Master’s Thesis in Informatics

The adoption of Knowledge Management Systems in Mexico
A Quantitative Study

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Abstract

Knowledge is a very important asset for organizations; it is one of the best sources of competitive advantage. Knowledge Management is used to effectively capture and apply knowledge in organizations. This task is usually carried out with the help of knowledge management systems, which serve for the creation, transfer, application and storage/retrieval of knowledge.

Currently in Mexico the level of KM in organizations is not at the level that it could be. It seems that organizations are having a hard time applying the practices and level of KM that organizations in first world countries have achieved.

The purpose of this study is to understand what factors drive employees in Mexico to adopt knowledge management systems. With these results organizations will know what factors they should pay close attention to, and it will shed light into what actions or interventions they should take in order to increase the adoption level of KMS.

In order to do this, a research framework was designed based on a review of theoretical models used to study the adoption of technology, as well as previous KM adoption studies. And by applying a survey questionnaire, which received a total of 953 valid responses, through which several hypotheses were tested, it was found that subjective norm and efficiency gains have a significant positive influence over perceived usefulness, which in turn has a significant positive influence on the intention to use and attitude towards use of KMS. Subjective norm also influences image, which itself also influences perceived usefulness. It was also found that perceived ease of use has a positive influence on attitude towards use, perceived usefulness and attitude towards use. Finally voluntariness influences attitude towards use which in turn influences intention towards use, which is the primary factor that we wish to influence for usage behavior.

The most important factors that organizations in Mexico, particularly in Monterrey, should pay attention to when seeking to increase the level of adoption of KMS are the following, in order of relevance: perceived usefulness, perceived ease of use, subjective norm, efficiency gains, voluntariness and image.

Keywords
Knowledge, Knowledge Management, Knowledge Management Systems, Knowledge Management Cycle, Technology Adoption
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List of Abbreviations

CBAM - The Concerns Based Adoption Model
CKS - Centre of Knowledge Systems at the Tecnologico de Monterrey
CSF - Critical Success Factor
DOI - The Diffusion of Innovation Theory
GDP - Gross Domestic Product
IDT - The Innovation Diffusion Theory
IT - Information Technology
K – Knowledge
KM – Knowledge Management
KMO - Kaiser-Meyer-Olkin
KMS – Knowledge Management Systems
LISREL - Linear Structural Relations
SEM - Structural Equation Modeling
SME - Small and Medium Enterprises
SPSS - Statistical Package for the Social Sciences
TAM - The Technology Acceptance Model
TAM2 - The Extended Technology Acceptance Model
TPB - Theory of Planned Behavior
TRA - Theory of Reasoned Action
UTAUT - The Unified Theory of Acceptance and Use of Technology
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Chapter 1 - Introduction

This initial chapter presents an introduction to the research area and the problem situation. Following this, the research question and objectives are outlined, and finally the scope and limitations for the research are defined.

1.1 Background

Knowledge has been noticed and studied by many throughout the years, even since the Greek era. Throughout the last couple of years the study of knowledge has been a growing trend since it has been considered as a resource of very high value from an organizational context. This is the reason why managing knowledge has a very high importance in today’s industry and within Information Systems. (Alavi and Leidner, 2001)

Knowledge is one of the most important assets belonging to an organization. It is a very crucial determinant on the success of a firm, especially those firms belonging to the small or medium-sized categories. Knowledge is also considered as one of the organizations most valuable sources of competitive advantage. This is why organizations today are more focused in hiring “minds” rather than hiring “hands”. (Omerzel and Antoncic, 2008)

A knowledge asset is considered to be an intangible one, in terms of accounting, and in terms of management it is known as intellectual capital. It is very hard to manage these assets and their property rights tend to be confusing. But these intangible assets are the main source for value creation in an organization; the impact on gross domestic product (GDP) in the period of 1991 to 2000 from knowledge capital investment (KCI) surpassed that of fixed capital investment (FCI). (Lopes and Martins, 2006)

Today, organizations can be considered as repositories of knowledge. Knowledge can be present in tacit form (the knowledge stored in the minds of employees) as well as in explicit form (the knowledge which is stored in files, records and other types of documents). (Salvati, Shafei, Shaghayegh, 2010).
Business organizations understand that they need to be able to respond to their client’s needs and the changes that arise in the market place in an efficient and effective manner. Knowledge Management is crucial in order to reach this goal and therefore this needs to be considered as a very important part of an organizations strategy to improve performance. (Carrillo, Robinson, Anumba and Al-Ghassani, 2003)

As part of this strategy to improve business performance, Knowledge Management seeks to effectively capture and apply knowledge in the organization; it helps workers to enhance their creativity and their ability in regard to delivering business value. It also provides real-time information to those who need it in order to be able to make correct decisions and react to arising situations in the best way possible to keep in line with the organizations objectives. (Al-Mabrouk, 2006)

The systems which are designed to help and aid in this “management of knowledge” are known today as Knowledge Management Systems (KMS). These systems can vary greatly from one another but they all have focus on aiding and supporting at least one of the following four factors: the creation, transfer, application and storage/retrieval of knowledge. Knowledge and Knowledge Management are highly complex concepts and they have a foundation on many rich literatures which will be further discussed in the literature review of this dissertation. (Alavi and Leidner, 2001)

In organizations Knowledge Management Systems are perceived as new technology, and this is why organizations tend to face several challenges when deciding either to adopt them or not, having to consider user reaction to the new system in the case of a top level adoption.

Adoption is considered a very important concept in regard with technology. It is known as the stage of technology diffusion in which a technology is selected for use by an individual or by the organization (Kaldi, Aghaie and Khoshalhan, 2008).

1.2 Problem Situation

OuYang, Yeh and Lee (2010) in their study point out that knowledge is not only a major asset for the success of organizations, but it is also a very important asset for the economic growth of any country. However according to Kale and Little (2005) the process of knowledge management is not as easily undertaken by organizations in developing countries as it is by organizations in advanced countries, this is because the process tends to have more difficulties since it is shrouded by social, political and economic complexities.
The situation in Mexico in terms of knowledge management practices as well as in technology and innovation is not very outstanding when compared to highly developed countries. From a general perspective, Mexican organizations as well as the Mexican economy are having a hard time adopting practices from developed countries in these areas. This is the reason why the global competitiveness in Mexico seems to be dropping year after year. (Carral and Capote, 2010)

Mexico is currently ranked number 66 by the Global Competitiveness Report for 2010-2011, and it used to be ranked number 60 in the report for 2009-2010, proving that the global competitiveness of the country is indeed falling. It is considered to be in the second stage of development which is “Efficiency Driven” and having a GDP per capita in USD between 3,000 and 9,000. Other stages of development can be appreciated in the following table. (Schwab, 2010)

| Income threshold for establishing stages of development (Schwab, 2010) |
|---------------------------------|--------------------------|
| **Stage of development**        | **GDP per capita (in USD)** |
| **Stage 1**: Factor Driven      | < 2,000                  |
| **Transition from S1 to S2**    | 2,000 - 3,000            |
| **Stage 2**: Efficiency Driven  | 3,000 - 9,000            |
| **Transition from S2 to S3**    | 9,000 - 17,000           |
| **Stage 3**: Innovation Driven  | > 17,000                 |

In the Global Competitiveness Report for 2010-2011, Venezuela is ranked number 122 which is much lower than Mexico is, and it is considered to be in transition from stage 1 to stage 2 (Schwab, 2010). Nevertheless, a study by Borjas and Fernandez (2010) in which a comparison between two groups of organizations in terms of Knowledge Management is carried out, one group from Mexico and the other from Venezuela, shows that even though both groups have various KM activities in place and with almost no difference at all, the Venezuelan organizations generate more homogenous and more activities of knowledge management than the Mexican ones.

This proves that there is very likely a general problem with the implementation or adoption of knowledge management in Mexican organizations, which is the first reason why conducting this research is worthwhile.

A second reason to perform this research is that even though there has been a moderate amount of research carried out in regard to the adoption of knowledge management in organizations, there has not been much research carried out on the adoption of knowledge...
management in Mexican organizations. For example a previous study of adoption of knowledge management in Mexico was focused on a single division of one single company (Delgado-Hernandez, et al., 2009). That case study only focused on how this particular company had embraced knowledge management. Needless to say, the adoption of knowledge management in Mexico cannot be generalized by the results obtained in one division of a single organization. Especially considering that this was a very large company (80,000 employees) and large companies tend to be more advanced in terms of knowledge management than SMEs, (Evangelista, et al., 2010) which constitute a 99.6 % of the organizations in Mexico (Kakihara, 2010). Still no study which investigates the factors influencing knowledge management adoption in Mexico has been previously carried out.

According to Al-Mabrouk (2006) organizational culture is a very important success factor on the effective achievement of Knowledge Management. There is even an old proverb that states that Knowledge Management is 20 % related to technology and 80 % related to organizational culture and other human factors (Becerra-Fernandez and Sabherwal, 2010, p.10). Hofstede (1980) within his cultural dimensions theory states that dysfunctions and inequalities in society are reflected in organizational culture. Mexico currently has very noticeable inequalities in education and employee earnings (Lächler, 1998) and it has also been known to have very high levels of corruption and insecurity which have risen lately due to the undergoing drug war (Beittel, 2009). This difference in culture and society could be one of the reasons why Venezuela has a higher level of knowledge management in its organizations, even though it has a lower level of development. And this is a third reason why this research is worth carrying out, since the adoption of knowledge management can vary greatly amongst different cultures in the World. However, it is not the intention of this study to prove if and how this situation is affecting the organizational culture.

1.3 Research Question

Based on all previously stated, the chosen research question for this study is the following:

*What factors should organizations pay more attention to when seeking to increase the adoption level of knowledge management systems in Mexico?*

In order to address this research question, testing of hypothesis will take place. A model in order to be able to identify the factors influencing the adoption of knowledge management systems in Mexican organizations was constructed, based on an extensive literature review of
previous studies on the adoption of technology and the adoption of knowledge management in organizations.

1.4 Research Objectives

The main aim of this research is to provide a better understanding of what factors are influencing the adoption of knowledge management in organizations in Mexico, particularly in the city Monterrey. The objectives can be understood as follows:

- Quantify the constructs that drive towards the adoption of technology, validating the relationships between each factor, in order to generate reliable and valid hypothesis.
- Investigate the different factors that can have an influence on the adoption of knowledge management systems in a developing country, such as Mexico.
- Shed light into what actions and interventions might be reasonable to consider taking within organizations in order to persuade employees to adopt knowledge management systems.

1.5 Scope and limitations

Due to the fact there is a time limit for all the activities that are necessary to undergo throughout this research, the size and the scope must be limited as well. The first limitation will be the sample of participants who take the survey for the data collection, it is obvious that the more participants the more reliable the results will be, but this is too time consuming, so the aim for this research will be a total of 1000 surveys. Another limitation here is the scope of an entire country, especially one as large as Mexico with a total of 31 states, and due to the lack of budget the study will be limited only to the city of Monterrey. The results of this study will prove valid only to the city of Monterrey Mexico, the nation’s economic capital; in order to further the research the entire country could be surveyed in the future. Not all factors concerning technology adoption are considered within this study, but those considered of utmost importance were included thanks to the analysis of previous knowledge management adoption studies.
1.6 Thesis Structure

This study is presented in six different chapters:

1. **Introduction** – An introduction to the topic and the reasoning for this research is provided, including research question, objectives, scope and limitations
2. **Literature Review** – A literature review is presented to provide a good understanding of knowledge management, the KM situation in Mexico and previous studies on KM adoption along with their results. Finally theories on adoption of technology are presented
3. **Research Framework** – The research framework implemented in this study
4. **Research Methodology** – A complete description of the research methodology used
5. **Data Analysis** – Empirical findings from the analysis of the data collected
6. **Discussion and Conclusion** – Discussion of the results from the research, conclusion, recommendations for future research
Chapter 2 – Literature Review

The purpose of this chapter is to present a solid and relevant literature review in relation to the research question. First a broad range of information regarding knowledge, knowledge management, knowledge management systems as well as the current situation for knowledge management in Mexico will be presented. This is followed by a presentation of previous studies regarding the adoption of knowledge management. Finally a comprehensive amount of theoretical models which have been proposed in order to study the adoption of technology are presented.

2.1 Knowledge

There is no agreement on the nature of knowledge just as there has never been one in the history of human thought. (Firestone, 2001) Different authors tend to define knowledge in distinct ways; but actually defining knowledge is surprisingly difficult. (Schneider, 2009, p.9) A definition which covers every perspective or discipline is not the purpose for this case, so I will present information that I believe is relevant from an information systems perspective.

The Oxford Dictionary defines Knowledge as “facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject; awareness or familiarity gained by experience of a fact or situation”. (Oxford, 2012)

Nonaka and Takeuchi (1995) view knowledge as the result obtained from a process in which the information gets transformed into a justified belief. Empiricists believe this same definition in which facts can justify knowledge claims. (Firestone, 2001)

Knowledge is in fact very different from data and information. Even though they may get used sometimes seeking to provide the same answer they are naturally very different from each other (Becerra-Fernandez and Sabherwal, 2010, p.17). These terms can be easily confused since there are definitions of knowledge that treat data and information as knowledge, like the UK based Open Knowledge Foundation definition, for instance (King, 2009, p.16).

Data can come in many forms for example pictures, numbers, text, objects, etc. it is composed of discrete facts that have very low interpretation. Data tends to have no meaning by itself. (Matney, 2011)
Formatted data is what we call information, in other words it is data that has been organized in a certain way that it has a meaning, context or purpose for a certain individual. It is data that can be understood and can be considered useful. (Rowley, 2007)

Knowledge is differentiated from data mainly in two distinct manners. A simple way to look at this can be as a three-level hierarchy where knowledge is at the top level, information in the middle level and data in the lower level. Knowledge can then be understood as information that helps in decision making, it aids in turning information in a way that can be an action enabler. So in a sense knowledge is very similar to data and information, but has a much higher value. In this view data refers to ideas which are lacking a particular context, while information is ideas that are placed into a particular context and knowledge is information that makes actions and decisions easier. This is a very simplistic way of seeing the difference between the three. (Becerra-Fernandez and Sabherwal, 2010, p.18)

This basically is part of a hierarchy called DIKW in which Information is data with a context, and knowledge is information that is structured and organized, and finally there is wisdom which is composed of knowledge in an ethical or moral framework. (Cooper, 2010)

As is shown in this hierarchy of data, Jashapara (2004, p.16) considers knowledge to be ‘actionable-information’ that helps to make better decisions, allowing us to act more effectively than with information or data by itself.

Another way to understand this is that knowledge aids in the production of information from data or it aids in the generation of information of higher value from information that is
already available. In this sense information facilitates actions and decisions. (Becerra-Fernandez and Sabherwal, 2010, pp.19-20)

As quoted from Xu and Quaddus (2005b), Knowledge can be distinguished from information in the following six ways:

1. knowledge is a human act
2. knowledge is the residue of thinking
3. knowledge is created in the present moment
4. knowledge belongs to communities
5. knowledge circulates through communities in many ways
6. new knowledge is created at the boundaries of old

2.2 Knowledge Taxonomies

Knowledge is a phenomenon that has a lot of dimensions and therefore can be studied from many different perspectives. Trying to understand the nature of knowledge has been a major question for thousands of years. Aristotle (384-322 BC) thought knowledge could be easily accessible by providing categories to it. Because it has several different dimensions, taxonomies are possible. An attempt to present different taxonomies that is highly known of is
the work of Alavi and Leidner (2001), where they came up with 10 categories summarized in the table below. (Ein-Dor, 2006)

Table 2 Knowledge Taxonomies (Alavi and Leidner, 2001)

<table>
<thead>
<tr>
<th>Knowledge Types</th>
<th>Definitions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tacit</td>
<td>Knowledge is rooted in actions, experience, and involvement in specific context</td>
<td>Best means of dealing with specific customer</td>
</tr>
<tr>
<td>Cognitive Tacit</td>
<td>Mental models</td>
<td>Individual's belief on cause-effect relationships</td>
</tr>
<tr>
<td>Technical Tacit</td>
<td>Know-how applicable to specific work</td>
<td>Surgery skills</td>
</tr>
<tr>
<td>Explicit</td>
<td>Articulated, generalized knowledge</td>
<td>Knowledge of major customers in a region</td>
</tr>
<tr>
<td>Individual</td>
<td>Created by and inherited in collective actions of a group</td>
<td>Insights gained from completed project</td>
</tr>
<tr>
<td>Social</td>
<td>Created by and inherited in collective actions of a group</td>
<td>Norms for inter-group communication</td>
</tr>
<tr>
<td>Declarative</td>
<td>Know-about</td>
<td>What drug is appropriate for an illness</td>
</tr>
<tr>
<td>Procedural</td>
<td>Know-how</td>
<td>How to administer a particular drug</td>
</tr>
<tr>
<td>Causal</td>
<td>Know-why</td>
<td>Understanding why the drug works</td>
</tr>
<tr>
<td>Conditional</td>
<td>Know-when</td>
<td>Understanding when to prescribe the drug</td>
</tr>
<tr>
<td>Relational</td>
<td>Know-with</td>
<td>Understanding how the drug interacts with other drugs</td>
</tr>
<tr>
<td>Pragmatic</td>
<td>Useful knowledge for an organization</td>
<td>Best practices, business frameworks, project experiences, engineering drawings, market reports</td>
</tr>
</tbody>
</table>

Understanding the concept of knowledge and its taxonomies is of high importance due to the fact that all theoretical developments in knowledge management are highly influenced by the differentiation of these distinct types of knowledge. (Alavi and Leidner, 2001)

**Commonsense Knowledge:** Expected from all individuals in a society, involves the acquaintance with the laws that govern the physical world and the world itself, as well as procedures necessary for common day to day tasks. (Ein-Dor, 2006)

**Contextual Knowledge:** Knowledge within the context of task performing in organizations. Depending on the task, the knowledge could be just internal to the organization or involving some external contexts as well, such as markets or legal contexts. (Ein-Dor, 2006)

**Declarative Knowledge:** The knowledge of basic facts. Such as the number of items in storage room, the name of a person or the address of a customer. (Ein-Dor, 2006)

**Expert Knowledge:** The knowledge that was obtained by an individual through experience and training in a particular field. Examples are the knowledge of a doctor, an architect or an engineer. (Ein-Dor, 2006)

**Explicit Knowledge:** All knowledge which can be recorded and verbalized externally. An example would be the information in a library or the Internet. (Ein-Dor, 2006)
**Individual Knowledge**: The knowledge which is owned by an individual, rather than a group. It is usually “tacit” in nature, and thus it is completely personal. When tacit knowledge is turned explicit, individual knowledge turns into social knowledge. (Ein-Dor, 2006)

**Procedural Knowledge**: Knowledge required performing a certain task. (Ein-Dor, 2006)

**Social Knowledge**: Knowledge that belongs to or can be accessed to members of an entity or organization. (Ein-Dor, 2006)

**Tacit Knowledge**: It is the knowledge owned by a particular individual, and it is usually knowledge which is hard to articulate or communicate in a verbal manner. It is usually knowledge product of emotions, feelings, impressions and memories. (Ein-Dor, 2006)

**Task Knowledge**: Knowledge required for performing a certain task within or outside an organizational context. Such as delivering goods or updating accounts. (Ein-Dor, 2006)

The distinction between explicit and tacit knowledge is highly known and accepted. According to Nonaka and Takeuchi (1995) there are four modes of tacit and explicit **knowledge creation processes**: socialization, externalization, combination, and internalization (Xu and Quaddus, 2005b).

**Socialization** – the conversion of tacit knowledge to tacit knowledge which is hidden and hard to communicate, i.e. knowledge sharing between individuals through different forms of face-to-face contact. Information technology can prove useful for this process by connecting people through teleconferencing and videoconferencing. (Xu and Quaddus, 2005b)

**Externalization** – the conversion of tacit knowledge to explicit knowledge in the form of analogies, hypotheses, models and metaphors, i.e. writing down tacit knowledge, for example past experience, insight, judgment, practice, observations in a way that can be used in the future by whoever needs it. Information technology can prove useful for this process through groupware tools and e-mail. (Xu and Quaddus, 2005b)

**Combination** – the conversion of explicit knowledge to new explicit knowledge, through combining, sharing, organizing and processing existing pieces of explicit knowledge, such as telephone conversations, information documents, meetings, and common databases, i.e. learning through knowledge and information systems. Intranets are today’s best enabled form of paperless explicit knowledge transfer. (Xu and Quaddus, 2005b)

**Internalization** – the conversion of explicit knowledge to tacit knowledge, in a way in which the explicit knowledge is absorbed by an individual to become tacit knowledge, i.e. learning through hands-on practices (learning by doing), documented knowledge is helpful in these practices. Data mining tools for example help in making sense of explicit information to decision-makers. (Xu and Quaddus, 2005b)
The figure above, “illustrates the interplay among Nonaka’s knowledge creation modes, and hence may be useful in interpreting relationships between the four modes. Each arrow represents a form of knowledge creation. The arrows labeled A represent externalization; the arrows labeled B represent internalization; the arrows labeled C represent socialization; and the arrows labeled D represent combination.” (Alavi and Leidner, 2001, p. 116)

2.3 Knowledge Management

Some people believe that it is not possible to manage knowledge, since it is personal (tacit) and it is stored within the minds of people, so it simply cannot be managed as you could manage information for instance. (Cheema, 2010) With this in mind, knowledge management is “doing what is needed to get the most out of knowledge resources” (Becerra-Fernandez and Sabherwal, 2010, p. XIII). It helps in making important knowledge available when and where it is required. Knowledge management offers very promising results in the long run for the development and competitiveness of organizations. (Cheema, 2010)
The knowledge management approach was developed initially to tackle two challenges that organizations realized they should overcome in order to have and maintain a competitive advantage. The first was to have higher control on the increasing amount of useful information, by holding the sources of the information and not losing what already been located and captured. The second was to transform information so that it was useful in order to address business questions in an everyday more complex environment. (Figallo and Rhine, 2002)

Drucker (1994) known by many as the father of Knowledge Management defines the need for Knowledge Management as follows:

“Knowledge has become the key resource, for a nation’s military strength as well as for its economic strength . . . is fundamentally different from the traditional key resources of the economist—land, labor, and even capital . . . we need systematic work on the quality of knowledge and the productivity of knowledge . . . the performance capacity, if not the survival, of any organization in the knowledge society will come increasingly to depend on those two factors.”

Becerra-Fernandez and Sabherwal (2010, p.4)

There is no single agreed upon definition of knowledge management (Filemon, 2008, p.13), authors tend to define knowledge management in different ways. The following collection of definitions of Knowledge Management was obtained from the work of Jashapara (2004, p.11) and Kanagasabapathy, Radhakrishnan and Balasubramanian (2006, pp. 2-3).

“Knowledge Management is to discover, develop, utilize, deliver, and absorb knowledge inside and outside the organization through an appropriate management process to meet current and future needs.”

Ouintas, et al., 1997 cited in Kanagasabapathy, Radhakrishnan and Balasubramanian, 2006, p.2

“Knowledge Management is managing the corporation’s knowledge through a systematically and organizationally specified process for acquiring, organizing, sustaining, applying, sharing and renewing both the tacit and explicit knowledge of employees to enhance organizational performance and create value.”

“Knowledge Management is a process that helps organizations find, select, organize, disseminate, and transfer important information and expertise necessary for activities.”


“Knowledge Management is a process of knowledge creation, validation, presentation, distribution and application.”

**Bhatt, 2001** cited in Kanagasabapathy, Radhakrishnan and Balasubramanian, 2006, p.3

“Knowledge Management is getting the right information to the right people at the right time, helping people create knowledge and sharing and acting on information.”

**Holm, 2001** cited in Kanagasabapathy, Radhakrishnan and Balasubramanian, 2006, p.3

“Knowledge Management is the creation, extraction, transformation and storage of the correct knowledge and information in order to design better policy, modify action and deliver results.”

**Horwitch and Armacost, 2002** cited in Kanagasabapathy, Radhakrishnan and Balasubramanian, 2006, p.3

“Knowledge Management draws from existing resources that your organisation may already have in place – good information systems management, organisational change management, and human resources management practices.”


“Knowledge Management is any process or practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organisations.”

**Swan, et al., 1999** cited in Jashapara, 2004 p.11

“Knowledge Management is the explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organising, diffusion, use and exploitation, in pursuit of organisational objectives.”

**Skyrme, 1999** cited in Jashapara, 2004 p.11
“Knowledge Management is composed of all methods, instruments and tools that in a holistic approach contribute to the promotion of core knowledge processes.”


“Knowledge Management is the achievement of the organisations goals by making the factor knowledge productive.”

uit Beijerse, 2000 cited in Jashapara, 2004 p.11

“Knowledge Management refers to improving the ways in which firms facing highly turbulent environments can mobilize their knowledge base (or leverage their knowledge ‘assets’) in order to ensure continuous innovation.”


For simplicity and to continue with the real purpose of this research which is to investigate the factors that influence the adoption of KMS in Mexico. Knowledge Management will be treated all and any activities that foment the effective sharing, creating, storing and utilization of knowledge in an organization.

2.4 Knowledge Management Systems

Knowledge Management Systems are technologies used in order to reach an effective and efficient Knowledge Management. The primary task of a Knowledge Management System (KMS) is to be able to use knowledge obtained from the past in today’s activities and by doing so, increase the effectiveness of an organization. Knowledge management systems are used to enhance knowledge intensive tasks, processes and projects. (Maier and Hädrich, 2006)

Knowledge Management Systems are applications which result from a synergy of the latest technologies and social structural mechanisms. For example, the use of web-based conferencing to support interactive conversations while simultaneously exchanging large amounts of documentation between individuals located remotely. (Becerra-Fernandez and Sabherwal, 2010, p.8)

Knowledge Management Systems are considered a class of information systems (IS) which are used in order to be able to manage knowledge within organizations. Even though they are information systems, they do not necessarily involve an implementation of information
technology (IT). They are developed in order to support knowledge creation, storage/retrieval, transfer and application. (Alavi and Leidner, 2001)

The following is a quoted definition from the work of Hester which will be presented in the surveys of this research, as an introduction for the participants, it is the definition KMS to be used for the rest of this research work “A KMS refers to a generally IT-based system for managing knowledge in organization, supporting creation, capture, storage and dissemination of information. It can comprise a part of a Knowledge Management initiative. The idea of a KMS is to enable employees to have ready access to the organization’s documented base of facts, sources of information, and solutions.” (Hester, 2010, p.4)

2.5 The Knowledge Management Cycle

There are many different cycle models for the knowledge management process which show how the key processes of knowledge management are related to each other, “ranging from Davenport and Prusak’s (2000) 3-stage model (“Generate, Codify/Coordinate, Transfer”) to Ward and Aurum’s (2004) 7-stage (“Create, Acquire, Identify, Adapt, Organize, Distribute, Apply”).” (King, 2009, p. 6)

The approach I have chosen to present is that presented by Jashapara (2004) which is constituted by 5 generic activities: Discovering Knowledge, Generating Knowledge, Evaluating Knowledge, Sharing Knowledge and Leveraging Knowledge

![Knowledge Management Cycle](image)

Figure 4 The Knowledge Management Cycle (Jashapara, 2004)
2.5.1 Discovering Knowledge

In this stage it is necessary to differentiate data, information and knowledge. Previous history of management within the organization should be taken into account, in order to be able to get a higher perspective than that of a simple understanding of tacit and explicit knowledge.

2.5.2 Generating Knowledge

This is concerned with generating knowledge by pushing and inspiring organizational learning with the correct implementation of knowledge management tools and technology. The way in which knowledge gets created is by the four modes of knowledge which were identified by Nonaka (1994): Socialization (tacit knowledge to tacit knowledge), Externalization (tacit knowledge to explicit knowledge), Internalization (explicit knowledge to tacit knowledge) and Combination (explicit knowledge to explicit knowledge)

2.5.2.1 Critique to Nonaka’s SECI model

Even though Nonaka’s theory, based on knowledge being created through social interaction between tacit and explicit knowledge has been found by many as highly respected, there are others who have criticized his work. The following information is quoted from the work of Gourlay and Nurse (2005), which is a solid critique to this theory, shows how many different authors have criticized this theory over the years.

“Becerra-Fernandez and Sabherwal (2001), for example, show that each of the SECI modes is dependent on the presence of appropriate task characteristics. Poell and van der Krogt (2003), treating the modes as forms of learning, also report that the type of work involved influences how workers learn. More generally, Doyle (1985) and Glisby and Holden (2003) argue that the model rests on Japanese management cultural practices, and is thus not transferable to other contexts. Other empirical criticisms include Engestrom’s (1999) discovery that problem finding is an important part of innovation missing from the SECI model, and Poell and van der Krogt’s comment that Nonaka apparently assumes workers only learn within parameters set by managers. Their research points to the importance of self-organized learning, particularly in professional organizations.” (cited in Gourlay and Nurse, 2005, p. 294)

“Questions, however, have been raised about the theory itself. Adler (1995) suggested that Nonaka’s discussion of externalization (e.g., Nonaka & Takeuchi, 1995, pp. 13, 64–67) may not be generalizable, and pointed out that although the other modes had been previously studied, Nonaka and his colleagues neglected that research. Jorna (1998) argued that Nonaka neglected learning theory, especially in his discussion of tacit and explicit knowledge. He also charged Nonaka and his colleagues with misreading important organizational writers, and suggested that better accounts of Western philosophy were available than those used. In addition, Jorna argued
“knowledge conversion” entails semiosis, but the model lacks a semiotic framework.” (cited in Gourlay and Nurse, 2005, p. 295)

Nonaka’s work has been criticized by so many authors, and it is impossible to present all the information in this thesis, if you are interested in finding out more on the critiques to this theory, I suggest for you to start by reading the critique to Nonaka’s theory by Gourlay and Nurse (2005), titled “The flaws in the ‘engine’ of knowledge creation.”

2.5.3 Evaluating Knowledge

This consists of doing careful examination in order to evaluate how effective knowledge actually is with the use of knowledge management systems and strategic management perspectives. Exploring how the knowledge management systems are affecting management processes and how they can be improved in order to increase or obtain competitive advantage.

2.5.4 Sharing Knowledge

The ability to be able to share knowledge effectively and do this to its full potential is a difficult task for knowledge management. This is highly influenced by organizational culture, leadership and employee involvement.

2.5.5 Leveraging Knowledge

This activity seeks to increase the level of intellectual capital by having proper implementation of knowledge management in order to pursue organizational learning. Knowledge is critical for economic growth in organizations and it needs to be nurtured and measured in order to achieve and obtain its full potential benefits.

2.6 Knowledge Management in Mexico

The process of Knowledge Management in Mexico began in the early 1980’s, throughout the first few years this concept was only discussed in academia but between the years of 1989 and 1995 this began to spread into other areas as well. Those years marked the first major phase of Knowledge Management development within the country. (Lelic, 2003)

Within the years of 1996 and 2000, research and implementation of Knowledge Management was growing ever faster, led by the CKS (The Centre of Knowledge Systems at the Tecnologico de Monterrey) which is considered to be the forefront of Knowledge Management
in Mexico. It was during these years where large corporations began to invest strongly in Knowledge Management and many consultancy firms began to offer these services as well. (Lelic, 2003)

Today consultancy services in regard to every possible aspect of Knowledge Management are highly available, as well as the skills and capabilities amongst professionals who carry out these tasks. Training and education in this area is at a good competitive level when compared to other countries in the World. (Lelic, 2003)

Studies have shown that many organizations which have had plans to implement Knowledge Management have still failed to do so. Mainly larger corporations have done an investment while smaller firms still tend to see this as non-essential for day to day business and are reluctant to invest their time, money and resources to such initiatives. (Lelic, 2003)

2.7 Previous studies on Knowledge Management adoption

2.7.1 Adoption and diffusion of knowledge management systems: an Australian survey

Xu and Quaddus (2005a) in this study sought to find out the factors which influence the adoption and the diffusion of knowledge management systems in Australia. The authors used a mixed method approach for their research which was carried out in three stages.

Throughout the first stage they created a model of KMS diffusion in organizations by combining the results of a qualitative study, from which they identified 16 factors and 72 unique variables, and literature review. For their second stage they created a questionnaire based on the model that they had developed in the initial stage and conducted a pilot survey in twelve randomly selected Australian companies. Finally for the third stage they conducted a national survey with the top 1,500 organizations in Australia, which was analyzed using structural equation modeling with LISREL software.

The results of this study show that “individual factors” as well as “task complexity” are very influential to the “perceived usefulness” of a KMS, and the “perceived usefulness” is highly influential on the “intention of adoption” of a KMS and its process of diffusion.
2.7.2 Knowledge-Based Systems: Examining a model of knowledge management systems adoption and diffusion: A Partial Least Square approach

Xu and Quaddus (2005a) at the end of their previous study “2.7.1” mentioned that many hypothesis tested were contradictory to the findings of previous studies carried out by others and that more empirical studies on KMS were needed in order to gain comprehensive knowledge. This is a more recent empirical study carried out by them in regard to this topic.

Xu and Quaddus (2011) in this case follow a very similar structure of research as in their previous study. The first two stages are mentioned exactly the same and with the same results as before, which implies they are the exact same phases from the previous study. For the third phase they conducted a two-round state-wide survey with the top 300 organizations in Western Australia in 2002. The same 16 Hypothesis tested on the previous study are the ones tested in this study.

The results of this study show that “individual factors”, “task complexity”, “external inspiring” and “organizational factors” are those influential to the “perceived usefulness” of a KMS, and the “perceived usefulness” is highly influential on the “intention of adoption” of a KMS and its process of diffusion.

2.7.3 Factors affecting knowledge management adoption of Taiwan small and medium-sized enterprises

Hsu, Lawson and Liang (2007) carry out an empirical study to investigate the KM adoption behavior of Taiwanese SMEs. They specifically wanted to understand how diverse industrial characteristics, enterprise management, and the degree of IT application affect the adoption of knowledge management in small and medium-sized firms. Aside from this they also wanted to see how the degree of adoption of knowledge management in an enterprise influences its performance.

The research carried out suggested that all three factors, that is “industrial characteristics”, “enterprise management” and the “degree of IT application” affect the adoption of knowledge management. The results show that out of the three the “degree of IT application” is the most influential; therefore enterprises need to have an efficient and capable application of IT in order to truly be able to adopt knowledge management.

The results also show that the application of IT together with the complexity of product management and marketing have a positive effect on an organizations acknowledgement of the importance of knowledge management. Results also show that the depth of adoption, range and intention of KM had no influence on financial and managerial performance, but the coverage
depth of KM does affect the performance by providing a higher amount of valuable information as well as better knowledge acquisition mechanisms for decision making.

2.7.4 Critical Success Factors Affecting Knowledge Management Adoption: A Review of the Literature

Al-Mabrouk (2006) points out 12 Critical Success Factors (CSF’s) identified from the literature, which were believed to be critical and could possibly affect the success of knowledge management adoption in any organization. Management leadership, Culture, Information Technology, Strategy, Measurement, Organizational Infrastructure, Processes, Motivation, Resources, Training and Education, Human Resource Management and Marketing.

From the 12 factors identified and studied which are explained in more detail in this study, the four found most critical for success in knowledge management adoption were: Management Leadership, Culture, Information Technology and Strategy. Those factors which were found to be important but not very important were Motivation, Human Resource Management, Training and Education, and Resources. With a low ranking of importance the factors of organization infrastructure, processes and marketing were found. The least important CSF identified was Measurement.

2.7.5 The Critical Success Factors for Knowledge Management Adoption: A Review Study

OuYang, Yeh and Lee (2010) in this study do a complete review of critical influence factors that may influence a successful knowledge management adoption. They developed a classification scheme for these identified factors based on 4 different categories: organizational factors, individual performance, knowledge management capability and organizational performance.

A total of 91 knowledge management articles collected were used in order to be able to identify factors within these categories which could influence the success of knowledge management. The most important factors identified for each category were defined as critical success factors and are presented on the figure below.
2.7.6 A Comparison of the Influence of Social Factors and Technological Factors on Adoption and Usage of Knowledge Management Systems

Hester (2010) in this study uses the Innovation Diffusion Theory (IDT) in order to examine factors which influence the use and adoption of knowledge management systems. The IDT model was extended in order to include “reciprocity expectation” which is considered an important factor when practices and technology used for knowledge management are examined.

Four social factors and four technological factors were studied. The social factors were: Voluntariness, Visibility, Image, and Reciprocity Expectation. The technological factors were: Ease of Use, Trialability, Relative Advantage, and Result Demonstrability. Voluntariness, Visibility, Reciprocity Expectation, and Result Demonstrability were found to have a positive effect on the adoption level. Visibility, Trialability, and Relative advantage were found to have a positive effect on the usage level.

2.7.7 KMS Adoption in Organizations

Kaldi, Ahaie and Khoshalhan (2008) through an extensive literature review show in this study that the decision to adopt knowledge management systems in an organization may be influenced by diverse factors such as perceived characteristics of the system, firm characteristics,
adopter characteristics and environmental factors. The acceptance by the user is also influenced by many factors such as individual and organizational factors as well as system characteristics; the acceptance in turn if highly influential on the effectiveness of a knowledge management system.

With the results from the study and in combination with the technology acceptance model (TAM), the authors show a model for user’s acceptance of knowledge management systems “KMS Acceptance Model”, as well as a thorough KMS Adoption Model.

2.7.8 Application of the technology acceptance model to a knowledge management system

Money and Turner (2004) in this study seek to investigate the application of the technology acceptance model (TAM) to user acceptance of a knowledge management system. In order to do this the authors developed a 15 item survey to measure four different constructs: perceived usefulness, perceived ease of use, behavioral intention to use, and system usage. The survey aimed to clarify six previously defined hypotheses created with the use of TAM, and the participants were employees in two major Northeast U.S. metropolitan areas.

The results show that perceived usefulness has a positive relation to behavioral intention. Perceived ease of use has a positive influence on behavioral intention. Behavioral intention has a positive influence on system usage. Perceived usefulness and perceived ease of use have a positive influence on behavioral intention and system usage. The only inconsistency with previous TAM research was on the behavioral intention construct.

2.7.9 Technology Implementation Management in Law Enforcement: COPLINK System Usability and User Acceptance Evaluations

Lin, Jen-Hwa Hu, and Chen (2004) perform two user-centered evaluation studies on a knowledge management system known as COPLINK which is intended to aid law enforcement officers in their crime fighting activities, the studies mainly focus on user-acceptance and the usability of the system. The study is carried out using the theory of planned behavior (TPB) in combination with the technology acceptance model (TAM). A questionnaire survey including 23 items was applied and participants included more than 280 police officers identified as target users of COPLINK.

The results show that efficiency gain and subjective norm have a high influence on the determination of perceived usefulness, which itself affects the attitude and behavioral intention, perceived ease of use affected attitude.
2.7.10 It's Easier to Ask Someone I know: Call Center Technicians Adoption of Knowledge Management Tools

Downing (2004) uses the innovation diffusion theory (IDT) primarily to understand what factors discourage technicians to adopt knowledge management tools. The research took place in the organization known as Techtronics using a descriptive case study method.

The results showed that since initially the tools were in beta version, that first impression the technicians had was too difficult to overcome even though the tools were better and fully functional later on. Amongst the other reasons found for not adopting was the lack of an incentive and reward program, difficulty using a tool or the employees were not trained to use one, tool taking too much time, easier to ask someone else than to use the tools, tools not informative enough, no support on tools from top management and tools not fulfilling employee’s needs.

2.8 Theories on technology adoption

According to Straub E.T. (2009) an adoption theory looks into the individuals and the choices they take to either accept or reject an innovation. It is a particular way of looking into change, not as a whole, but as smaller pieces of which it is composed of. It considers several factors such as social pressure and time in order to be able to explain how individuals choose to adopt or reject an innovation, which can be defined as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 1995, p.11).

There are several adoption theories in existence; adoption is usually understood through some kind of change in behavior, therefore adoption theories are measured in terms of behavioral change, while its predictors are understood through contextual, affective and cognitive factors (Straub, 2009). An individual’s acceptance of a technology is therefore generally explained by his/her behavioral intention (Lin, Jen-Hwa Hu, and Chen, 2004).

Among the theories on technology adoption that prevail today we can find the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975), the Theory of Planned Behavior (TPB) (Ajzen, 1991), the Diffusion of Innovation theory (DOI) (Rogers, 1995), the Technology Acceptance Model (TAM) (Davis, Bagozzi and Warshaw, 1989), the Concerns Based Adoption
Model (CBAM) (Hall, 1979), the Innovation Diffusion Theory (IDT) (Moore and Benbasat, 1991), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, et al., 2003). These theories will be explained in detail through the following sub-sections.

2.8.1 The Theory of Reasoned Action – TRA

The theory of reasoned action has its roots in social psychology; it aims to predict the behavior of individuals. The idea is basically that the behavioral intention is highly dependent on an individual’s attitude and subjective norms. The attitude towards a behavior is highly influenced by what a person believes about a certain behavior and a personal evaluation of the behavior. The subjective norms are highly influenced by the motivation towards a certain behavior and the how we perceive the opinions of referent others about performing a certain behavior (Lin, Jen-Hwa Hu, and Chen, 2004). The basic premise of TRA is that individuals will adopt a behavior if they believe it will have positive outcomes (Money and Turner, 2004).

Fishbein and Ajzen (1975), state that attitudes and norms can’t be given the same level of importance in every given scenario. "Indeed, depending on the individual and the situation, these factors might be very different effects on behavioral intention; thus a weight is associated with each of these factors in the predictive formula of the theory. For example, you might be the kind of person who cares little for what others think. If this is the case, the subjective norms would carry little weight in predicting your behavior" (Miller, 2005, p.127).

The key normative influence in organizations can be understood as the opinion of leaders, peers and coworkers. Conformity is usually enforced through internalization, and members begin to see the norms of the group as their personal values. (Banerjee, Siriwardena and Iqbal, 2010)
2.8.2 The Theory of Planned Behavior – TPB

The theory of planned behavior is basically an extension of the theory of reasoned action (TRA), but it includes behavioral control in order to be able to tackle the situations in which the individuals don’t have the capability or resources needed to perform a certain behavior. TPB suggests that an individual’s behavior is not only determined by attitude and subjective norm, but also by perceived behavioral control (Lin, Jen-Hwa Hu, and Chen, 2004).

Therefore this can be considered as an extension to include behaviors which are non-volitional in order to predict behavioral intention and actual behavior (Ajzen, 1991). One of the reasons this extension took place was because actions that were in some way determined by factors beyond an individual’s voluntary control, could not be analyzed by TRA (Sheppard, Hartwick and Warshaw, 1988).

The new determinant added from TRA “perceived behavioral control” relates to the perceived ease or difficulty of performing a certain behavior, it is highly related to previous experiences of the individual and foreseen impediments and obstacles. The importance of each of the three determinants (attitude towards behavior, subjective norm, perceived behavioral control) will vary according to situations and behaviors (Ajzen, 1991).
2.8.3 The Diffusion of Innovation Theory - DOI

This theory began in 1962 with the work of Everett Roger’s, and is today one of the most influential in understanding if an innovation will be adopted or not by a certain population. The structure developed by Rogers can aid in understanding both individual and collective adoption (Straub, 2009).

Roger’s (1995, p. 5) defines diffusion as “the process by which an innovation is communicated through certain channels over time among members of a social system” and innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption”.

“The adoption decision process is composed of five main stages through which individuals undergo when deciding to adopt an innovation or not” (Straub, 2009, p. 630).

1. The awareness of the innovation; influenced by personal characteristics, socioeconomic factors and the access to change agents
2. Persuasion; the individual gains enough knowledge to make a personal judgment in order to either favor or disfavor an innovation
3. Individual decides to adopt or discard the innovation
4. The individual acts on his decision
5. Confirmation; The individual reflects on his decision
“Rogers identified five attributes of an innovation which ultimately influence its adoption: relative advantage, compatibility, complexity, triability and observability.” (Straub, 2009, p. 630).

1. **Relative Advantage** – The perception of whether or not an innovation is better or worse than others, those that are believed to be better will usually be adopted faster.
2. **Compatibility** – It’s how the innovation fits in place from an individual’s perspective, how it is related to previous or past ideas he may have, those that he can understand will be adopted easier.
3. **Complexity** – How difficult an innovation may be to understand, this is negatively related to adoption rates.
4. **Triability** – The accessibility of an innovation to experiment on, when individuals can try out the innovations it makes the adoption easier
5. **Observability** – It can be thought of as unspoken peer pressure, when everyone is using an innovation even those who would not have adopted the innovation before begin considering it.

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![Diagram](image.png)

**Figure 8 The Diffusion of Innovation Theory (Roger’s, 1995)**
Looking at the model in a simpler manner we can infer that the factors influencing the adoption of an innovation are the perceived characteristics.

![Diagram showing factors influencing adoption](image)

**Figure 9 Factor relation to adoption in DOI (IDT, 2009)**

### 2.8.4 The Innovation Diffusion Theory – IDT

Just as TPB is an extension of TRA, the Innovation Diffusion Theory can be considered as an extension to the Diffusion of Innovation Theory. The most important difference between the two is the level of analysis. In Roger’s Diffusion of Innovation theory the attributes are defined in a way that they focus on the innovation itself. Moore and Benbasat changed the definitions in their Innovations Diffusion Theory in order to describe the behavior of using an innovation. The analysis level therefore is at a behavior level, and the behaviors are labeled as “Perceived Characteristics of Innovating (PCI)” (Hester, 2010)

Moore and Benbasat identify eight factors which have an influence on the adoption of technology: voluntariness, image, relative advantage, compatibility, ease of use, result demonstrability, triability and visibility. (Carter and Belanger, 2003)
These are the construct definitions proposed by Moore and Benbasat: (Hester, 2010)

1. **Voluntariness** – the level to which using an innovation can be considered as voluntary or as free will
2. **Image** – the level to which using an innovation can enhance the perception others have towards you within the organization
3. **Relative advantage** – if using an innovation can yield better results or is better in some way than the current way of doing things
4. **Compatibility** – If there is consistency with previous experiences and the values of the potential adopters
5. **Ease of use** – how easy an innovation can be learned and used
6. **Result demonstrability** – the level in which results can be seen by others
7. **Triability** – The extent to which an innovation can be experimented prior to adoption
8. **Visibility** – How visible the usage of an innovation is within the organization

I have created a model as a summary of the construct definitions proposed by Moore and Benbasat, with the aim of illustrating their Innovation Diffusion Theory.

![Figure 10 The Innovation Diffusion Theory](image-url)
2.8.5 The Concerns Based Adoption Model – CBAM

Straub (2009) in his research article on technology adoption, states that CBAM has a very different approach to look into the adoption of innovations; it does so from the perspective of the adoptees. CBAM allows to get a perspective on the concern’s individuals may have which may influence in the end their decision to adopt or not an innovation. The goal of CBAM was “to ease the problems diagnosing group and individual needs during the [innovation] adoption process (Hall and Loucks, 1978 in Straub, 2009 p. 633)”.

The model resides on the premise that individuals who will experience change begin to ask themselves certain questions regarding their personal concerns. “In general, early questions are more self-oriented: What is it? and How will it affect me? When these questions are resolved, questions emerge that are more task-oriented: How do I do it? How can I use these materials efficiently? How can I organize myself? and Why is it taking so much time? Finally, when self- and task concerns are largely resolved, the individual can focus on impact.”(Loucks-Horsley, 1996)

The model has the following perspective in regard to the change process (Straub, 2009)

1. Change is not an event, it is a process
2. The focus should be in individuals, because organizations won’t change unless it’s members change
3. Since the change is a personal experience, how the change is perceived will ultimately influence the outcome
4. Adoptees pass through different stages in terms of their emotions towards an innovation
5. A model based on the individuals can help the process go smoother
6. Those responsible for change should work in an adaptive way, with regular monitoring.

The model looks primarily into doing appropriate intervention when it is needed according to the stage of concern of an individual (awareness, informational, personal, management, consequence, collaboration, refocusing) as well as by the level of use of an innovation (no-use, preparation, mechanical, routine, refinement, integration, renewal). (Dirksen and Tharp, 1997)

2.8.6 The Technology Acceptance Model – TAM

The technology Acceptance Model was initially introduced by Davis (1986) it is an adaption of the Theory of Reasoned Action, and it was adapted specifically to be able to model user acceptance of information systems. Its primary goal is to give an explanation of the factors which ultimately define the acceptance of a technological innovation, across different organizational contexts, technologies and
groups of users. It allows us to predict if a system will be unacceptable in order to be able to change what is necessary so it becomes acceptable. One of the main ideas is to be able to trace external factors into personal beliefs, intentions and attitudes. (Davis, Bagozzi and Warshaw, 1989)

TAM states that the decision an individual takes in order to accept or reject a technology can be explained by his behavioral intention, which itself can be explained by his perception or the technology’s perceived usefulness and its perceived ease of use. (Lin, Jen-Hwa Hu, and Chen, 2004)

Davis (1989, p. 320) defines perceived usefulness as “the degree to which a person believes that using a particular system would enhance his or her job performance” and perceived ease of use as “the degree to which a person believes that using a particular system would be free of effort”

TAM is similar to TRA in the sense that both of them hypothesize that the actual system usage is influenced by behavioral intention to use, but they differ in what determines behavioral intention. In TRA behavioral intention is determined by subjective norm and attitude. In TAM behavioral intention is determined by perceived usefulness and attitude, perceived usefulness is influenced by perceived ease of use. Davis, Bagozzi and Warshaw (1989) found that subjective norm was not significant, so they removed it from the model. (Rivera Green, 2005)

![Figure 11 The Technology Acceptance Model (Davis, Bagozzi and Warshaw, 1989)](image)

The TAM model works very well together with the TPB model since they both share an attitude-intention-behavior thread. (Lin, Jen-Hwa Hu, and Chen, 2004) TAM in fact is compatible with many other theories as well, and is considered one of the most widely applied models when investigating technology acceptance. (Kaldi, Aghaie and Khoshalhan, 2008)
The most common extension to TAM is known as TAM2 and it was developed by Venkatesh and Davis (2000) in which they explain how perceived usefulness and usage intentions, considering determinants as social influences and cognitive processes, ultimately affect technology acceptance. Within the social influences they include subjective norm, voluntariness and image. Within the cognitive processes they include job relevance, output quality, result demonstrability and perceived ease of use. Subjective norm is brought back from TRA and experience and voluntariness are thought to have effects on it. (Rivera Green, 2005)

Venkatesh and Davis (2000) define the new added factors as follows:

- **Image** – The response to social influence to establish or maintain a good image within a group.
- **Job Relevance** – The degree to which an innovation is applicable or not to an individuals job
- **Output Quality** – How well a system performs the tasks it is supposed to accomplish in order to get a benefit off of using the innovation

![Figure 12 The Extended Technology Acceptance Model ‘TAM2’ (Green, 2005)](image-url)
- Result Demonstrability – How easy it is to perceive the advantage or the results of using an innovation.

2.8.7 The Unified Theory of Acceptance and Use of Technology - UTAUT

The Unified Theory of Acceptance and Use of Technology model was created after an empirical comparison of eight theoretical models on the adoption of technology: TRA, TAM, MM (Motivational Model), TPB, The model of PC utilization, IDT and social cognitive theory. The best parts of each model were taken in order to create UTAUT and were empirically tested with results proving to be very positive. (Rivera Green, 2005) Even though the results were quite positive, it is a model which has not been used a lot since it was published; the model still needs further validation since it is still considered relatively new. (Straub, 2009)

The UTAUT model “was formulated, with four core determinants of intention and usage, and up to four moderators of key relationships”. The four core determinants are: performance expectancy, effort expectancy, social influence, and facilitating conditions. The four key moderators are: gender, age, voluntariness and experience. (Venkatesh, et al., 2003, p. 425)

Performance expectancy (perceived usefulness) – the level that an individual believes he will be benefitted in his job by using the system. The root constructs from other models for performance expectancy are perceived usefulness, extrinsic motivation, job-fit, relative advantage, and outcome expectations. (Venkatesh, et al., 2003)

Effort expectancy (perceived ease of use) – how easy it is to use a system. The root constructs from other models for effort expectancy are perceived ease of use, complexity and ease of use. (Venkatesh, et al., 2003)

Social influence (subjective norms) – the level to which an individual thinks that other people who are important believe he should use the system. The root constructs from other models for social influence are subjective norm, social factors, and image. (Venkatesh, et al., 2003)

Facilitating conditions – The level to which an individual believes that there is an infrastructure both technical and organizational to support the use of the system. The root constructs from other models for facilitating conditions are perceived behavioral control, facilitating conditions and compatibility. (Venkatesh, et al., 2003)
Figure 13 The Unified Theory of Acceptance and Use of Technology (Venkatesh, et al., 2003)
Chapter 3 – Research Framework

This chapter presents the research framework which will be used in this research. It describes which factors are composing this research framework, as well as from which theories and/or previous studies each of the hypotheses to be tested was adapted.

Through the extent literature review presented in chapter 2, it is possible to see that the most used model for technology acceptance in previous studies of knowledge management adoption is the Technology Acceptance Model (TAM). From the literature review we can also see that TAM is highly compatible with many other theories and is easy to expand upon. I have chosen to use the TAM model for this research but I will be extending it to include other factors from some of the other models in order to be able to analyze the case in a higher extent.

From the TAM model I will be using the factors of perceived usefulness, perceived ease of use, attitude towards use and intention to use. From the TAM2 model I will use subjective norm, image, job relevance and output quality, but I have chosen to rename this factor as efficiency gains since I believe it is easier to understand. And finally from the IDT model I will use the voluntariness and triability factors. All of these factors have already been well defined in the literature review section, please consult chapter 2 if you have any questions.

The following hypotheses have been inspired and created based on theories of technology adoption and research models of previous studies on knowledge management adoption, available in chapter 2. Hypotheses 1,2,3,4,5,6,7,8,13 and 15 can be understood by looking into the TAM2 model and the research of Lin, Jen-Hwa Hu, and Chen (2004) and the work of Kaldi, Aghaie and Khoshalhan (2008). Hypotheses 9, 10 and 11 can be understood by looking into the IDT model and the research from Hester (2010); Hypothesis 9 was inferred and is not explicitly stated in any of the research papers previously presented, however it had a resulting t-value of 2.49 on a previous run of this same survey questionnaire conducted online (see section 4.6), and therefore I decided to include it in the final application of this survey. Hypotheses 12 and 14 can be understood by looking into the TAM model and the research of Lin, Jen-Hwa Hu, and Chen (2004). Hypothesis 2 and 12 are also present in TPB.

The factors in the research framework were chosen by me, based on the theories on adoption of technology and some of the previous research’s presented in chapter two, which follow this style of research. I chose as many different factors and their relations as possible, by electing those which were not only present in the theories but which were used in previous research’s as well, in order to be able to test all possible relations that I considered important,
rather than only testing a really small amount of factors, which would probably lead to a result with a very low amount of valid hypothesis.

Factors and hypothesis from UTAUT, CBAM and TRA were not included in this research, first of all because they were not present or used in any of the previous research’s carried out in regards to the adoption of knowledge management, and furthermore, no factors were chosen from UTAUT because as was mentioned earlier in 2.8.7, it is relatively new and thus untested. CBAM wasn’t used since it focuses on individual needs, during the adoption process and that is irrelevant in this case. TRA was also discarded since TPB is newer version considered to extend from TRA.

\[ H1: \text{Subjective norm will have a positive effect on perceived usefulness} \]
\[ H2: \text{Subjective norm will have a positive effect on image} \]
\[ H3: \text{Subjective norm will have a positive effect on intention of use} \]
\[ H4: \text{Image will have a positive effect on perceived usefulness} \]
\[ H5: \text{Job Relevance will have a positive effect on perceived usefulness} \]
\[ H6: \text{Efficiency gains will have a positive effect on perceived usefulness} \]
\[ H7: \text{Perceived ease of use will have a positive effect on perceived usefulness} \]
\[ H8: \text{Perceived ease of use will have a positive effect on intention to use} \]
\[ H9: \text{Triability will have a negative effect on perceived usefulness} \]
\[ H10: \text{Triability will have a positive effect on intention to use} \]
\[ H11: \text{Voluntariness will have a positive effect on Attitude towards use} \]
\[ H12: \text{Attitude towards use will have a positive effect on intention to use} \]
\[ H13: \text{Perceived usefulness will have a positive effect on intention to use} \]
\[ H14: \text{Perceived usefulness will have a positive effect on attitude towards use} \]
\[ H15: \text{Perceived ease of use will have a positive influence on attitude towards use} \]
The following model illustrates the research framework intended for this study:

Figure 14 The Research Framework
Chapter 4 – Research Methodology

This chapter presents the methodology that was followed for this research; Knowledge claim, purpose of the research, approach, research method, data collection, the questionnaire. This chapter also explains how validity and reliability were measured.

4.1 Knowledge Claim

This research is based on the positivist paradigm. It is the assumption of this paradigm that reality does not change, it is fixed and the World is ordered according to an objective truth. Generalizable theory can be developed to describe this World accurately. The aim of this paradigm is to discover what exists through prediction and control, the theory in this paradigm is established deductively; in this case the factors which influence the adoption of knowledge management systems in Mexico. It works really well with the quantitative methodology, as it usually includes statistical testing of hypotheses (such as survey questionnaires and randomized control trials). (Bunniss and Kelly, 2010)

4.1.1 Hypothetico-Deductive

Through this study initial hypothes have been deduced and defined from the literature review, in order to be tested and further prove their validity in my own research model. This goes in line with the Hypothetico-Deductive method, in which predictions are made from the theory and then the intention is to test these predictions, and from the results obtained generate new hypothesis (Shuttleworth M., 2008). The same process will be done in this research, the hypothesis will either be wrong or right, and in the end I will present the resulting model obtained from the results, which would basically describe the new hypothesis induced from the results
4.2 Research Purpose

According to Isaias and Nunes (2012) a research can fall into one of three categories: exploratory, descriptive or explanatory.

Exploratory research deals with gathering information and creating new ideas about a problem which is not highly known, this type of research usually serves as a prelude for other types of research. Its main purpose is to provide an understanding of an area or topic that is currently not so well understood (Isaias and Nunes, 2012).

Descriptive research deals with describing a situation or problem. It tends to be better structured than exploratory research is, it has a more reliable or solid bases of ideas and methods. You usually analyze things with pre-existing analytical categories. Statistics and numerical data can be used to provide the description (Isaias and Nunes, 2012).

Explanatory research tends to be more concerned with causes; it seeks to provide explanations about the relations between two or more phenomena. Hypotheses testing with surveys and quantitative methods are highly used in this type of research (Isaias and Nunes, 2012).

This research falls more into the descriptive research category since the research methods and theories used are highly reliable, the categories are all pre-existing as they have been used in previous researches and I will be using statistics and numerical data to analyze the results. Once the hypotheses have been tested, some suggestions for action will be provided in the discussion, in order to provide organizations with some ideas to increase the knowledge management adoption level based on the results. According to Dalerum (2011), that part of the research can be considered to fall into the explanatory category.

4.3 Research approach

According to Creswell (2009) there are three main types of research design: Quantitative, Qualitative and Mixed Methods.

Quantitative research refers to a method which facilitates the testing of objective theories by examining the relationships existing between different variables, which can be measured in terms of numbers and which can be analyzed with the use of statistical procedures (Creswell, 2009). Quantitative research is also known as hypothesis-testing research. Through statistical testing result findings tend to approve or reject hypothesis. Quantitative research tends to be deductive in nature, it is considered to contribute to scientific knowledge with theory testing. In
this type of method it is required to have tightly controlled conditions, and therefore there is a sacrifice of the richness and depth of meaning that participants could provide (Jha, 2008).

Qualitative research refers to a method which facilitates the possibility of exploring and understanding the meaning that a social or human problem is given by an individual or by groups of individuals. In this type of method data is usually gathered in the participants setting, while the researcher gives an interpretation to the meaning people give to the data, which is usually in the form of words and images (Creswell, 2009). Qualitative research involves the use and collection of many empirical materials, such as: personal experience, life story, interview, historical, observational, interactions, introspective and visual texts; the routines, meanings and problematic moments in individuals’ lives. Qualitative research is usually inductive in nature (Jha, 2008).

Mixed methods research involves the need to analyze both types of data, qualitative and quantitative, and by using both approaches in tandem the overall strength of the study rises (Creswell, 2009).

For this case the most suiting approach is the quantitative research methodology, having as its main purpose to investigate the factors which influence the adoption of knowledge management systems in Mexico. The approach should be quantitative since all data will be transformed into numbers which can then get statistically analyzed in a structured and formalized manner in order to obtain the results. Quantitative research is also known as hypothesis-testing, which is what will be carried out in this research to all the hypotheses deduced from the theory. The results will be obtained through a deep analysis of the existing relations amongst the factors that relate to the adoption of knowledge management systems, and these results are based on statistics and numbers.

4.4 Research Method

According to Yin (2009, p. 8) there are 5 types of research methods (Experiment, Survey, Archival Analysis, History, Case Study), when each of these should be used depends on three conditions: “(a) the type of research question posed, (b) the extent of control an investigator has over actual behavioral events, and (c) the degree of focus on contemporary as opposed to historical events”
Table 3 Relevant Situations for Different Research Methods (Yin, 2009)

<table>
<thead>
<tr>
<th>Method</th>
<th>Form of Research Question</th>
<th>Requires Control of Behavioral Events?</th>
<th>Focuses on Contemporary Events?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>how, why?</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Survey</td>
<td>who, what, where, how many, how much?</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Archival Analysis</td>
<td>who, what, where, how many, how much?</td>
<td>no</td>
<td>yes/no</td>
</tr>
<tr>
<td>History</td>
<td>how, why?</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Case Study</td>
<td>how, why?</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

The main purpose of this study, as is defined by the research question, is to identify “what” are the factors influencing the adoption of knowledge management systems. So as seen on the case above, this type of question can be answered by both survey and archival analysis method, but in this particular case the answer to this question cannot be obtained through the examination of archival records. The situation does not require any control over behavioral events and it does focus on contemporary events, therefore the most appropriate method for this research is the survey method.

A survey provides us with the possibility of being able to numerically describe the opinions, trends and attitudes of a population by studying a sample of that population. Thanks to the results that are obtained from the sample population it is possible to generalize the results to the population (Creswell, 2009).

In order to be able to reach the objectives of this research, first a thorough literature review will take place in order to fully understand the subject in study, in this case knowledge management, as well as what and how previous studies regarding its adoption have taken place. After this an investigation will take place in order to identify the factors which influence knowledge adoption in Mexico, in order to obtain quantities data through the survey application. Finally analysis of the collected data will take place in order to obtain the results desired by this research through statistical testing and mapping.

4.5 Sample Selection and Data Collection

According to Creswell (2009) the following aspects of the population and sample are essential to describe in a research plan: Identify the population in the study, identify if the sampling design for this population is single staged or multi-staged, Identify the selection process for individuals, identify if the study will involve stratification(specific characteristics of individuals) of the population, discuss the procedures for selecting the samples, indicate the number of people in the sample and procedures used to compute this number.

Voluntary response surveys are identified this way because the participants, in other words “the sample”, chose to participate in the survey. A voluntary sample is therefore non-
random. There are four types of non-random sampling: systematic sampling, convenience sampling, stratified sampling and cluster sampling. Systematic sampling consists in establishing a start point and then follow on to the next subject in a systematic manner, for instance every fifth subject. Convenience sampling, as its name suggests is the easiest or most convenient, for instance the first persons to pass by. Stratified sampling, divides the population into groups and then survey is applied to a specific group. Cluster sampling is similar to stratified sampling, in the sense that the population is divided into groups, but it focuses on increasing sampling efficiency by reducing the population size, and not in increasing precision by grouping for a specific target. (Teixeira, 2010)

The theoretical population of this study comprises of any and all employees of business organizations working or hired in Monterrey, Mexico’s economic capital. Any individual who is working in an organization in the city of Monterrey can participate in this survey. The sampling was voluntary and it followed a mixture of convenience-cluster types of non-random sampling and it did not involve stratification. A wide range of respondents were desired representing various sizes and types of organization in Mexico, as well as with different levels of adoption of knowledge management.

During 5 days with the help of four other people the survey was handed out as an invitation and an opportunity to participate in this study to people in several industrial and corporate locations in Monterrey, including locations such as “Las Torres Moradas”, “Edificios Corporativos Valle Oriente”, “Corporativo Santa María”, “Torre Ave”, “Torre Connexity”, “Torre Murano”, “Horizontes Obispado”, “Paseo Tec”, “Tevo”, etc., where hundreds of different companies have their offices located in this city.

A total of 1000 surveys were distributed. The decision to eliminate 47 of these was made since they were either incomplete, that is, lacking one or more answers in the survey, or the respondent had marked more than one answer for one or more of the questions in the survey. A total of 953 valid responses were collected, giving a total valid response rate of 95.3%.

The amount of responses received is highly reasonable when compared to the previous studies in the literature review, for instance the study of Hester (2010) had a total of 129 respondents, the study of Xu and Quaddus (2011) had a total of 25 in their pilot and 149 in their state-wide, the study of W. Money and A. Turner (2004) had a total 35 even when there were incentives given out to the participants who answered the survey, since they could charge the time spent on the survey, less than 20% of employees answered it and many did it in an incomplete or invalid way, proving it is quite hard to obtain valid responses for this type of survey and that 953 is a very reasonable number to sample the population for this particular case. Further studies could be carried out in the future involving the participation of Mexican companies nationwide with the help of INEGI, an institute dedicated to conduct statistical analysis in Mexico in a wide range of study areas. This could be done in order to obtain a larger
sample and thus better results, but there would be a necessity of funding in order to be able to conduct this survey nationwide.

4.5.1 Sampling Bias

Bias, is one of the biggest problems that can be encountered in sampling. The problem being that when you have a biased sample your data is therefore not absolutely valid and consequently any of the conclusions that you draw from that sample may possibly be incorrect. Bias will very likely always be present in any sample data; it is the role of the researcher to try to keep this bias to it’s very least. (Pande, Neuman, Cavanaugh, 2013)

The highest potential bias in this research, is therefore only gathering data from a few participants, which may not actually reflect the reality of the entire possible population, Monterrey City. In order to minimize this, as stated previously in section 4.5, the sample was obtained by going to several corporate locations, where many companies of different sizes and economic statures are present, to obtain a more heterogeneous sample. Another potential Bias is that since the surveys were anonymous, someone may have decided to participate more than once, although this is highly unlikely.

Also since the bigger the amount of responses obtained, the higher the accuracy of the results is (Pande, Neuman, Cavanaugh, 2013); the number of surveys was set at 1000.

But even by taking these measures to try to keep the potential Bias to a minimum, I do want to point out there is indeed a possibility of Bias being present in the results of this study. Since convenience sampling was used, therefore not every person who is working in Monterrey had the same possibilities of participating in the survey and furthermore those who did participate in the survey did so voluntarily. Therefore it is quite possible that those who did not wish to participate, or did not have the opportunity at all, may have other thoughts or opinions in regards to knowledge management.

The persons who were helping me to apply the survey may have been able to target a certain population more than another. People who looked aggressive or in a hurry maybe were not approached as much as other possible candidates. And also since the survey was anonymous, there is the possibility that maybe someone could have decided to participate more than once. Therefore the possibility of a bias can indeed be present in this sample. This possible Bias will be further discussed in section 5.2.1 together with an analysis of the sample population.
4.6 Questionnaire

As can be seen on Chapter 3, the research framework for this study is designed based on a highly extent literature review, all the factors and hypothesis were based on previous studies. In order to appropriately test the factors identified through the survey, questions previously used and validated to test these factors were employed, adapting them from previous studies. The questions for intention to use, perceived usefulness, perceived ease of use, subjective norm, voluntariness, image and job relevance, where adapted from the work of Venkatesh and Davis (2000). The questions for efficiency gains and attitude towards use were adapted from the work of Lin, Jen-Hwa Hu, and Chen (2004). The questions for triability were adapted from the work of Hester (2010).

The questionnaire was translated into Spanish since it is the native language in Mexico (see Appendix B). A pilot test took place in which only 10 participants answered and provided feedback, through this it was found that by the time the participants got to page two (where they needed to rate the KMS based on the factors) many respondents did not know what a KMS was, proving they did not read the definition on page one. So a smaller definition was added to the top in the second page as well for their reference. An initial run of this survey was conducted online after the pilot test, but it received only a total of 137 valid responses from participants nationwide. This number was too small to actually be able to arrive at a valid nationwide conclusion, aside from the fact that a minimum of 200 responses are considered necessary to produce valid results through confirmatory factor analysis.

Therefore a decision was made to reduce the sample frame to only one city “Monterrey”, reduce the scope of the results to the nation’s economic capital, and conduct the survey once more as was mentioned previously in section 4.5. Also in this case since we had the opportunity to meet the respondents face to face, we could clarify to them what a knowledge management system was in case they had any doubt. This allowed for a previous definition which was found on the surveys from the first run (online) to be removed, granting a possibility to obtain better results.

The definition was very broad in nature. I couldn’t know the level of familiarity of the respondent with the terms used and I wanted them to be able to pin-point what it was that I was referring to by giving them a nice variety of examples. This was no longer necessary; the definition previously found in the surveys is the following:

“Common knowledge management systems are: Knowledge repositories (wikis, blogs), Collaborative tools (e-mail, messenger, Lotus Notes, etc.), Search engines (information retrieval), Document management systems, Data mining systems, decision support systems, e-learning tools, expert directories, simulation tools, etc.”
The questionnaire is composed by two parts; the first part asks some basic information about the participants, their education and work. The second part of the survey consists of 29 observed variables in order to evaluate the 10 identified factors which will be studied according to the research framework; these are all rated on a likert scale as follows: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1) (see Appendix A).

In the first run of this survey which was conducted online, in order to ensure that the participants where indeed working in Mexico, a question about work location was included, however this was removed from the in-person surveys since these were being conducted at local corporate locations in Monterrey.

4.7 Validity and Reliability

Not only all factors which form part of the research framework were obtained from previous theory’s and studies, but also all the questions and answers have been adapted from previous validated studies. Therefore all factors and the way the survey is being carried out are considered valid and reliable. Nevertheless, since the research framework used in this case is not exactly the same as that of any theory or previous studies, I will be testing for the reliability and validity of the framework.

One of the most cited definitions of validity is that of Hammersley’s (1987, p. 69) “An account is valid or true if it represents accurately those features of the phenomena, that it is intended to describe, explain or theorize”. Winter (2000) in his work shows different definitions from diverse authors for validity such as: Accuracy, the measure that an instrument measures what it is intended to, degree of approximation to ‘reality’, if we are measuring what we think we are. So basically validity is if the means of measurement are accurate and if indeed they measure what they are intended to measure. According to Muijs (2004), validity has three different aspects: content validity, criterion validity and construct validity. Content validity refers to if the content of the manifest variables are correct to measure the latent concept that is being intended to measure. Criterion validity refers to if a measure is related to other measures or particular outcomes, and itself is divided into two smaller parts (predictive validity and concurrent validity). Predictive validity is if the instrument predicts the outcomes you expect it to. Concurrent validity is if scores on some factors relate to other factors you expect them to. Construct validity focuses on the internal structure of the measurement instrument.

Winter (2000) in his work shows many definitions from several authors for reliability such as: the ability to measure consistently, reproducibility of measures, ability to yield same measurement… result stability, accuracy or precision on a measurement instrument. Three types of reliability in quantitative research were found by Kirk and Miller (1986): (1) the level to which a measurement stays the same after several repetitions, (2) how stable the measurement is
through time and (3) similarity of the measurement in a certain time period. Muijs (2004) defines reliability as the level to which certain score or result is free of measurement error, “true results” or results without error. Muijs (2004) also states there are two types of reliability: repeated measurement and internal consistency. Repeated measurement refers to the ability of measuring the same thing at different times. Internal consistency reliability is applicable only to instruments that have more than one item, it refers to how homogeneous these items are or how they measure a single construct. This type of reliability is usually measured by split half reliability and coefficient alpha. For split half reliability the test is randomly split in two, then results are calculated and compared to see if results relate to each other, they are expected to be related with a coefficient above ‘0.8’. For coefficient alpha the measure should be above ‘0.7’, in order to say the test is internally consistent.

An aggregated definition of validity could be that of ‘accuracy’ and an aggregated definition of reliability could be that of ‘replicability’ (Winter, 2000).

So with this in mind content validity is proven since all measures for the factors in study were obtained from previous validated survey questionnaires. Criterion validity exists since the research framework was created based on a very extent literature review. Aside from this, construct validity will be carried out through factor analysis techniques in Chapter five, to help ensure validity.

In terms of reliability, the survey consists of more than one factor and each factor consists of several measures, so internal consistency reliability is applicable in this case. This was done through Cronbach’s alpha value using SPSS version 17.0. According to Hester (2010) the reliability of the Cronbach’s alpha results are considered as follows [fair (.45 - .54), good (.55 - .62), very good (.63 - .70), and excellent (.71 and higher)]. The result for each factor as well as for the entire survey instrument can be found on the following table, proving there is high internal consistency reliability, since every result falls under the excellent category (.71 and higher):
### Table 4 Internal Consistency Reliability

<table>
<thead>
<tr>
<th>Factor</th>
<th>Cronbach's Alpha</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention to Use</td>
<td>0.776</td>
<td>2</td>
</tr>
<tr>
<td>Perceived Usefulness</td>
<td>0.865</td>
<td>4</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>0.836</td>
<td>4</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>0.915</td>
<td>2</td>
</tr>
<tr>
<td>Voluntariness</td>
<td>0.793</td>
<td>3</td>
</tr>
<tr>
<td>Image</td>
<td>0.872</td>
<td>3</td>
</tr>
<tr>
<td>Job Relevance</td>
<td>0.900</td>
<td>2</td>
</tr>
<tr>
<td>Efficiency Gains</td>
<td>0.930</td>
<td>3</td>
</tr>
<tr>
<td>Attitude Towards Use</td>
<td>0.847</td>
<td>3</td>
</tr>
<tr>
<td>Triability</td>
<td>0.799</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Reliability</strong></td>
<td><strong>0.869</strong></td>
<td><strong>29</strong></td>
</tr>
</tbody>
</table>

### 4.8 Ethical Issues

Since there is no personal information requested from the participants, the participation on this survey is done voluntarily, and an explanation of why this research is being carried out being provided in the e-mails and postings, there is no ethical issues that could possibly be encountered by the use and distribution of this information.

Furthermore no information about any particular organization is requested either, so this information is to be considered general. If research were to be carried out with participation of a particular organization as is suggested in the recommendations for future research, some ethical issues should be thought out before hand and should be planned and discussed with any participating organization.
Chapter 5 – Data Analysis

In this chapter the data collected is analyzed and presented. Moreover, results for exploratory factor analysis in order to prove factor validity are presented, as well as results for confirmatory factor analysis, through structural equation modeling with T-Value coefficients for the hypotheses testing. Goodness of Fit of the research model and the data collected is shown at the end of this chapter.

5.1 Data Analysis Method

As was mentioned in the previous chapter, the validity of each factor will be tested to comply with construct validity by using Varimax Rotation with Principal Component Analysis methods, through SPSS. Structural equation modeling (SEM), also known as analysis of covariance structures, latent variable analysis, causal modeling or confirmatory factor analysis (Hill and Lewicki, 2006, Xu and Quaddus, 2005a), will be carried out using LISREL in order to evaluate the proposed research framework and hypotheses. LISREL is the most widely applied software package used for structural equation modeling (Xu and Quaddus, 2005a).

Structural equation modeling, is “an analytical tool that improves upon, and supersedes, other tools for data analysis, such as regression (multiple and multivariate), recursive path analysis, non-recursive econometric modeling, ANOVA, analysis of covariance, factor analysis, principal component analysis, and classical test theory” (Holmes-Smith, 2001, p.1).

Compared with other common analytical techniques, such as factor analysis, path analysis and multivariate multiple regressions, structural equation modeling has the following advantages (Xu and Quaddus, 2005a):

- It is capable of examining the relationships among dependent variables, as well as outcome, response or exogenous variables
- It is capable of estimating relationships amongst constructs indicated by explanatory, endogenous or observed variables
- It is capable of measuring both recursive and non-recursive relationships amongst constructs.
- It is capable of assigning unequal weightings to multiple observed variables of a construct
It is capable of allowing correlations amongst error covariance’s or measurement errors.

The way structural modeling works is as follows (Hill and Lewicki, 2006):

1. You state the way you believe that the factors are inter-related, with a path diagram usually (in this case, the research framework)
2. The implications for variances and covariance’s of variables are worked out, through complex internal rules
3. You test whether these variances and covariance’s fit the model
4. Results of statistical testing are reported in the linear equations, including parameter estimates and standard errors
5. Based on all this, the decision of whether the model fits the data is made.

5.2 Sample Analysis (Descriptive Statistics)

Descriptive Statistics are commonly used in order to better describe the properties of empirical distributions, in other words the data distributions contained in samples (Pyzdek and Keller, 2013). They are used when you want to get information and there isn’t time to perform a more in depth analysis. They help the analyst to become more acquaint with the data, even though the information is mathematical, it allows communicating findings in short and simple terms (Pease, Byerly and Fitz-enz, 2012).

Descriptive statistics are quantitative, basic numerical indicators that do not require advanced mathematical knowledge to understand. Showing the data effectively is the first step that we should take, since that makes it understandable. In the corporate world it is believed that graphics are the best way to present information (Pease, Byerly and Fitz-enz, 2012). And therefore I will begin by showing the main participant characteristics of the sample population through graph diagrams.

The basic participant responses obtained from the application of the survey are shown in the following diagrams. The basic characteristics are gender, age, education level, number of employees that work in their organization and the department best suiting their job role. Respondents amongst many different ages, level of educations, sizes in organizations as well as different departments participated, which is really suitable for the generalizability of this study. Since people at different ages, level of education and work background can have different perspectives on knowledge management. The size of an organization usually deals with the level to which knowledge management is implemented within the organization, so this is good for the generalizability as well.
As shown in the following figure, 522 respondents were male (54.77 %), while 431 respondents were female (45.23 %).

![Gender](image)

**Figure 15 Gender of respondents**

As shown in the following figure, no respondent fell into the category of 16-20 years of age, 204 respondents fell into the category of 21 – 25 years of age (21.40 %), 284 respondents were between the age of 26 – 30 (29.80 %), 162 respondents were within the age of 31 – 35 (16.99 %), 124 respondents were in the range of 36 – 45 years of age (13.01 %), 113 respondents were within 46 – 55 (11.85 %), and finally from 56 and above there were a total of 66 respondents (6.92 %).

![Age](image)

**Figure 16 Age of respondents**
In regard to the level of education as can be seen in the following figure, no respondents had middle school as their highest level of education, 19 people marked high school (1.99 %), 711 people claimed their highest level of education was bachelor (74.60 %), 193 people marked down masters level (20.25 %), and the remaining 30 respondents marked down doctorate level as their highest level of education (3.14 %).

![Level of Education](image17.png)

**Figure 17 Level of Education of respondents**

As can be seen in the following figure, 229 respondents worked in an organization with less than 50 employees (24.02 %), 189 respondents marked 50 – 199 (19.83 %), 149 respondents marked 200 – 499 (15.63 %), 128 respondents marked 500 – 999 (13.43 %), and 258 marked 1000 and above giving the remaining 27.07 %.

![Employees per Organization](image18.png)

**Figure 18 Employees per organization were respondents are employed**
In terms of the department in which the role of the participant fell under as can be appreciated in the following figure, 166 replied marketing or sales (17.41%), 115 marked finance or accounting (12.06%), 139 marked down human resources (14.58%), 184 marked information technology (19.30%), 72 marked research and development (7.55%), 89 marked manufacturing (9.33%), the remaining 188 respondents marked other (19.72%).

![Participants Job Department](image)

Figure 19 Respondents Job Department

### 5.2.1 Descriptive Statistics (interval data)

As stated earlier on in 5.2, Descriptive Statistics are a way in which patterns in data are made to be understandable easier through graphical and numerical presentations of data. The following table provides a summary of the diagrams presented in section 5.2, and will be used in order to further analyze the 953 valid sample respondents, by using descriptive statistics.

<table>
<thead>
<tr>
<th>Table 5 Basic Participant Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>male</td>
</tr>
<tr>
<td>female</td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>16 - 20</td>
</tr>
<tr>
<td>21 - 25</td>
</tr>
</tbody>
</table>
A central tendency measure is that which allows us to understand the results better by using simple numerical procedures. Basically we can understand a lot of the results when they tend to fall mostly around a certain value, or if the results are stable throughout all available values or around the top and lower values, etc. The focus of the central tendency is mainly to find out which is the typical result, that which outstands the others (Abbot and McKinney, 2012).

The most common central tendency measures are the following (Abbot and McKinney, 2012):.

- **Mean** – the average of the results
- **Median** – the middle value of the results
- **Mode** – The most frequent result value

When speaking about descriptive statistics we also wish to identify if there is balance or variability in the results (Abbot and McKinney, 2012).

- **Skewness** – tells us if the results are not perfectly balanced and if they trail off to one side or to the other.
- **Kurtosis** – Indicates how peaked or flat the distribution of values is.
• **Standard Deviation.** Represents the standard amount of distance between the mean and each other available result.

• **Range** – The difference between the smallest result and the highest result

The *mode* is the most frequent value on each result; it is highlighted in yellow in table 5 for each of the available characteristics.

### Table 6 Descriptive Statistics

<table>
<thead>
<tr>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std Deviation</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>963</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.45</td>
<td>.016</td>
<td>.430</td>
</tr>
<tr>
<td>Age</td>
<td>963</td>
<td>6</td>
<td>2</td>
<td>7</td>
<td>3.65</td>
<td>.060</td>
<td>1.537</td>
</tr>
<tr>
<td>Education</td>
<td>963</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>3.25</td>
<td>.017</td>
<td>.537</td>
</tr>
<tr>
<td>EmployeeCount</td>
<td>963</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3.03</td>
<td>.006</td>
<td>1.642</td>
</tr>
<tr>
<td>Department</td>
<td>963</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>3.94</td>
<td>.068</td>
<td>2.103</td>
</tr>
<tr>
<td>Work</td>
<td>963</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.03</td>
<td>.006</td>
<td>.183</td>
</tr>
</tbody>
</table>

In order to obtain the descriptive statistics above, values had to be assigned to each of the possible responses for each characteristic. Gender has 2 values for instance, the minimum value (1 – male) and the maximum value (2 – female). You can find the number corresponding to each possible value at the right hand side of table 5.

Because the descriptive level 1 for both Age and Education was 0 in the results, the minimum statistic for each of these, starts at level 2.

**Skewness** and **Kurtosis** are a way to say that the results of the population are equally distributed or not.

The normal skewness result is of 0. A negative skewness is said that the concentration of the results is higher than the mean, while a positive skewness refers to results being lower than the mean. (Zask, 2013) In our case however we do not desire a skewness of 0, which would mean we would only have results around the mean.

The normal kurtosis result is of 3. A higher number than 3 indicates that the results concentrate around the mean. Lower kurtosis says that the results are more evenly distributed. (Zask, 2013) In our case however we do not want results at 3, since that would mean that all the results are around the mean value.

Thanks to the **descriptive analysis** of the sample population we can clearly define that our population is not exactly equally distributed amongst all categories. The most representative values are that the respondents are mainly *men*, the most common age of the respondents is between ages 26 *and* 30, the higher level of education in common is a *bachelor’s degree*, and
most of the participants work in rather large organizations with over 1000 employees, and the main department of those wishing to participate was sales or marketing, since the other category cannot be generalized.

It is important to keep in mind that if we grabbed the entire population of acceptable candidates for the survey in Monterrey, the results would obviously not be equally distributed amongst each variable as well.

So revising the topic in 4.5.1, the issue here is that we cannot know how representative this data is compared to the entire population of acceptable candidates in Monterrey. If the entire population were to mimic the demographic characteristics of the 953 respondents from the sample, then it would be safe to say that the results of this study were absolutely valid and could be applicable to the entire population, however this is very likely not the case.

So considering the possibility of a possible Bias in this study, that the sample population does not mimic in characteristics it’s true complete possible sample, this study will only serve as an initial basis for further studies, which can then try to prove or disprove the results obtained from this research.

The exact same steps could then be followed, just making sure that the sample population is random, so that every possible candidate has the exact same amount of opportunity to participate as the other, and thus eliminate the possible sample Bias.

5.3 Exploratory Factor Analysis

As mentioned earlier construct validity in this research will be carried out through factor analysis as a Data Reduction method. Factor analysis techniques are mainly used to reduce the number of variables and to detect structures in the relation of variables (classify variables).

The basic idea behind factor analysis as a data reduction method is as follows. Imagine you are conducting a ‘silly’ study, involving variables that are clearly redundant within it, let’s say for instance that you measure a person’s weight in both kilograms and pounds. Therefore there are two variables that measure weight. If for future studies we want to study how a person’s diet affects their weight, would it make sense to continue to use both measures? Probably not, weight is a single characteristic of a person, it does not matter how it’s measured (Hill and Lewicki, 2006).

So extrapolating from this example, to an example of something you actually would do as a researcher. Let’s say you are measuring participants satisfaction with their lives and among the many other variables, you decide to ask the participants to rate how satisfied they are with their hobbies and how intensely they pursue a hobby. It is very likely that the responses to both of
these variables will be highly correlated, and since they are highly correlated they can be considered redundant (Hill and Lewicki, 2006, p. 266).

By combining these highly correlated variables into a single component (factor or construct) which basically captures the ‘essence’ of both variables, we can reduce variables into factors. The new factor is a linear combination of the two variables, in this case for instance the factor could be seen as ‘satisfaction-with-hobbies’ (Hill and Lewicki, 2006, p. 266). Through Varimax rotation it is possible to extract the principal components or factors from many variables, which is what will be carried out next in order to see how the variables that aim to measure each factor in the survey (see appendix A) according to the data collected, actually fit these factors.

In order to make sure that factor analysis is appropriate to perform with the data collected, an additional two calculations will be done through SPSS; the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett’s test of sphericity.

KMO statistics vary between the range of 0 and 1, when the result is 0 it means that there is a high number of partial correlations in regard to the sum of correlations, this indicates there is diffusion of pattern correlations and therefore factor analysis is probably not appropriate. When it is closer to one it means the correlations are more compact and therefore the analysis can provide appropriate reliable factors. Kaiser (1974) recommended values above .05. Values between 0.5 and 0.7 are considered acceptable, between 0.7 and 0.8 are considered good, between 0.8 and 0.9 are great, and above that they are superb (Field, 2005).

Barlett’s tests the null hypothesis that the original correlation matrix is an identity matrix. In order for factor analysis to work it is needed to have some relationships between the variables, if the R-matrix were to be an identity matrix then all correlations would be zero. A significant test is what tells us that the R-matrix is not an identity matrix. To be significant we look for a value less than 0.05, to be highly significant we look for a value less than (p < 0.001) (Field, 2005).

It is important to consider that factors do not extract all variance from the items. They only extract the proportion that belongs to common factors and shared by many items. “The proportion of variance of a particular item that is due to common factors (shared with other items) is called communality; communality is the level of variance that a particular item has in common with other items.” (Hill and Lewicki, 2006, p. 269)

So with this in mind, it is probably best to begin by making sure that factor analysis is indeed appropriate for the data collected from the surveys.
The result of the Kaiser-Meyer-Olkin measure of sampling adequacy is that of .770, falling in the range of ‘good’, while the result of Barlett’s test of Sphericity is (p < 0.001) so it is highly significant. Therefore according to both of these analytical results, factor analysis is appropriate to carry out from the data collected through the survey application.

So now that it is known that factor analysis is valid for the data collected. Assume we have 29 variables (the measures for all of the factors) and we want to identify a fixed number of 10 factors (the number of factors we already know we have in the research framework), this is called exploratory data analysis, in which a variable can belong to any factor and we want to identify these factors, with the assumption that there is no theory to rely on (Hill and Lewicki, 2006). So by doing calculations in SPSS through Varimax rotation converged in eight iterations with Kaiser normalization, through the Principal Component analysis, and excluding small coefficients (those below 0.50), we get the following table as an output:

### Table 7 Kaiser-Meyer-Olkin and Barlett’s Test of Sphericity

<table>
<thead>
<tr>
<th>KMO and Bartlett's Test</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy</td>
<td>.770</td>
<td></td>
</tr>
<tr>
<td>Barlett's Test of Sphericity</td>
<td>Approx. Chi-Square</td>
<td>19199.953</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>406</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

### Table 8 Exploratory Data Analysis results

<table>
<thead>
<tr>
<th>Component Matrix(^a)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU3</td>
<td>.840</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU2</td>
<td>.806</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU1</td>
<td>.740</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PU4</td>
<td>.738</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU3</td>
<td>.832</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU1</td>
<td>.762</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU4</td>
<td>.745</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEU2</td>
<td>.722</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG2</td>
<td>.855</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG3</td>
<td>.837</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

58
As can be seen, the measures that fit each identified factor (component) through the factor analysis are a “perfect fit” to those in the survey, which is quite surprising as to find some variables associated to another factor would not have been something rare to appear in the results. A very good explanation for this is that, as already been stated before, all constructs and measures have been adapted from previous reliable and valid studies. Nevertheless thanks to the factor analysis, the validity of these factors in the context that is necessary for this particular research has been efficiently proven.

In the following sections I will proceed to show the resulting communalities for each of the items that belong to each factor as well as the total variance per factor. The factors will be placed in the order they were discovered by SPSS, in that sense, the cumulative value for the second factor for example, will include the total variance of the first and the second factor. The cumulative value for the third factors, will involve the first, the second and the third factor. And


Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.
so on. The reason SPSS discovered the factors in this order is quite logical, the first factors identified are those measured by four variables, then those by three variables, then those by two variables, those factors with more variables have higher correlations and higher variances.

There are two total variances presented in Appendix C, the first one represents the variance at extraction, this is before the varimax rotation, therefore the components are not measured exactly by the measures as in the survey. The result you want to be looking at in these measures is the total variance of the rotation sums of squared loadings, in which the measures are pertaining to the factors exactly as presented in the survey (see appendix A).

For those of you who are not very familiar with probability theory or statistical analysis and are not aware of what variance means, to put in simple terms, variance is used to measure how much something changes. To be more precise it is a measure used to explain how much an observed result differs from its expected value.

As can be seen in the following table, perceived usefulness is accountable for 10.58% of the total variance, meaning that from the results collected through the survey implementation and the SSPS analysis, this factor is found responsible for 10.58% of difference to the research framework. Perceived ease of use accounts for 9.87%, efficiency gains for 9.38%, image for 8.57%, voluntariness for 7.71%, attitude towards use for 7.71%, triability for 7.64%, subjective norm for 6.62%, job relevance for 6.43%, and intention to use for 6.25%.

<table>
<thead>
<tr>
<th></th>
<th>% of Variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Usefulness</td>
<td>10.581</td>
<td>10.581</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>9.875</td>
<td>20.455</td>
</tr>
<tr>
<td>Efficiency Gains</td>
<td>0.384</td>
<td>20.839</td>
</tr>
<tr>
<td>Image</td>
<td>8.577</td>
<td>38.416</td>
</tr>
<tr>
<td>Voluntariness</td>
<td>7.719</td>
<td>46.135</td>
</tr>
<tr>
<td>Attitude Towards Use</td>
<td>7.715</td>
<td>53.850</td>
</tr>
<tr>
<td>Triability</td>
<td>7.646</td>
<td>61.496</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>6.627</td>
<td>68.124</td>
</tr>
<tr>
<td>Job Relevance</td>
<td>6.435</td>
<td>74.558</td>
</tr>
<tr>
<td>Intention to Use</td>
<td>6.255</td>
<td>80.813</td>
</tr>
</tbody>
</table>

Once again you can find more detailed tables of these results in Appendix C, as well as the results of the communalities for each of the factors explored in this analysis.
5.4 Hypothesis testing

For the testing of the hypothesis I will also use a factor analysis technique, but in this case it will be the confirmatory factor analysis technique. As stated previously, the idea behind exploratory factor analysis is to identify factors from the variables, and it can also be used to identify relationships between the factors. In confirmatory factor analysis, the aim is to test predefined hypotheses about the factor structure for a given set of variables (the research framework), with the data sample collected (Hill and Lewicki, 2006).

This will be carried out by using LISREL 8.80 through structural equation modeling. In the structural model we have a total of six independent latent factors and four dependent factors. The six independent latent factors are: Subjective Norm, Job Relevance, Efficiency Gains, Voluntariness, Triability and Perceived Ease of Use. The four dependent latent factors are: Image, Perceived Usefulness, Attitude Towards Use, Intention to Use (see Chapter 3).

In order to evaluate the hypothesis presented in Chapter 3, the path coefficients in the structural model were analyzed. Each hypothesis (path) was tested using the T-Value. According to Xu and Quaddus (2005a) the path is valid or significant at the level of 5 percent if the T-Value is higher than ± 1.96.

Figure 20 Structural Equation Model with Path Coefficient Estimates
Figure 21 Structural Equation Model with Standardized Path Coefficients

![Path Coefficients Diagram]

Chi-Square=3863.95, df=347, p-value=0.00000, RMSEA=0.103

Figure 22 Structural Equation Model with T-Values

![T-Values Diagram]

Chi-Square=3863.95, df=347, p-value=0.00000, RMSEA=0.103

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The results of these Diagrams are presented more clearly in the following table, please note that both the standardized path coefficient diagram and the coefficient estimates diagram yield the same result for the path relation amongst the latent variables:

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Path</th>
<th>Standardized Path Coefficients</th>
<th>T-Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong></td>
<td>SN → PU</td>
<td>0.28</td>
<td>7.39</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H2</strong></td>
<td>SN → IMG</td>
<td>0.33</td>
<td>9.19</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H3</strong></td>
<td>SN → ITU</td>
<td>-0.18</td>
<td>-4.47</td>
<td>Rejected</td>
</tr>
<tr>
<td><strong>H4</strong></td>
<td>IMG → PU</td>
<td>0.13</td>
<td>3.93</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H5</strong></td>
<td>JR → PU</td>
<td>0.05</td>
<td>1.35</td>
<td>Rejected</td>
</tr>
<tr>
<td><strong>H6</strong></td>
<td>EG → PU</td>
<td>0.34</td>
<td>8.39</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H7</strong></td>
<td>PEU → PU</td>
<td>0.13</td>
<td>3.77</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H8</strong></td>
<td>PEU → ITU</td>
<td>0.20</td>
<td>4.78</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H9</strong></td>
<td>TRI → PU</td>
<td>0.19</td>
<td>5.53</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H10</strong></td>
<td>TRI → ITU</td>
<td>-0.14</td>
<td>-3.62</td>
<td>Rejected</td>
</tr>
<tr>
<td><strong>H11</strong></td>
<td>VOL → ATU</td>
<td>0.09</td>
<td>2.48</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H12</strong></td>
<td>ATU → ITU</td>
<td>0.23</td>
<td>4.73</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H13</strong></td>
<td>PU → ITU</td>
<td>0.38</td>
<td>7.20</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H14</strong></td>
<td>PU → ATU</td>
<td>0.55</td>
<td>15.03</td>
<td>Approved</td>
</tr>
<tr>
<td><strong>H15</strong></td>
<td>PEU → ATU</td>
<td>0.22</td>
<td>5.74</td>
<td>Approved</td>
</tr>
</tbody>
</table>

**Hypothesis one** (H1), which is about subjective norm having a positive influence on perceived usability, has a result on the t-value as 7.39 and therefore is **accepted**.

**Hypothesis two** (H2), which is about subjective norm having a positive influence on image, has a result on the t-value as 9.19, and therefore **accepted**.

**Hypothesis three** (H3), which is about subjective norm having a positive influence on intention towards use, has a result on the t-value as -4.47, and therefore is **rejected**

**Hypothesis four** (H4), which is about image having a positive influence on perceived usefulness, has a result on the t-value as 3.93, and therefore is **accepted**.

**Hypothesis five** (H5), which is about job relevance having a positive influence on perceived usefulness, has a result on the t-value as 1.36, and therefore is **rejected**.

**Hypothesis six** (H6), which is about efficiency gains having a positive influence on perceived usefulness, has a result on the t-value as 8.39, and therefore is **accepted**.
Hypothesis seven (H7), which is about perceived ease of use having a positive influence on perceived usefulness, has a result on the t-value as 3.77, and therefore is accepted.

Hypothesis eight (H8), which is about perceived ease of use having a positive influence on intention to use, has a result on the t-value as 4.78, and therefore is accepted.

Hypothesis nine (H9), which is about triability having a negative influence on perceived usefulness, has a result on the t-value as 5.53, which means that it is accepted.

Hypothesis ten (H10), which is about triability having a positive influence on intention to use, has a result on the t-value as -3.62, and therefore is rejected.

Hypothesis eleven (H11), which is about voluntariness having a positive influence on attitude towards use, has a result on the t-value as 2.48, and thus it is accepted.

Hypothesis twelve (H12), which is about attitude towards use having a positive influence on intention to use, has a result on the t-value as 4.73, and therefore is accepted.

Hypothesis thirteen (H13), which is about perceived usefulness having a positive influence on intention to use, has a result on the t-value as 7.20, and therefore is accepted.

Hypothesis fourteen (H14), which is about perceived usefulness having a positive influence on attitude towards use, has a result on the t-value as 15.03, and therefore is accepted.

Hypothesis fifteen (H15), which is about perceived ease of use having a positive influence on attitude towards use, has a result on the t-value as 5.74, and therefore is accepted.

5.5 Goodness of Fit

Structural Equation Modeling has become a very transcendental technique in research and it is becoming a ‘must’ for researchers in social sciences. Researches that use this technique must feel comfortable knowing that a certain model, fits the data, therefore it is considered a crucial step in structural equation modeling (Hooper, Coughlan and Mullen, 2008). To test the model (the research framework) with the data collected, in order to see if it is a good fit, there are many fit indices that can help; their recommended values along with the results for this confirmatory factor analysis are presented in the following table:
Due to the large amount of fit indexes available, many researchers tend to pick out those for which their model and the data actually fit, and discard those in which they don’t. This is considered a very bad practice and should be avoided, since it could mask possible problems existing in the model (Hooper, Coughlan and Mullen, 2008). For the goodness of fit of this model (the research framework) to the data collected, we can see that many indexes are within the recommended values but many are not. It is not too surprising that it is not a perfect fit for all of the indexes, because that would suggest that all of the hypothesis should have been accepted, so it is logical that the model would need some modifications in order to fit the data better. Also according to Hooper, Coughlan and Mullen (2008) some of the indexes can vary greatly according to the size of the data sample, and therefore not all indexes can be considered reliable for all sample sizes. So in order to obtain results with a higher level of certainty for the fit of this model, a larger scale survey with more participant responses is probably necessary.

Table 11 Goodness of Fit

<table>
<thead>
<tr>
<th>Fit Index</th>
<th>Recommended Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Fit Function Chi-Square (χ²)</td>
<td>≥ 2.0 and ≤ 5.0</td>
<td>4.41</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>≈ 0.06 and &lt; 0.07</td>
<td>0.10</td>
</tr>
<tr>
<td>Goodness of Fit Index (GFI)</td>
<td>≤ 0.95</td>
<td>0.78</td>
</tr>
<tr>
<td>Adjusted Goodness of Fit (AGFI)</td>
<td>≥ 0.90</td>
<td>0.73</td>
</tr>
<tr>
<td>Root Mean Square Residual (RMR)</td>
<td>≤ 0.08</td>
<td>0.069</td>
</tr>
<tr>
<td>Standardised Root Mean Square Residual (SRMR)</td>
<td>≤ 0.08</td>
<td>0.089</td>
</tr>
<tr>
<td>Normed-Fit Index (NFI)</td>
<td>≥ 0.90</td>
<td>0.86</td>
</tr>
<tr>
<td>Non-Normed Fit Index (NNFI)</td>
<td>≥ 0.80</td>
<td>0.85</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>≥ 0.90</td>
<td>0.87</td>
</tr>
</tbody>
</table>
Chapter 6 – Discussion and Conclusion

This chapter first shows a brief discussion on the result of each of the hypotheses when comparing them to the theories and previous studies. The results are then discussed and some recommendations are proposed based on the findings. A conclusion with the main points of this research is then presented as well as recommendations for future research.

6.1 Hypotheses results compared to the theoretical models

The results of the hypotheses testing through the T-Value path coefficients presented in the previous chapter, show that (Hypothesis 1) subjective norm has a significant positive influence on the perceived usefulness of knowledge management systems, this result is consistent with that of the model TAM2 proposed by Venkatesh and Davis (2000). This result is also in line with the model proposed by Kaldi, Aghaie and Khoshalhan (2008), to assess knowledge management adoption in organizations, and with the results obtained by Lin, Jen-Hwa Hu, and Chen (2004) in their assessment of the KMS COPLINK.

To continue, the results also show that (Hypothesis 2) subjective norm has a significant positive influence on image, this result is in line and consistent with the relation between these factors on the TAM2 model, proposed by Venkatesh and Davis (2000).

Contrary to what was expected the findings show that (Hypothesis 3) subjective norm does not have a positive influence on the intention to use knowledge management systems, the T-value was significant but it was also negative, meaning that subjective norm actually has a negative influence on the intention to use. This result contradicts the models TRA, TPB, UTAUT and TAM2 (Venkatesh and Davis, 2000, Venkatesh, et al., 2003, Fishbein and Ajzen, 1975, Ajzen, 1991).

The findings show that (Hypothesis 4) image does have a significant positive influence on the perceived usefulness of knowledge management systems, and that (Hypothesis 5) job relevance does not have a significant positive influence on the perceived usefulness of knowledge management systems. The relation between the factors in number five is not significant and therefore the result does not go in line with the TAM2 model proposed by Venkatesh and Davis (2000), like number four does.
Consistent with the results of Lin, Jen-Hwa Hu, and Chen (2004) in their assessment of the KMS COPLINK; (Hypothesis 6) efficiency gains have a significant positive influence on the perceived usefulness of knowledge management systems. This result is also in line with the TAM 2 model proposed by Venkatesh and Davis (2000).

In regard with perceived ease of use having a positive influence on the perceived usefulness of knowledge management systems (Hypothesis 7) as is suggested by both the TAM and the TAM 2 models (Davis, Bagozzi and Warshaw, 1989, Venkatesh and Davis, 2000), and by the model proposed by Kaldi, Aghaie and Khoshalhan (2008); the results prove that this is also valid in this study.

Continuing to the results (Hypothesis 8) perceived ease of use having a positive influence on the intention to use knowledge management systems, it is found that there is indeed a significant positive, as was to be expected from looking into the TAM2 and UTAUT models (Venkatesh and Davis, 2000, UTAUT – Venkatesh, et al., 2003)

The findings for (Hypothesis 9) triability having a negative influence on the perceived usefulness of knowledge management systems, the resulting T-Value was highly significant, therefore the relation does exist; triability has a negative influence on perceived usefulness. This hypothesis does not have previous findings since it was inferred from the IDT and DOI models (Moore and Benbasat, 1991, Rogers 1995), but it is not stated as such, but it goes in line with the results obtained on the online run of this same survey, as mentioned earlier in section 4.6.

Another result that was found to be negative and also significant in its relation was that of (Hypothesis 10) triability having an influence on the intention towards use of knowledge management systems. This does not go in line what is suggested by the DOI theory of Rogers (1995). On the contrary it means triability has a negative influence on the intention towards use.

In terms of (Hypothesis 11) voluntariness having a positive influence on attitude towards use as is suggested by the UTAUT and the TAM2 model (Venkatesh and Davis, 2000, UTAUT – Venkatesh, et al., 2003), voluntariness has a good influence on the attitude towards use of knowledge management systems.

The results show that (Hypothesis 12) attitude towards use has a significant positive influence on the intention to use knowledge management systems. Therefore the relation between these two factors does go in line with what is proposed by the TAM model for this particular case (Davis, Bagozzi and Warshaw, 1989).

Consistent with what was expected based on the TAM, TAM2 and UTAUT models (Davis, Bagozzi and Warshaw, 1989, Venkatesh and Davis, 2000, Venkatesh, et al., 2003), the results show that (Hypothesis 13) perceived usefulness has a significant positive influence on the
intention towards use of knowledge management systems. This result is also in line with the model proposed in the work of Kaldi, Aghaie and Khoshalhan (2008).

The highest result obtained from a T-value in this study was that of (Hypothesis 14) perceived usefulness having a significant positive influence on the attitude towards use of knowledge management systems; this result is in line with the TAM model proposed by Davis, Bagozzi and Warshaw (1989).

Also in line with the TAM model proposed by Davis, Bagozzi and Warshaw (1989) and the results of the study of Lin, Jen-Hwa Hu, and Chen (2004) in their assessment of the KMS COPLINK, the results show that (Hypothesis 15) perceived ease of use has a significant positive influence on the attitude towards use of knowledge management systems.

6.2 Discussion

In summary the results of this study show that subjective norm and efficiency gains have a significant positive influence over perceived usefulness, which in turn has a significant positive influence on the intention to use and attitude towards use. Subjective norm also has a significant influence on image, and just as subjective norm, image also has an influence on perceived usefulness of knowledge management systems.

Perceived ease of use also has a significant positive influence on perceived usefulness, but in turn has positive influences on intention to use and attitude towards use as well. Voluntariness also has positive influence on attitude towards use. And attitude towards use also influences intention to use.

Triability is best to be removed from the resulting model, since it’s hypothesis results are either not significant or negative when influencing perceived usefulness, and therefore this is not a factor that companies should be considering to better when seeking to improve their level of adoption of knowledge management systems within the organization. Job Relevance can also be removed from the model since it is also not part of any valid resulting hypothesis.

As can be seen from the research model presented previously in Chapter 3, and in the following representation, the desired factor which we want to influence is intention towards use, since this is the critical factor in relation to a user finally adopting a technology or not, in this case the KMS in the organization.
6.2.1 Resulting Model

Based on these results it is noticeable that the most important factor in the model is perceived usefulness followed by perceived ease of use. Since subjective norm influences the most important factor, perceived usefulness, and also influences image which in turn also influences the most important factor as well, subjective norm falls in third place of factor to pay attention to. And also efficiency gains influences perceived usefulness, which is the most important factor, therefore efficiency gains falls in factor number 4 to pay attention to.

The way people perceive high profile others want them to act in regard to KMS seems to be influential on other important factors, among them perceived usefulness, which is the construct with a higher level of effect on other factors, and accounts for the highest level of variance in this research. Perceived ease of use falls in second place, because it is the factor with the second highest variance, with all its hypothesis found valid, positively influencing intention to use, perceived usefulness and attitude towards use.

With this in mind, Mexican organizations who wish to increase the level of adoption of knowledge management systems should pay close attention to these factors since they are the strongest drivers towards adoption. Making sure that employees feel that their supervisors and high management want them and require them to use these systems would be a good place to
start. If employees feel that people in high roles all make use of these systems, they will become an interest for them as well, if they are considering getting promoted at some point.

Making sure people understand all the full advantages of using these systems is also crucial, since this seems to be the most important determinant of adoption in organizations in this study. What will they get out of it? How will they save time and how much time will they save? How will they accomplish tasks more effectively? If people become more aware of these advantages, they will be more inclined to adopt knowledge management systems.

To provide fast and efficient training of the knowledge management systems is another suggestion. Employees seem to have a better attitude towards adopting knowledge management systems when they feel the systems are easy to use. When they don’t understand how the system works, or find it too complex it is understandable that they won’t be too fond to use them. Also feeling that they aren’t forced to use the system, but having the feeling that they will benefit from using them (voluntariness) is found to influence their attitude towards use. Usability testing on new systems would also be of great help in order to increase the perceived ease of use factor.

6.3 Conclusion

The aim of this study was to understand the factors that influence the adoption of knowledge management systems in Mexico. Through a very extent and detailed literature review of previous studies regarding the adoption of knowledge management systems as well as theories involving the adoption of technology a research framework was designed in order to assess factors and their relations, with a total of 15 hypotheses involving it.

The factors and survey were proven reliable and valid through several analysis and techniques. Through Cronbach’s alpha all factors were proven reliable. Exploratory factor analysis by data reduction gave a perfect fit from the variables to the factors. This factor analysis was proven appropriate through Kaiser-Meyer-Olkin and through Barlett’s Test of Sphericity.

Finally for the testing of hypothesis, confirmatory factor analysis was carried out through structural equation modeling with T-Value testing, giving a total of 12 valid hypotheses. All of the results have been compared to previous findings.

In order to come up with better results to assess the models fit it would be necessary to conduct the survey with a higher amount of responses and possibly with a redefined model, since some of the goodness of fit indices are not within the acceptable range for the model and the data. Although it is not too surprising since 3 out of 15 hypotheses were rejected, and two of the factors in the resulting model were removed since they were not factors that would have a positive influence on the adoption or knowledge management systems (job relevance and
triability), and the second of these would actually have a negative influence according to the results previously discussed.

The factors which are found significantly influential on other factors and are the main factors which organizations should focus on when seeking to increase the adoption level of KMS in Monterrey Mexico are the following, presented in order of relevance: perceived usefulness, perceived ease of use, subjective norm, efficiency gains, voluntariness and image. These are the factors that are recommended to be paid more attention to in organizations in Mexico if they seek to increase the adoption of knowledge management systems.

In terms of total variance from highest to lowest the factors come in this order: perceived usefulness, perceived ease of use, efficiency gains, image, voluntariness, attitude towards use, subjective norms, intention to use. Just as a reminder triability and job relevance were removed from the resulting model, since these are factors not recommended to focus on. As mentioned previously in 5.3, variance is a measure used to explain how much an observed result differs from its expected value.

6.3.1 Bias consideration

As stated earlier in sections 4.5.1 and 5.2.1, the possibility of the sample being biased, meaning that it is not an exact representation of the entire population does exist, since the selection of participants was non-random, through convenience-cluster sampling. The main problem here is that this undermines the generalizability of the results to the rest of the population. So the results although valid, cannot be considered 100 % accurate. But this serves as a good basis for future studies in which random sampling is used.

6.4 Future Research

Even though a much larger amount of responses were desired for this research in the initial run, the amount of valid responses for this study was only that of 137, making it difficult to generalize the results to the entire Mexican population and also not meeting the minimum number of responses recommended for confirmatory factor analysis. Therefore posing two issues, the bias of being non-random sampling, which is considered to be higher with a small sample size. It was therefore decided to reduce the scope of the study and the sample frame to the city of Monterrey, Mexico’s economic capital. This way the bias is reduced greatly, with a much larger sample, although it is not entirely removed. On the final run of this survey a total of 953 valid responses were obtained. This study grants a good possibility for expansion on to other cities in Mexico, possibly seeking a nationwide survey with the help of INEGI.
Due to the time limitation for this study, it was not possible to obtain a larger sample, covering other states in Mexico. Other researchers have encountered this same problem as well, as the case of W. Money and A. Turner (2004) where they received less than 20% of participant response, even when they had funding and company cooperation as incentives to participants. But a total of 953 valid responses are enough to grant good results pertaining particularly to the city of Monterrey.

Considering this, future research could also involve testing this same model with a higher sample of respondents in other states. An easier way to get respondents would be to contact several organizations in Mexico (as in cluster sampling) and ask them if they would be willing to participate and send out to their employees, having some funding to grant incentives for participation could prove highly useful. This would also aid the generalizability of the results, since this would be a random sampling technique, which eliminates the possibility of a bias, as is present in this study.

A possibility in this case could be to re-define KMS to only those used particularly by each organization. This would in turn give a much more manageable population, which is random, and could be a workaround for the small amount of responses that usually surround this type of surveys.

Another possibility could also be to modify the research model for future research based on the results of this study. This is why I am providing a comprehensive amount of theory on knowledge management and technology adoption, so that those interested can have a solid basis to begin with. Those who decide to research the adoption of another technology can also benefit from this thesis work, by finding a good and solid source on technology adoption.

Not all factors from all models can be included, so in order to fully identify the factors which influence knowledge management adoption, it would be necessary to conduct several runs with different models, to come up with the better results.

Another possibility would be to conduct qualitative research based on the current findings, in order to interview participants and be able to get a detailed understanding of the situation and come up with better suggestions on what actions to take.
References


Filemon A.U., 2008. *Introduction to Knowledge Management: A brief introduction to the basic elements of knowledge management for non-practitioners interested in understanding the subject*. Jakarta: ASEAN Foundation.


Appendices

Appendix A

Survey Questionnaire

“A Knowledge Management System refers to a generally IT-based system for managing knowledge in organization, supporting creation, capture, storage and dissemination of information. It can comprise a part of a Knowledge Management initiative. The idea of a Knowledge Management System is to enable employees to have ready access to the organization's documented base of facts, sources of information, and solutions.”

Thank you very much for your valuable contribution

Gender:

○ Male ○ Female

Age:


○ 56 and above

What is your highest completed level of education?

○ Middle School
○ High School
○ Bachelor
○ Master
○ Doctorate

How many people are employed in the organization you work for?

○ Less than 50 ○ 50 – 199 ○ 200 – 499 ○ 500 – 999 ○ 1000 and above

In which of the following departments do you consider your job position to fit in?

○ Marketing or sales ○ Other
○ Finance or accounting
○ Human Resources
○ Information Technology
○ Research and development
○ Manufacturing
NOTE: Throughout the rest of this survey, Knowledge Management Systems will be abbreviated as KMS

<table>
<thead>
<tr>
<th>INTENTION TO USE</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assuming I have access to KMS, I intend to use them</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Given that I have access to KMS, I predict I would use them</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERCEIVED USEFULNESS</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using KMS improves my performance in my job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using KMS in my job increases my productivity</td>
<td></td>
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<tr>
<td>Using KMS enhances my effectiveness in my job</td>
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<td></td>
</tr>
<tr>
<td>I find KMS to be useful in my job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERCEIVED EASE OF USE</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My interaction with KMS is clear and understandable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interacting with KMS does not require a lot of my mental effort</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I find KMS to be easy to use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I find it easy to get KMS to do what I want them to do</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTIVE NORM</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who influence my behavior think I should use KMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People who are important to me think I should use KMS</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOLUNTARINESS</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>My use of KMS is voluntary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My supervisor does not require me to use KMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Although it might be useful, using KMS is certainly not mandatory at my job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMAGE</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Neutral</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
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<td>-------------------</td>
</tr>
<tr>
<td>People in my organization who use KMS have more prestige than those who do not</td>
<td></td>
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</tr>
<tr>
<td>People in my organization who use KMS have a high profile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using KMS is a high status symbol in my organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JOB RELEVANCE</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>In my job, the use of KMS is important</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In my job, the use of KMS is relevant</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>EFFICIENCY GAINS</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using KMS reduces the time I spend completing my job-related tasks</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>KMS allow me to accomplish tasks more quickly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Using KMS saves me time</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>ATTITUDE TOWARDS USE</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, it is a good idea to use KMS in my job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using KMS is/would be pleasant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using KMS is/would be beneficial to my work</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TRIABILITY</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know where I can go to satisfactory try out various uses of KMS</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Before deciding whether to use KMS, I was able to properly try them out</td>
<td></td>
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<tr>
<td>I was allowed to use KMS on a trial basis long enough to see what they could do before using them regularly for work</td>
<td></td>
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</tbody>
</table>
Appendix B

Encuesta

“Un Sistema de Gestión del Conocimiento se refiere a un sistema, generalmente basado en tecnologías de información, para administrar el conocimiento en una organización, soportando la creación, captura, almacenamiento y diseminación de información. La idea tras los sistemas de gestión del conocimiento es permitir a los empleados tener acceso disponible a fuentes de información y soluciones ya documentadas, pertenecientes a la organización.”

Muchas gracias de antemano por tu valiosa contribución

Sexo

○ Masculino ○ Femenino

Edad

○ 56 en adelante

Nivel de Estudios

○ Secundaria
○ Preparatoria
○ Licenciatura
○ Maestría
○ Doctorado

¿Cuánta gente está empleada en la organización para la cual trabajas?

○ Menos de 50 ○ 50 – 199 ○ 200 – 499 ○ 500 – 999 ○ 1000 o más

¿A cual de los siguientes departamentos consideras que pertenece tu actual posición laboral?

○ Mercadotecnia o Ventas ○ Investigación y Desarrollo
○ Finanzas o Contaduría ○ Manufactura
○ Recursos Humanos ○ Otro
○ Tecnologías de Información
NOTA: Se utilizará la abreviación SGC como referencia a los “sistemas de gestión del conocimiento” durante el resto de esta encuesta.

<table>
<thead>
<tr>
<th>INTENCION DE USO</th>
<th>Totalmente de acuerdo</th>
<th>De acuerdo</th>
<th>Indeciso</th>
<th>En desacuerdo</th>
<th>Totalmente en desacuerdo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asumiendo que tenga acceso a SGC, mi intención es hacer uso de ellos</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Si tuviera acceso a SGC, yo predigo que los utilizaría</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERCEPCION DE UTILIDAD</th>
<th>Totalmente de acuerdo</th>
<th>De acuerdo</th>
<th>Neutral</th>
<th>En desacuerdo</th>
<th>Totalmente en desacuerdo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilizar SGC mejora mi rendimiento en mi trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilizar SGC en mi trabajo incrementa mi productividad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilizar SGC mejora mi efectividad en el trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encuentro el uso de SGC útil en mi trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PERCEPCION DE LA FACILIDAD DE USO</th>
<th>Totalmente de acuerdo</th>
<th>De acuerdo</th>
<th>Neutral</th>
<th>En desacuerdo</th>
<th>Totalmente en desacuerdo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mi interacción con SGC es clara y entendible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interactuar con SGC no requiere mucho de mi esfuerzo mental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encuentro los SGC fáciles de usar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Para mi es fácil lograr que los SGC hagan lo que quiero</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NORMAS SUBJETIVAS</th>
<th>Totalmente de acuerdo</th>
<th>De acuerdo</th>
<th>Neutral</th>
<th>En desacuerdo</th>
<th>Totalmente en desacuerdo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gente que tiene influencia en mi comportamiento piensa que debo usar SGC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gente que es importante para mi piensa que debo usar SGC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLUNTARIEDAD</td>
<td>Totalmente de acuerdo</td>
<td>De acuerdo</td>
<td>Neutral</td>
<td>En desacuerdo</td>
<td>Totalmente en desacuerdo</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------</td>
<td>------------</td>
<td>---------</td>
<td>---------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Mi uso de SGC es voluntario</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mi supervisor no me exige usar SGC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aunque puede ser útil, el uso de SGC no es obligatorio en mi trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMAGEN</td>
<td>Totalmente de acuerdo</td>
<td>De acuerdo</td>
<td>Neutral</td>
<td>En desacuerdo</td>
<td>Totalmente en desacuerdo</td>
</tr>
<tr>
<td>La gente en mi organización que usa SGC tiene más prestigio que la que no los usa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>La gente en mi organización que usa SGC tiene un perfil alto</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usar SGC es un símbolo de alto estatus en mi organización</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RELEVANCIA PARA EL TRABAJO</td>
<td>Totalmente de acuerdo</td>
<td>De acuerdo</td>
<td>Neutral</td>
<td>En desacuerdo</td>
<td>Totalmente en desacuerdo</td>
</tr>
<tr>
<td>En mi trabajo, el uso de SGC es importante</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>En mi trabajo, el uso de SGC es relevante</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEJORA EN EFICIENCIA</td>
<td>Totalmente de acuerdo</td>
<td>De acuerdo</td>
<td>Neutral</td>
<td>En desacuerdo</td>
<td>Totalmente en desacuerdo</td>
</tr>
<tr>
<td>Usar SGC reduce el tiempo que invierto en completar las tareas relacionadas a mi trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Los SGC me permiten terminar mis tareas más rápido</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usar SGC me ahorra tiempo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACTITUD HACIA EL USO</td>
<td>Totalmente de acuerdo</td>
<td>De acuerdo</td>
<td>Neutral</td>
<td>En desacuerdo</td>
<td>Totalmente en desacuerdo</td>
</tr>
<tr>
<td>En general, pienso que es una buena idea usar SGC en mi trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usar SGC es/sería agradable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Usar SGC es/sería benéfico para mi trabajo

<table>
<thead>
<tr>
<th>TRIABILIDAD</th>
<th>Totalmente de acuerdo</th>
<th>De acuerdo</th>
<th>Neutral</th>
<th>En desacuerdo</th>
<th>Totalmente en desacuerdo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sé a donde puedo ir para probar los varios usos de SGC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antes de decidir si usar SGC, se me dio oportunidad de probarlos a fondo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Se me permitió usar SGC en modo de prueba el suficiente tiempo para ver que podían hacer antes de usarlos regularmente para mi trabajo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

C.1 Communalities and Total Variance for "Perceived Usefulness"

Table 12 Communalities for Perceived Usefulness

<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU1</td>
<td>1.000</td>
<td>.709</td>
</tr>
<tr>
<td>PU2</td>
<td>1.000</td>
<td>.703</td>
</tr>
<tr>
<td>PU3</td>
<td>1.000</td>
<td>.786</td>
</tr>
<tr>
<td>PU4</td>
<td>1.000</td>
<td>.655</td>
</tr>
</tbody>
</table>

Table 13 Total Variance for Perceived Usefulness

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
</tbody>
</table>

C.2 Communalities and Total Variance for "Perceived Ease of Use"

Table 14 Communalities for Perceived Ease of Use

<table>
<thead>
<tr>
<th>Perceived Ease of Use</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEU1</td>
<td>1.000</td>
<td>.658</td>
</tr>
<tr>
<td>PEU2</td>
<td>1.000</td>
<td>.638</td>
</tr>
<tr>
<td>PEU3</td>
<td>1.000</td>
<td>.755</td>
</tr>
<tr>
<td>PEU4</td>
<td>1.000</td>
<td>.635</td>
</tr>
</tbody>
</table>
Table 15 Total Variance for Perceived Ease of Use

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Perceived Ease of Use</td>
<td>3.531</td>
<td>12.177</td>
<td>37.857</td>
</tr>
</tbody>
</table>

C.3 Communalities and Total Variance for "Efficiency Gains"

Table 16 Communalities for Efficiency Gains

<table>
<thead>
<tr>
<th>Efficiency Gains</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG1</td>
<td>1.000</td>
<td>.879</td>
</tr>
<tr>
<td>EG2</td>
<td>1.000</td>
<td>.898</td>
</tr>
<tr>
<td>EG3</td>
<td>1.000</td>
<td>.872</td>
</tr>
</tbody>
</table>

Table 17 Total Variance for Efficiency Gains

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
</tbody>
</table>

C.4 Communalities and Total Variance for "Image"

Table 18 Communalities for Image

<table>
<thead>
<tr>
<th>Image</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMG1</td>
<td>1.000</td>
<td>.800</td>
</tr>
<tr>
<td>IMG2</td>
<td>1.000</td>
<td>.779</td>
</tr>
<tr>
<td>IMG3</td>
<td>1.000</td>
<td>.816</td>
</tr>
</tbody>
</table>
Table 19 Total Variance for Image

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Image</td>
<td>2.000</td>
<td>6.897</td>
<td>55.796</td>
</tr>
</tbody>
</table>

C.5 Communalities and Total Variance for "Voluntariness"

Table 20 Communalities for Voluntariness

<table>
<thead>
<tr>
<th>Voluntariness</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOL1</td>
<td>1.000</td>
<td>.641</td>
</tr>
<tr>
<td>VOL2</td>
<td>1.000</td>
<td>.730</td>
</tr>
<tr>
<td>VOL3</td>
<td>1.000</td>
<td>.762</td>
</tr>
</tbody>
</table>

Table 21 Total Variance for Voluntariness

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Voluntariness</td>
<td>1.782</td>
<td>6.146</td>
<td>51.942</td>
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</tbody>
</table>

C.6 Communalities and Total Variance for "Attitude Towards Use"

Table 22 Communalities for Attitude Towards Use

<table>
<thead>
<tr>
<th>Attitude Towards Use</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATU1</td>
<td>1.000</td>
<td>.817</td>
</tr>
<tr>
<td>ATU2</td>
<td>1.000</td>
<td>.660</td>
</tr>
<tr>
<td>ATU3</td>
<td>1.000</td>
<td>.839</td>
</tr>
</tbody>
</table>
Table 23 Total Variance for Attitude Towards Use

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
</tbody>
</table>

C.7 Communalities and Total Variance for "Triability"

Table 24 Communalities for Triability

<table>
<thead>
<tr>
<th>Triability</th>
<th>Initial Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRI1</td>
<td>1.000 .534</td>
</tr>
<tr>
<td>TRI2</td>
<td>1.000 .821</td>
</tr>
<tr>
<td>TRI3</td>
<td>1.000 .787</td>
</tr>
</tbody>
</table>

Table 25 Total Variance for Triability

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Triability</td>
<td>1.222</td>
<td>4.212</td>
<td>71.015</td>
</tr>
</tbody>
</table>

C.8 Communalities and Total Variance for "Subjective Norm"

Table 26 Communalities for Subjective Norm

<table>
<thead>
<tr>
<th>Subjective Norm</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN1</td>
<td>1.000</td>
<td>.922</td>
</tr>
<tr>
<td>SN2</td>
<td>1.000</td>
<td>.922</td>
</tr>
</tbody>
</table>
Table 27 Total Variance for Subjective Norm

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Subjective Norm</td>
<td>1.060</td>
<td>3.655</td>
<td>74.670</td>
</tr>
</tbody>
</table>

C.9 Communalities and Total Variance for "Job Relevance"

Table 28 Communalities for Job Relevance

<table>
<thead>
<tr>
<th>Job Relevance</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>JR1</td>
<td>1.000</td>
<td>.913</td>
</tr>
<tr>
<td>JR2</td>
<td>1.000</td>
<td>.913</td>
</tr>
</tbody>
</table>

Table 29 Total Variance for Job Relevance

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Job Relevance</td>
<td>.934</td>
<td>3.219</td>
<td>77.890</td>
</tr>
</tbody>
</table>

C.10 Communalities and Total Variance for "Intention to Use"

Table 30 Communalities for Intention to Use

<table>
<thead>
<tr>
<th>Intention to Use</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITU1</td>
<td>1.000</td>
<td>.818</td>
</tr>
<tr>
<td>ITU2</td>
<td>1.000</td>
<td>.818</td>
</tr>
</tbody>
</table>
Table 31 Total Variance for Intention to Use

<table>
<thead>
<tr>
<th></th>
<th>Initial Eigenvalues</th>
<th></th>
<th>Extraction Sums of Squared Loadings</th>
<th></th>
<th>Rotation Sums of Squared Loadings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>Intention to Use</td>
<td>.948</td>
<td>2.024</td>
<td>80.813</td>
<td>.843</td>
<td>2.024</td>
<td>80.813</td>
</tr>
</tbody>
</table>