	☐	☐	☐	☐	☐
Organizasyonda süreçlerin kullanımı ve uygulanması ile ilgili gerektiğinde sürekli kendisine başvurulabilecek etkin, yetkin ve profesyonel danışmanlar olmalıdır.	☐	☐	☐	☐	☐

İfade	5	4	3	2	1
Organizasyonda süreçlere kolay erişebileceğim, onları kolaylıkla istediğim gibi kullanabileceğim şekilde araçlar (tools) olmalıdır.	☐	☐	☐	☐	☐
Süreçlerde iyi rafine edilmiş ve anlamlı görsel öğeler, akış ve diyagramlar yer almalıdır.	☐	☐	☐	☐	☐
Süreçler sadece metinden (yazıdan) oluşmamalıdır.	☐	☐	☐	☐	☐
Süreçler kullanıcıların ana dilinde veya yetkin oldukları bir dilde yazılmış olmalıdır.	☐	☐	☐	☐	☐
Süreçler yabancı veya kullanıcıların yetkin olmadığı bir dilde yazılmamalıdır.	☐	☐	☐	☐	☐
Süreçler çevrim içi (online) erişilebilir ve kolay arama yapılabilir olmalıdır.	☐	☐	☐	☐	☐
Süreçlerin kullanım kolaylığı, süreçlerin kullanışlılığını arttırır.	☐	☐	☐	☐	☐
Süreçlerin kullanımının kolay olması gerekir.	☐	☐	☐	☐	☐
Süreçlerle etkileşimin açık ve anlaşılabilir olması gerekir.	☐	☐	☐	☐	☐
Süreçlerle etkileşim çok fazla zihinsel efor (çaba) gerektirmemeli ve çok karmaşık olmamalıdır.	☐	☐	☐	☐	☐
Süreçler yapılmak istenen işi kolaylıkla yapmaya olanak sağlamalı ve gereksiz bürokrasi oluşturmamalıdır.	☐	☐	☐	☐	☐
Süreçlerin kullanımının kolay olması, süreçlerin yararlılığını (kullanışlılığını) olumlu yönde etkiler.	☐	☐	☐	☐	☐
Süreçlerin çalışanlar tarafından kullanılması için süreçlerin yararlı (kullanışlı) olması ve süreçlerin kullanımının kolay olması gerekir.	☐	☐	☐	☐	☐
Süreçlerin yaygınlaştırılmasında, işletilmesinde ve bakım idamesinde etkin, yetkin ve profesyonel kişiler görev almalıdır.	☐	☐	☐	☐	☐
Süreçlerde yapılan iyileştirme temelli değişikliklerde, sürece, alana ve süreç sistemine yeteri kadar hakim ve yetkin kişiler görev almalıdır.	☐	☐	☐	☐	☐
Süreçlerin yaygınlaştırılması, işletilmesi ve bakım idame faaliyetleri belirli bir plan ve programa uygun olarak, organizasyonun iş hedefleri ve stratejik hedefleri ile paralel tutularak yapılmalıdır.	☐	☐	☐	☐	☐
Süreçlerin yaygınlaştırılması, işletilmesi ve bakım idame faaliyetleri için, yaptıkları işten doğrudan sorumlu, alanda yeteri kadar teorik ve pratik bilgiye sahip ve yetkin kişilerden oluşan bir grup kurulmalıdır.	☐	☐	☐	☐	☐

3. BÖLÜM (DİĞER)

Yönerge: *Yukarıda belirtilenlerden farklı olarak, sizce organizasyonlarda süreçlerin çalışanlar tarafından benimsenmesinde etkili olabileceğini düşündüğünüz diğer muhtemel faktörleri lütfen aşağıya yazınız. Lütfen bu bağlamda aklınıza gelen her şeyi çekinmeden yazınız.*

Anketin birinci ve ikinci bölümündeki tüm kısımları eksiksiz olarak doldurdunuz mu? ☐ Evet ☐ Hayır

Sağladığınız katkı, ayırdığınız zaman ve gösterdiğiniz ilgi için teşekkürler.

APPENDIX C: ONLINE QUESTIONNAIRE - SOME SCREENSHOTS (ENGLISH VERSION)

Online English version of the whole questionnaire is available at: *https://docs.google.com/spreadsheet/viewform?formkey=dHZsTXRZb3FySzhxUG1ncGd4cHhsRnc6MA#gid=0*

Yet, some screenshots from the questionnaire are provided below.

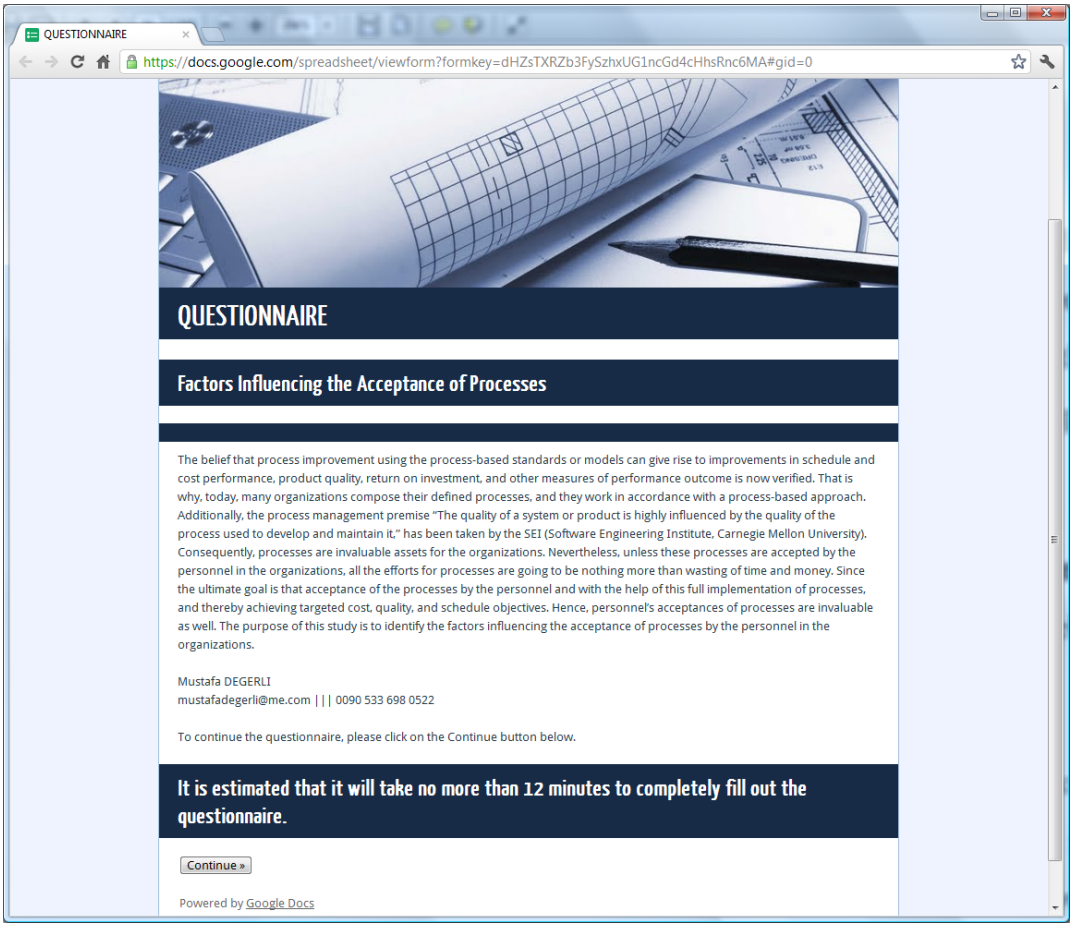


Figure A.1: First Page of the Online Questionnaire – Screenshot (English)

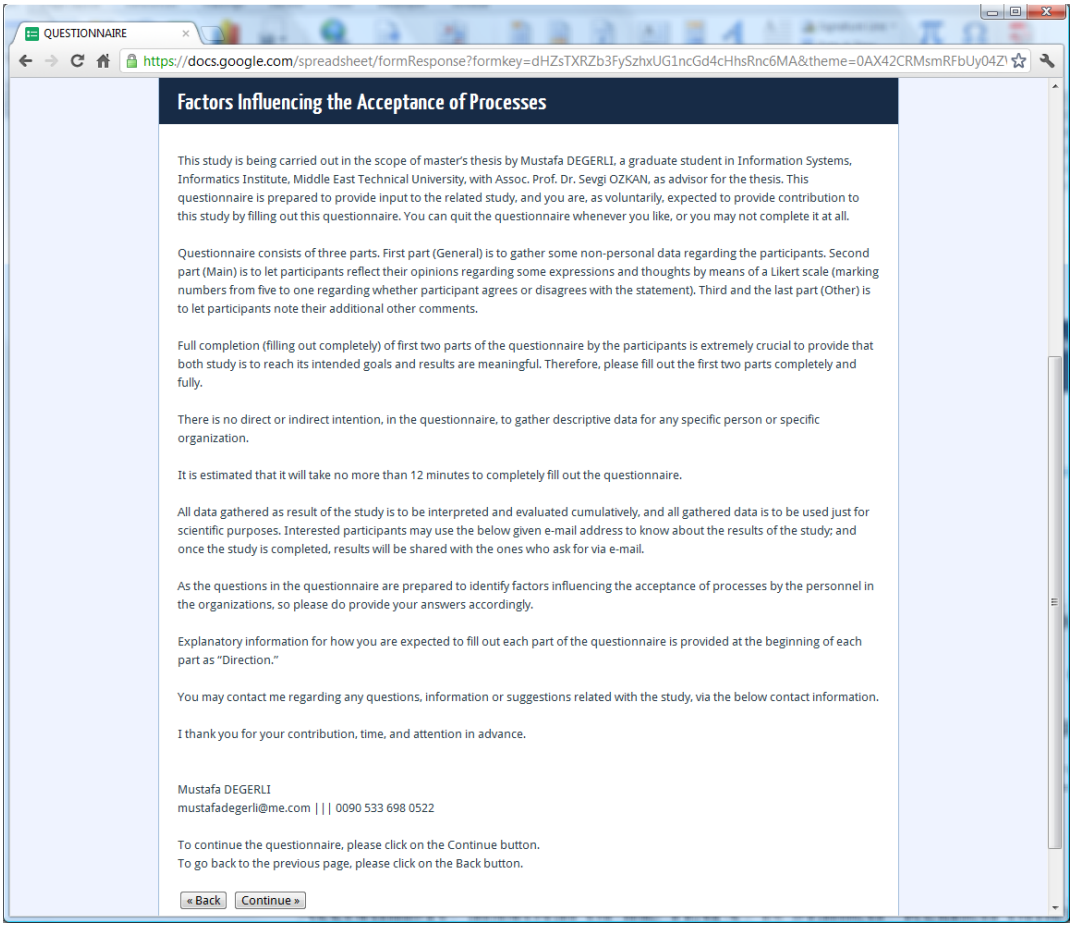


Figure A.2: Explanation Page of the Online Questionnaire – Screenshot (English)

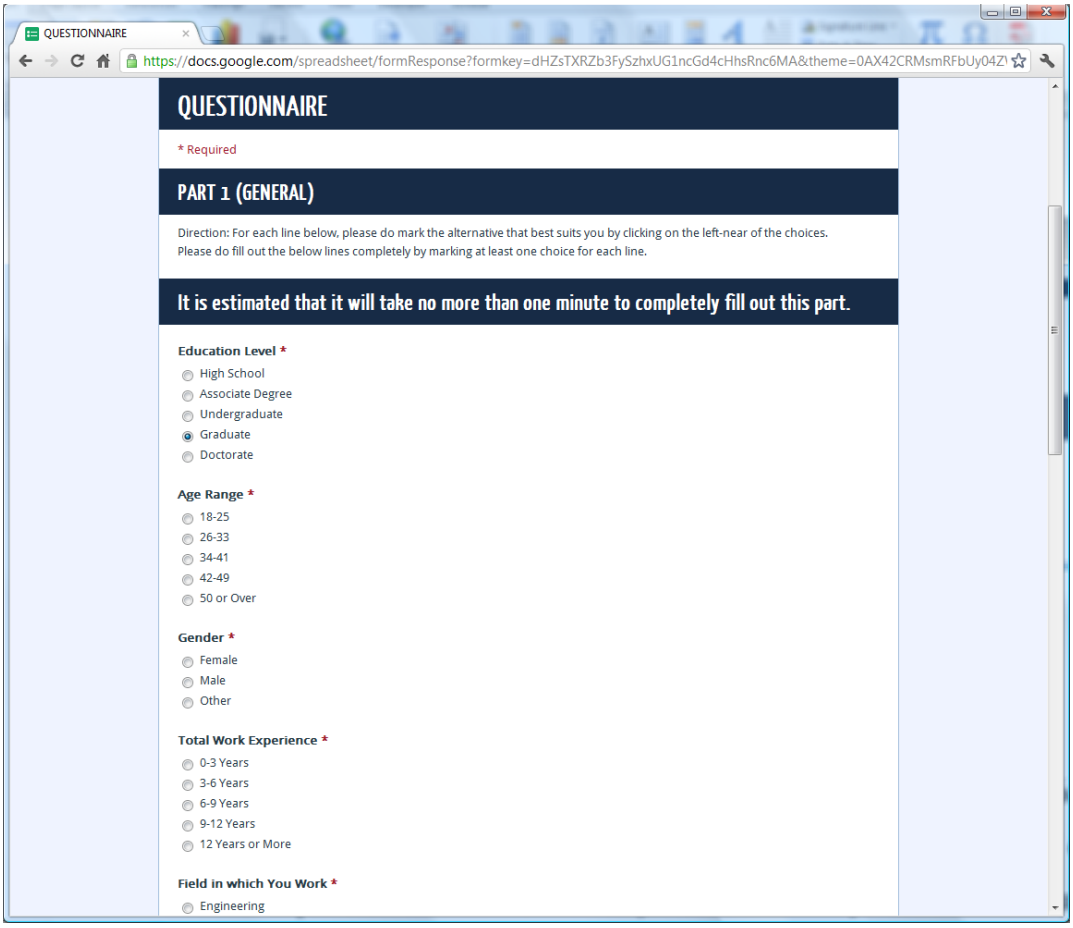


Figure A.3: Part 1 of the Online Questionnaire – Screenshot (English)

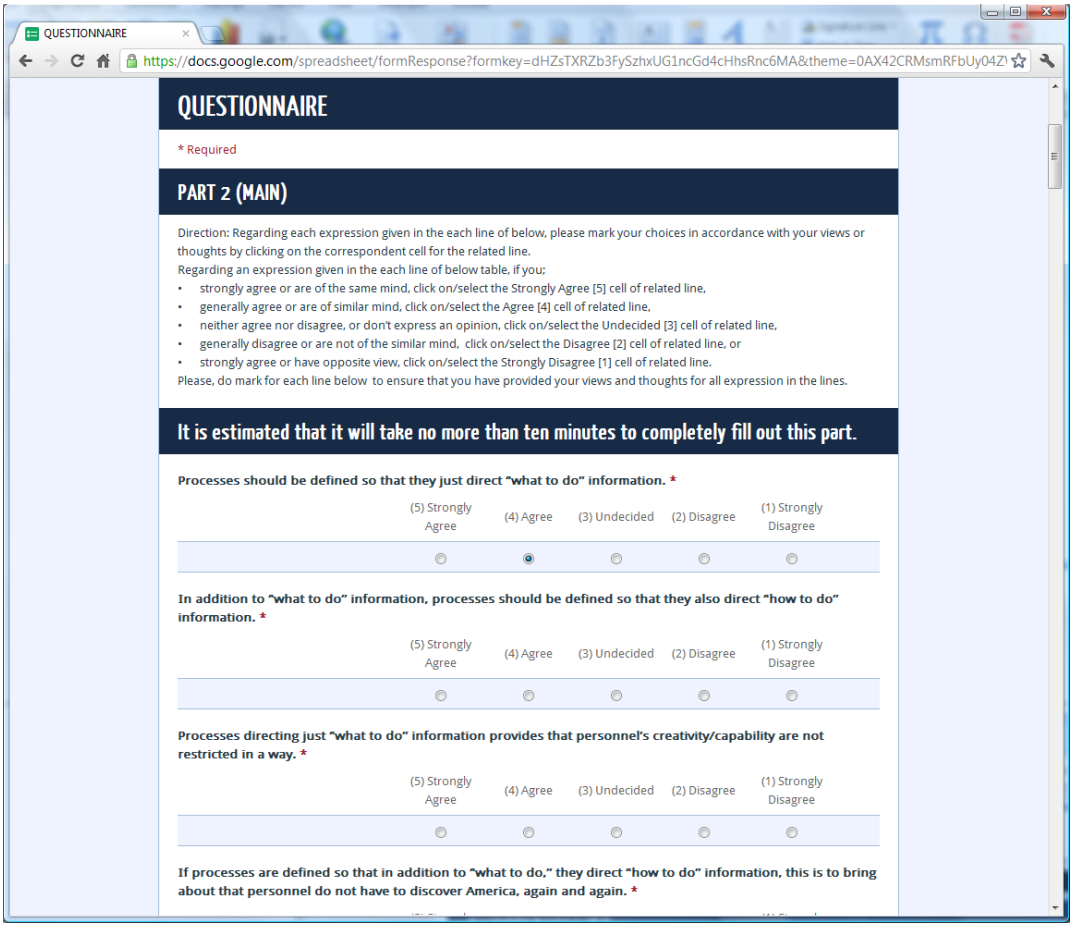


Figure A.4: Part 2 of the Online Questionnaire – Screenshot (English)

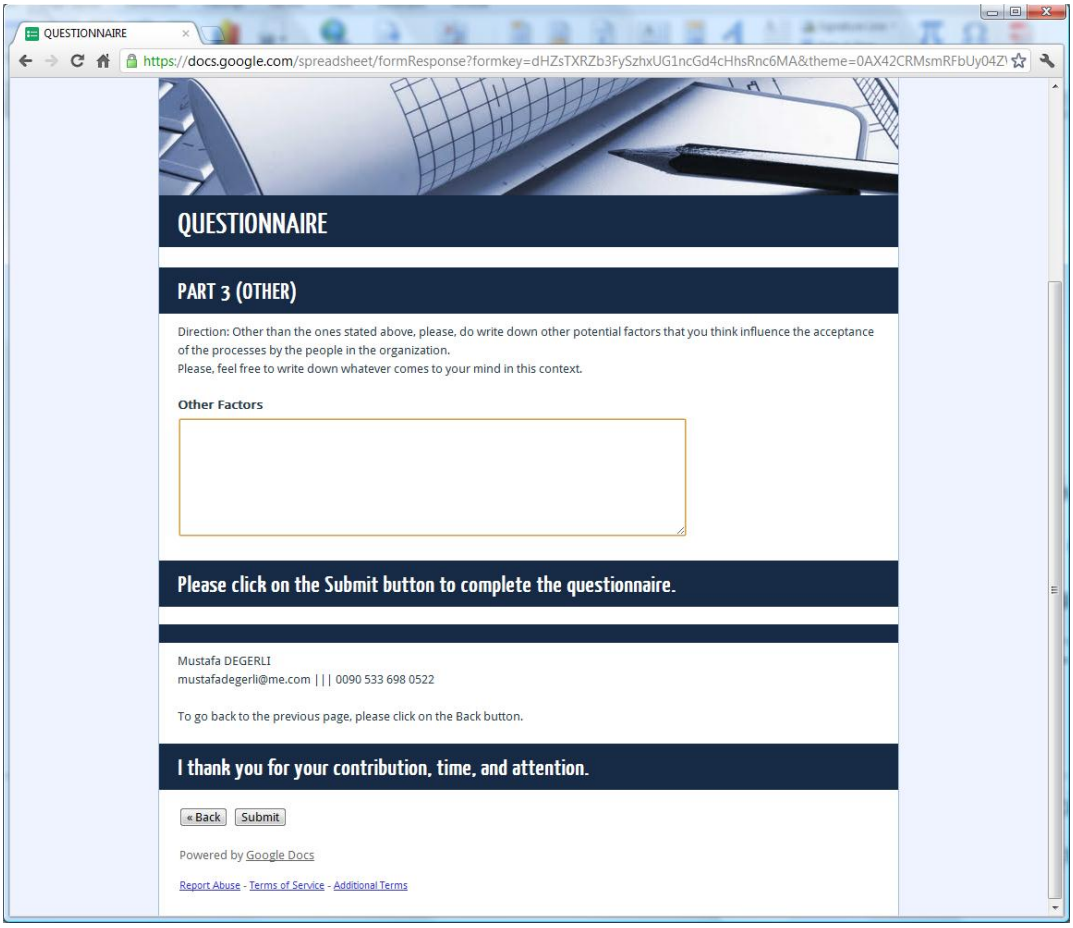


Figure A.5: Part 3 of the Online Questionnaire – Screenshot (English)

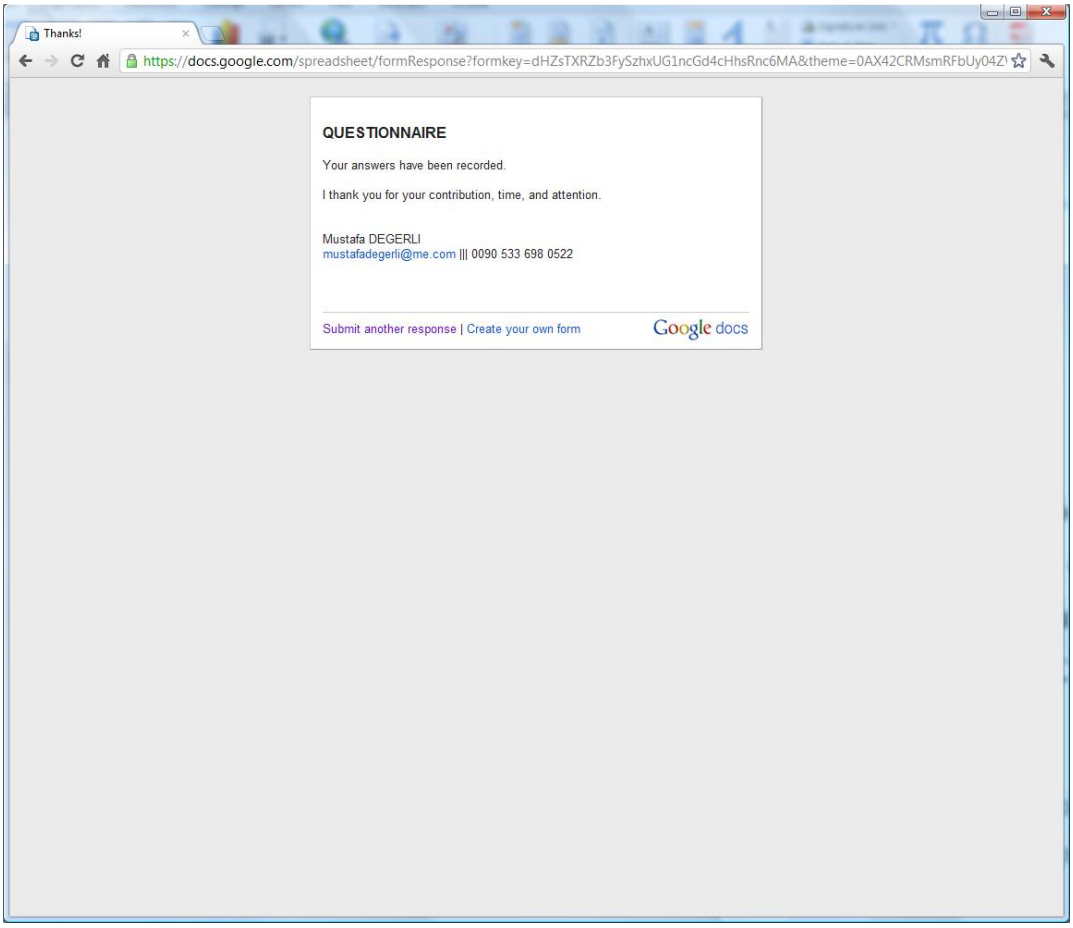


Figure A.6: Last Page of the Online Questionnaire – Screenshot (English)

APPENDIX D: ONLINE QUESTIONNAIRE - SOME SCREENSHOTS (TURKISH VERSION)

Online Turkish version of the whole questionnaire is available at: *https://docs.google.com/spreadsheet/viewform?formkey=dEdKMUZfc3ExSWFqeGNGSGtYODAwbVE6MA#gid=0*

Yet, some screenshots from the questionnaire are provided below.

Figure A.7: First Page of the Online Questionnaire – Screenshot (Turkish)

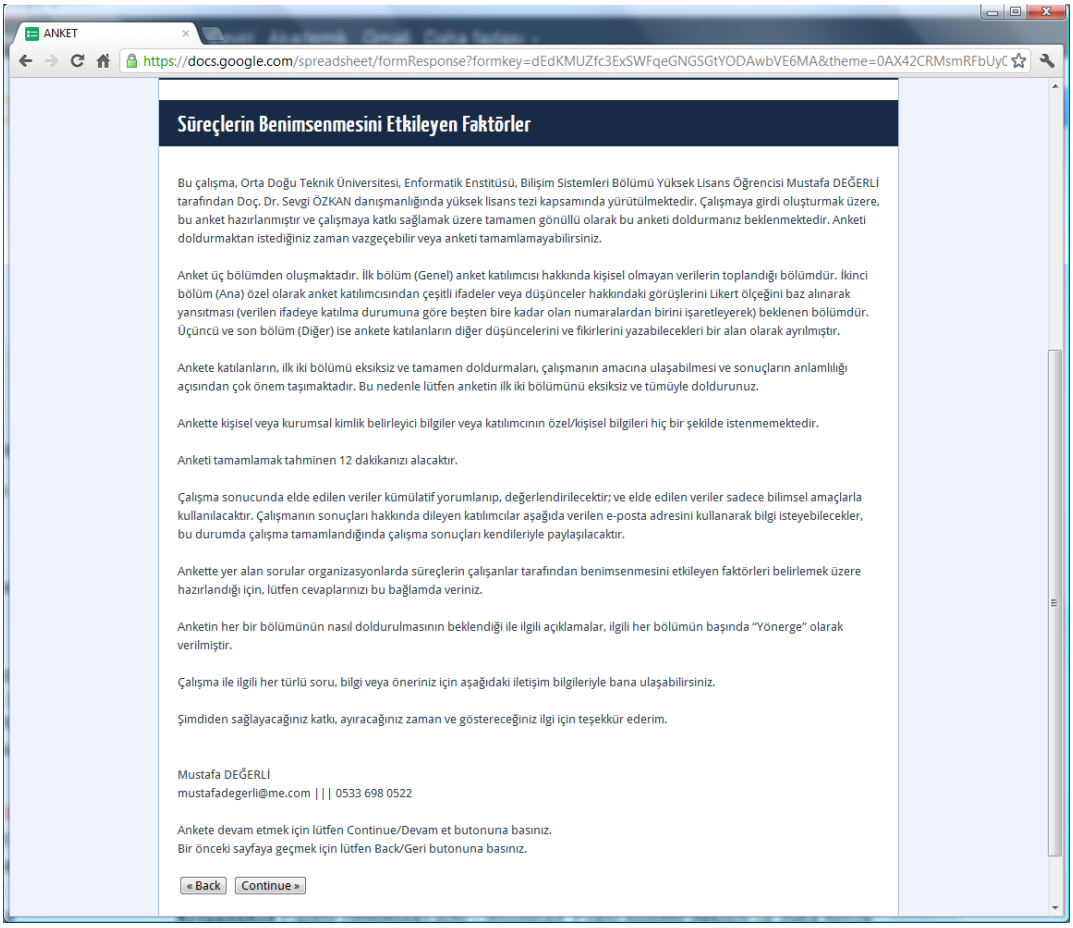


Figure A.8: Explanation Page of the Online Questionnaire – Screenshot (Turkish)

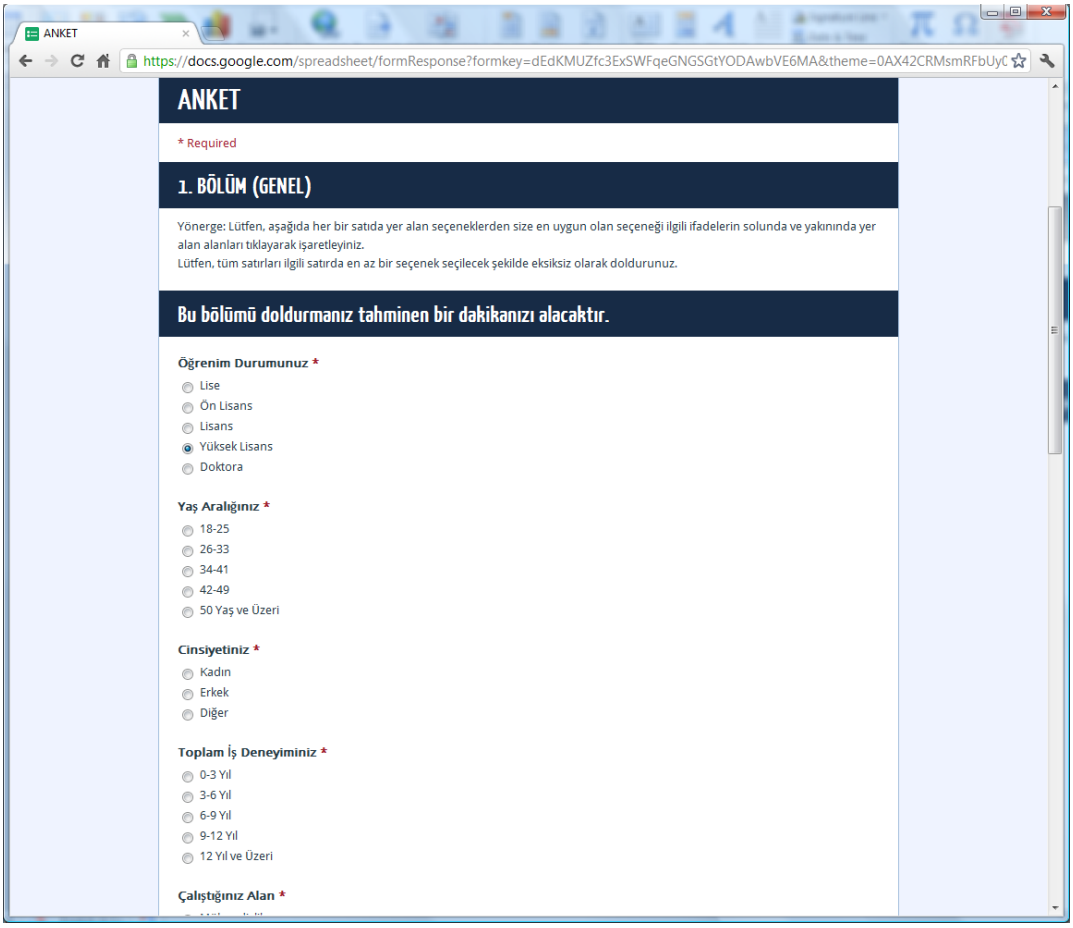


Figure A.9: Part 1 of the Online Questionnaire – Screenshot (Turkish)

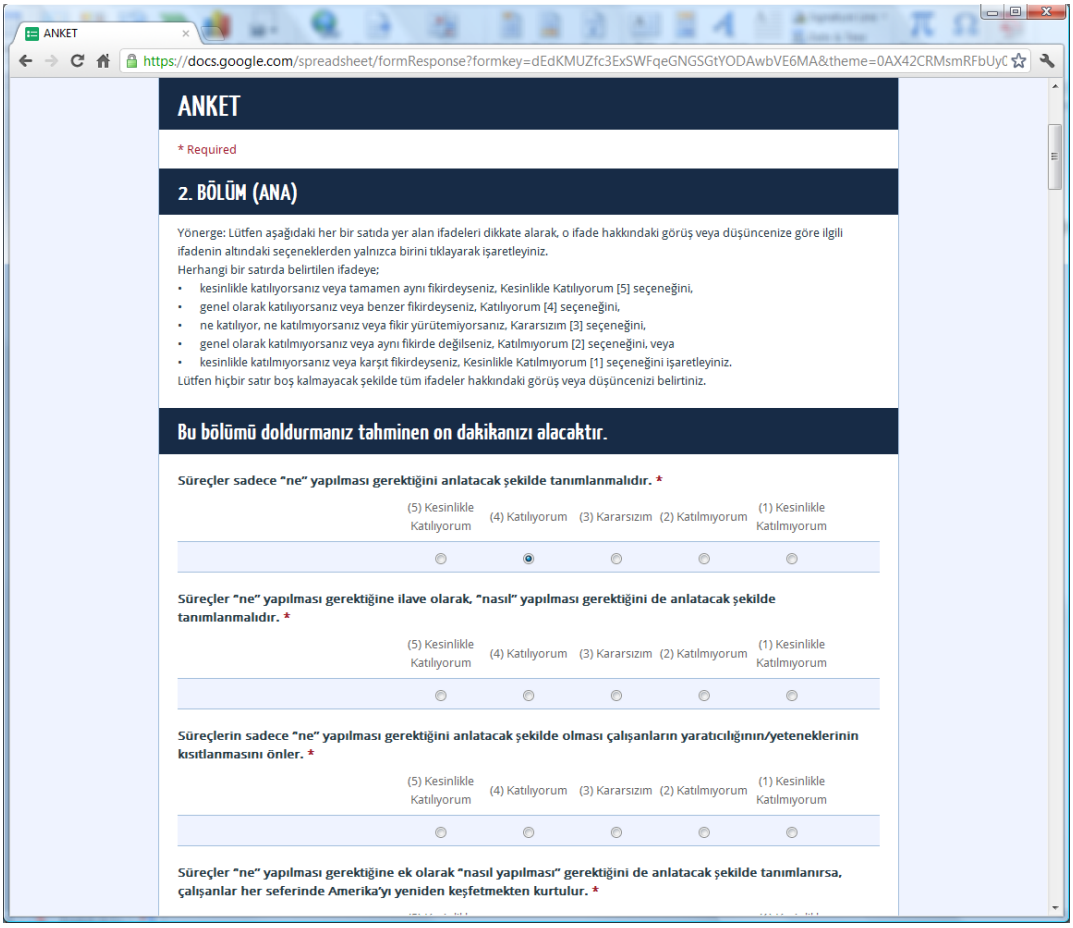


Figure A.10: Part 2 of the Online Questionnaire – Screenshot (Turkish)

Figure A.11: Part 3 of the Online Questionnaire – Screenshot (Turkish)

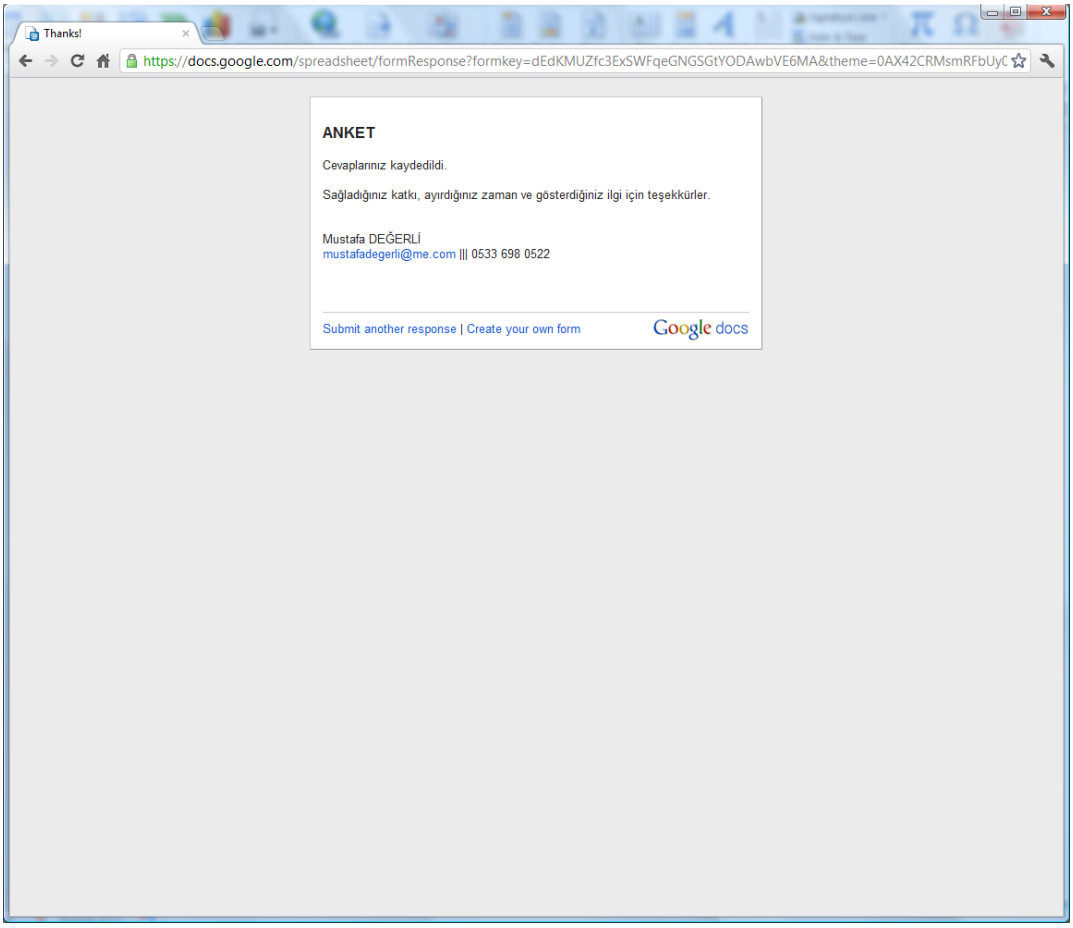
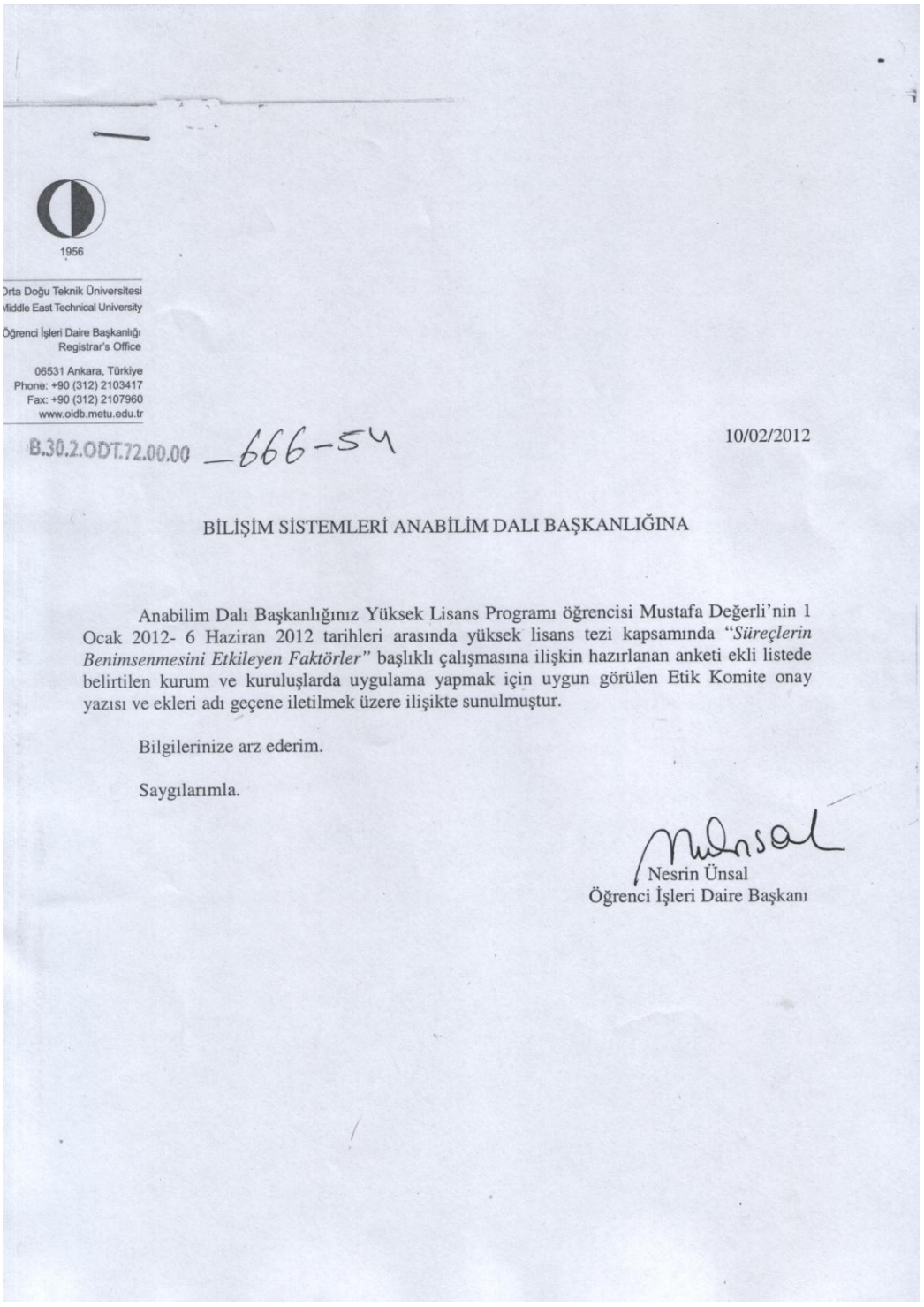


Figure A.12: Last Page of the Online Questionnaire – Screenshot (Turkish)

APPENDIX E: GRANTED ETHICAL PERMISSION



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BİLİŞİM SİSTEMLERİ ANABİLİM DALI BAŞKANLIĞINA

Anabilim Dalı Başkanlığınız Yüksek Lisans Programı öğrencisi Mustafa Değerli'nin 1 Ocak 2012- 6 Haziran 2012 tarihleri arasında yüksek lisans tezi kapsamında *"Süreçlerin Benimsenmesini Etkileyen Faktörler"* başlıklı çalışmasına ilişkin hazırlanan anketi ekli listede belirtilen kurum ve kuruluşlarda uygulama yapmak için uygun görülen Etik Komite onay yazısı ve ekleri adı geçene iletilmek üzere ilişikte sunulmuştur.

Bilgilerinize arz ederim.

Saygılarımla.

Nesrin Ünsal
Öğrenci İşleri Daire Başkanı

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Deniz Bilimleri Enstitüsü ☐

YAZARIN

Soyadı : **DEĞERLİ**

Adı : **MUSTAFA**

Bölümü : **Bilişim Sistemleri**

TEZİN ADI (İngilizce) : **IDENTIFYING FACTORS INFLUENCING THE ACCEPTANCE OF PROCESSES: AN EMPIRICAL INVESTIGATION USING THE STRUCTURAL EQUATION MODELING APPROACH**

TEZİN TÜRÜ : Yüksek Lisans ☑ Doktora ☐

Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın. ☐

Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullanıcılarının erişimine açılsın. ☐
(Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)

Tezim bir (1) yıl süreyle erişime kapalı olsun. ☑
(Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.)

Yazarın imzası ..... Tarih: **Mayıs 2, 2012**