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Identifying Subcultures and their Perceptions towards Knowledge Management Systems

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Abstract

Knowledge and culture are inextricably linked in organizations. Effective deployment of Knowledge Management Systems (KMS) requires an understanding of the culture of the knowledge workers in the organization and their perceptions towards such systems. It would be a mistake to perceive the organization as a homogenous culture. Instead, organizations are composed of multiple subcultures that co-exist and interact with each other, with each subculture having its distinct set of values, norms and work practices. Based on a survey of 230 knowledge workers in Singapore about their work environment and practices, this study first investigates the subcultures that exist among knowledge workers and then analyzes how each subculture perceives the various features in a KMS. Data collected were subjected to cluster and discriminant analyses and four distinct subcultures emerged from this study, namely (1) Conformists, (2) Craftsmen, (3) Technocrats and (4) Artists. Further analysis revealed that there is a highly significant effect of subcultures on how user perceives KMS features. Understanding subcultures and their perceptions towards common KMS features is crucial as it guides organizations when planning and designing new features for their KMS.

Keywords

Subcultures, Perceptions, Knowledge Management Systems (KMS)

1. Introduction

Knowledge Management Systems (KMS) refer to a class of information systems developed to support and enhance the organizational processes of knowledge creation, storage/ retrieval, transfer and application (Alavi & Leidner 2001). Some examples of KMS include Intranet and Lotus Notes[®]. Organizations have invested significant amount of time and money (Walsham 2001) into knowledge management (KM) initiatives, as they perceive that knowledge constitutes the major source of competitive advantage.

However, De Long and Fahey (2000) commented that efforts of many companies to manage their knowledge have not achieved their objectives. A survey undertaken by KPMG (2000)

highlighted that the benefits of KMS have failed to meet the expectations and the most cited reason for the failure is the lack of user uptake. Clearly, the challenge is to design systems and approaches to make KM activities more meaningful and valuable to all parties (Walsham 2001), yet little research exists on the design, use, or success of systems to support knowledge management (Alavi & Leidner 2001).

Besides knowledge on designing KMS, effective KM initiatives also require foundation in several rich literatures such as organizational, cultural and managerial initiatives (Ruggles 1998, Macwick 2001, Alavi & Leidner 2001). For example, Ruppel and Harrington (2001) found out that employee acceptance or resistance to intranets as a knowledge-sharing environment is a management and corporate culture issue rather than a technology issue.

Keeping in mind its importance, we have included the cultural dimension in this study. The study of KMS is not complete without considering the cultural aspect of the organization and its employees for knowledge and culture are inextricably linked in organizations. Indeed, any discussion of knowledge in organizational settings without explicit references to its cultural context is likely to be misleading (De Long & Fahey 2000).

Subcultural level of analysis was chosen as modern organizations are multicultural (Trice & Beyer 1993) and it would be a mistake to perceive the organization as a homogenous culture. Instead, organizations are composed of multiple subcultures that co-exist and interact with each other, with each subculture having its distinct set of values, norms and work practices. As members of the same subculture interact and work together, they come to share a similar view of their work and more generally, of the world in which they perform it (Trice & Beyer 1993). Subcultures were defined broadly as derivatives of, but different from, the larger culture. They embody shared system of norms, values, interests or behaviors that distinguish some individuals, groups and/ or larger aggregations from the "larger societies" in which they also participate (Short 1996).

Hence, the objective of this study is to understand how knowledge workers in different subcultures perceive the common features in KMS. Such an understanding guides management and IS planners when designing new features for their KMS as they can best identify those features that will be embraced by their employees. This paper is organized as follows: we will first review the literature from two main areas: KMS features and Perceived Characteristics of Innovating (PCI). We will proceed to demonstrate the process of identifying subcultures among knowledge workers. Following that will be the research model, hypotheses and variables used in this study. The data analysis section will describe the statistical tests that have been conducted and the results of the hypotheses. We will conclude with a discussion, implications of the results and provide some insights for future research.

2. Literature Review

The background of this study is drawn from two main areas. We will first discuss the features of KMS that have been widely studied by researchers and will proceed to introduce Perceived Characteristics of Innovating (PCI), which is a tool that we have employed to measure user perceptions towards innovations.

2.1. KMS Features

Organizations have adopted a number of relevant technologies for KM purposes. Some of the advanced technologies adopted include the Internet, Intranet, Data Warehousing/ Mining, Document Management Systems, Decision Support and Groupware (KPMG 2000). Researchers have focused on understanding specific applications and its usage in the organizations. For example, Vandenbosch and Ginzberg (1997) have examined the usage of Lotus Notes[®] and its influence in the degree of collaboration among organizational members. Ruppel et al. (2001) investigated Intranet implementation with respect to the organizational culture. Many other practitioner studies have also carried out research and surveys involving user and their attitudes towards specific KM technologies (KPMG 2000, Macwick 2001).

However, such studies based on KM technologies are too generalized and the results can be misleading. For example, Lotus Notes[®] facilitates the sharing of documents and discussions (Macwick 2001). If a knowledge worker perceives Lotus Notes[®] as advantageous to their work processes, which aspects of Lotus Notes[®] are they referring to? Is it sharing of documents or facilitating of discussions or is it both? Clearly, using KM technologies to understand user perceptions can be ambiguous and confusing because each technology can contain multiple features. Hence in this study, we have instead chosen six common features.

- *Collaborative Shared Space (css)* - The KMS is a collaborative environment where users can create network of shared virtual spaces. This shared space enable users to share and exchange ideas, thus enabling greater communication. This shared, collaborative environment is sometimes known as communities of practice or the concept of 'ba' (Nonaka & Konno 1998).
- *Knowledge Yellow Pages (kyp)* - This feature in KMS contains pointers to experts within the organization on key knowledge topics and facilitates contact and knowledge transfer between knowledgeable people and those who have seek their knowledge. Knowledge Yellow Pages is sometimes known as expertise location systems, corporate directories or the mapping of internal expertise and knowledge dictionaries (Macwick 2001, Ruggles 1998, Alavi & Leidner 2001).
- *Building and Managing Knowledge Stocks (mks)* - KMS carry out the functions of gathering, storing and transferring knowledge easily and efficiently. Managing knowledge stocks also include effective search and retrieval mechanisms for locating relevant knowledge. Knowledge repositories are commonly used.
- *Integration to Work Processes (iwp)* - The KMS may be actively integrated into the work process and social practices of the users. Sometimes, the usage of KMS may involve a redesign of the work process. The KMS may play a crucial role in their decision-making process, changing their mode of working (Vandenbosch & Ginzberg 1997).
- *Self-Development (sde)* - The KMS may contain self-learning tools and techniques that enhance the individual intellectual developmental process. KM efforts should try to avoid the loss of intellectual capital by retaining employees through enabling personal development and empowerment.
- *Participation and Incentives (pai)* - Since knowledge is being extracted from individuals or groups for others to use, it is likely that incentives or rewards will be given to participants for knowledge creation and contribution.

2.2. Perceived Characteristics of Innovating (PCI)

In the innovations literature, researchers have attempted to understand problems in technology innovations using theories such as the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) (Davis 1986, Davis, Bagozzi & Warshaw 1989). Other researchers have examined a variety of factors that are thought to be determinants of IT adoption and usage (Ryker, Nath & Henson 1997, Szajna & Scamell 1993, Damanpour 1991). In this study, we have adopted the Perceived Characteristics of Innovating (PCI) instrument developed by Moore and Benbasat (1991) that measures the various perceptions an individual may have of adopting an information technology innovation.

The perceptions of adoption were initially based on the five characteristics of innovations derived by Rogers (1995). Moore et al. (1991) refined, added more characteristics and labelled them as the Perceived Characteristics of Innovating (PCI). The PCI developed are

- *Voluntariness* refers to the degree to which use of the innovation is perceived as being voluntary, or of free will.
- *Relative Advantage* measures the degree to which an innovation is perceived as being better than the idea it supersedes.
- *Compatibility* looks at the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters.
- *Image* examines the degree to which the use of an innovation is perceived to enhance one's image or status in one's social system.
- *Ease of use* refers to the degree that the innovation will be easy to use.
- *Result Demonstrability* measures the degree to which the user will have no difficulty showing others that the innovation is beneficial to his or her work.
- *Visibility* is the degree to which the user can see the tangible benefits of using the innovation.
- *Trialability* is the degree to which an innovation may be experimented with on a limited basis.

3. Identifying Subcultures

To identify the subcultures that exist among knowledge workers, we have adopted an instrument developed by Hofstede, Neujin and Ohayv (1990) that measures organizational work practices, norms and values on six independent dimensions, namely (1) process vs. results oriented, (2) employee vs. job oriented, (3) parochial vs. professional, (4) open vs. closed, (5) loose vs. tightly controlled, and (6) normative vs. pragmatic. Hofstede himself has applied the instrument to identify three distinct subcultures that exist in a large Danish insurance company (Hofstede 1998). However, our usage of the instrument is different from Hofstede. Instead of identifying subcultures in a particular organization, we are interested in a broader aspect of subcultures among knowledge workers as a whole. Figure 1 summarizes the process of identifying the four subcultures.

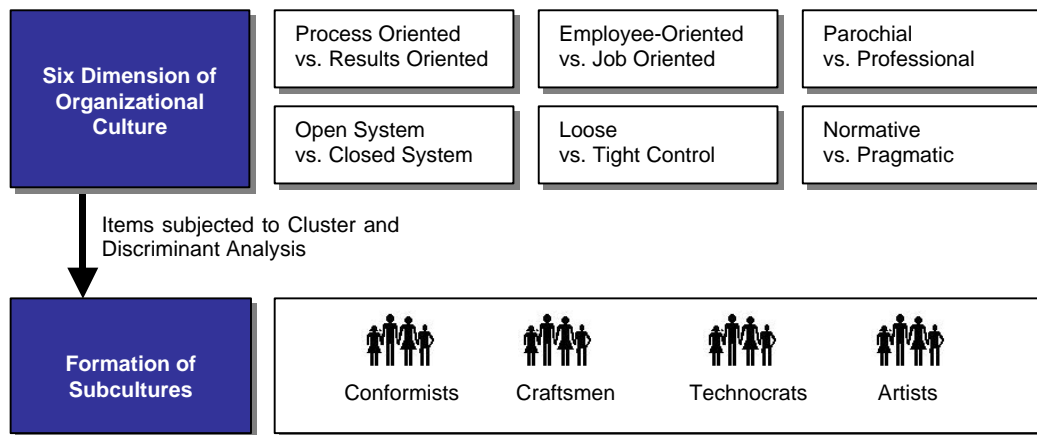


Figure 1. Summary of the process of identifying subcultures

A total of 43 items were extracted from the instrument and responses to these questions were collected from the 230 knowledge workers via questionnaires (See Section 5.1 for details). The results from the respondents were subjected to a Hierarchical Cluster Analysis using Ward’s method (Hofstede 1998), which produced a dendrogram. The inspection of the dendrogram revealed the existence of four distinct clusters.

Discriminant analysis was then conducted on the 43 questions to identify the questions that best describe each of the clusters. First, questions with significance value that are small ($p < 0.10$) are used as this indicates that cluster differences are significant. A total of 31 questions are used instead of the full instrument of 43 questions. Second, in order to identify which question strongly describes each cluster, the 31 questions were subjected to Fisher’s linear discriminant functions where large coefficient implies heavy loading (See Appendix C). The detailed description of the four subcultures is found in Appendix A.

4. Research Model

In this section, we will illustrate and explain the framework used in this study and the various hypotheses that were derived.

4.1. The Integrative Framework

Figure 2 illustrates the integrative framework used in this study. The right side of the diagram shows the derivation of the KMS instrument. The PCI is intended to be a general instrument to measure user perceptions towards innovations. To apply the instrument, we have extracted six features of KMS to form a 45-item instrument that is specific to measuring user perceptions towards KMS. The left side illustrates the four types of knowledge workers and their identification was discussed earlier. In summary, the objective of this study is to find out the perceptions of these four types of knowledge workers towards the six common features in KMS.

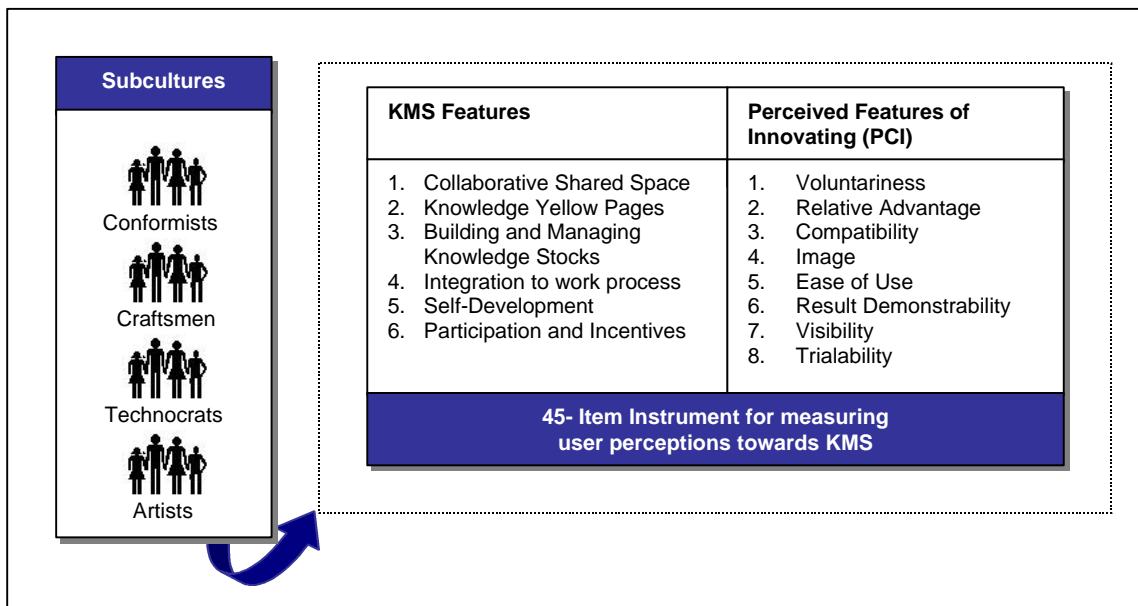


Figure 2. The Integrative Framework

4.2. Hypotheses

Among the four types of knowledge workers, Craftsmen are the ones who work in an environment where the style of dealing with each other is informal. In addition, the organization and people are open to each other and are not secretive about work. Given such a conducive environment for Craftsmen to learn and acquire information and knowledge, we believe Craftsmen may not hold high perception towards the collaborative shared space in KMS as they do not think it is a good substitute to their current process of acquiring information and knowledge. Hence we hypothesize that

H1: Craftsmen will have the lowest perception towards using the collaborative shared space in KMS, as compared to other types of knowledge workers.

The Conformists are the knowledge workers that express very negative perceptions towards their organization and work environment. They feel that there is no trust and cooperation between departments in the organization and even perceive their own department to be the worse performing. Given such low self-esteem, Conformists may not wish to seek knowledge and experts through the knowledge yellow pages. Hence we hypothesize that

H2: Conformists will have the lowest perception towards using the knowledge yellow pages in KMS, as compared to other types of knowledge workers.

In building and managing knowledge stocks, knowledge workers typically has to contribute to the repositories. This requires a high degree of empowerment and initiatives exhibited by knowledge workers. However, the Craftsmen feel that there is a high degree of intervention by the management and Craftsmen are rather passive in making changes involving their work processes. Hence we hypothesize that

H3: Craftsmen will have the lowest perception towards using the KMS for building and managing knowledge stocks, as compared to other types of knowledge workers.

H4: Craftsmen will have the lowest perception towards using the KMS for integration to current work processes, as compared to other types of knowledge workers.

In using the KMS for self-development, the knowledge workers typically have to be receptive to new learning styles. However, in the Craftsmen environment, new employees take more than a year to integrate and feel at home. They are given room for learning and mistakes are tolerated. Hence we believe they may have low perceptions of using KMS for self-development, as they are afraid that mistakes will be tracked using such systems. We hypothesize that

H5: Craftsmen will have the lowest perception towards using the KMS for self-development, as compared to other types of knowledge workers.

Finally, participating and sharing using KMS involves an open environment where people are not secretive about their work. Since the Technocrats feel that the organization and people tend to keep among themselves and are secretive about their work, we hypothesize that

H6: Technocrats will have the lowest perception towards participation and incentives in KMS, as compared to other types of knowledge workers.

5. Data Collection, Analysis and Results

In this section, we will provide the profiles of our respondents and discuss the types of statistical analysis that have been conducted from the data collected.

5.1. Survey Administration

Survey questionnaire was used to collect data for this study. Each questionnaire includes brief descriptions of the KMS and various features. The questionnaire comes in two parts - Part A consists of a 45-item instrument used to measure User Perceptions towards KMS while Part B consists of a 43-item instrument used to measure Organizational Culture and Work Practices (See Appendix B for a sample).

A total of 360 questionnaires were sent out and 230 were returned, indicating a response rate of 64%. About 55% of the respondents were male and 45% were female. The majority of the respondents fall under the age group of 20-30 and this group accounts for 63% of the respondents. Educational level ranges from primary school to master's degree, with the majority of them (52.5%) attaining a Bachelor's degree. About 95% of the respondents were exposed to full-time working experience and 42% indicated that they are currently a student pursuing either postgraduate or diploma courses.

Among the respondents who are currently working, the longest work experience indicated is 34 years while the shortest is only a month. The average number of years these respondents have worked in their current department is 2.6 years while the average for the organization is 3.5 years. These working respondents come from a range of professions, with the majority of them involved in the work of engineers, managers, system analysts, educationists and sales. The working respondents were asked to indicate their job with respect to the organizational level and the majority of them (39%) felt that they belonged to the Professional category. The working respondents also indicated their computer usage during work, with about 41% of them spending greater than 8 hours everyday on the computer.

5.2. Construct Validity and Reliability Assessments

Instrument validation is a prior and primary process in confirmatory empirical research (Straub 1989). Although the PCI instrument was comprehensively developed and tested by Moore et al. (1991), it would be prudent to check for validity and reliability as the items were reworded to include the features of KMS.

The 45-Item KMS Instrument was first tested for validity and reliability. Validity refers to the extent to which an instrument measures what it is supposed to and does not measure what it is not supposed to. There are two forms of validity: content and construct validity. Reliability refers to the consistency of a score and the extent to which the measure is free from random error.

Content validity refers to the representativeness and comprehensiveness of the items used to create the scale (Bock & Kim 2002). An instrument is deemed to be content valid when it has drawn representative questions from a universal pool (Straub 1989). In this study, the various PCI were first drawn from Rogers (1995) from the diffusion innovations literature and then were tested and thoroughly reviewed by Moore et al. (1991), which is a high indication of content validity.

Construct validity asks whether the items chosen are true constructs describing the event or merely artifacts of the methodology itself (Straub 1989). Construct validity was completed using principal component analysis with a varimax rotation, specifying a six-factor solution. The factor analysis captured 67% of the variance and six factors had eigen-values above and close to 1.00 (See Appendix C). An eigenvalue of 1.00 or greater indicates that the factor possesses at least as much total variance as contained in a single item.

The rotated factor matrix was next examined for items that either did not load strongly on any factor or loaded highly or relatively equally on more than one factor. Such items were dropped from the instrument, as they are an indication of low construct validity. A factor loading of .50 was determined to be the lowest acceptable loading, although in exploratory analysis, after factors are rotated, loadings of .30 or higher is acceptable (Nunnally 1978). Hence items with factor loading less than .50 were dropped from the scale and the KMS Instrument was reduced to 25 items. The 25 items loaded together on their “target” factor, with the lowest loading being 0.501 and the highest 0.833 (See Appendix D).

Reliability of the constructs was investigated using Cronbach alpha, with values ranging from 0.771 to 0.884 and large Cronbach alphas are usually signs that the measures are reliable (Straub 1989).

5.3. Results of Hypothesis Testing

Analysis included subculture as independent variable and the six features of KMS as dependent variables. A MANOVA test involving the above variables was conducted, testing the overall effect of subculture on user perceptions towards the six features of KMS. MANOVA result indicated that the overall effect of subculture on user perceptions towards KMS is highly significant $F(18, 563) = 2.72, p < 0.01$. This highly significant effect of subculture permitted ANOVA tests to be applied to each of the dependent variable.

	Subculture
Collaborative Shared Space (css)	F(3, 204) = 4.34, p < 0.01 ***
Knowledge Yellow Pages (kpy)	F(3, 204) = 2.62, p = 0.0522 *
Building and Managing Knowledge Stocks (mks)	F(3, 204) = 2.51, p = 0.0596 *
Integration to Work Processes (iwp)	F(3, 204) = 5.58, p < 0.01 ***
Self-Development (sde)	F(3, 204) = 4.30, p < 0.01 ***
Participation and Incentives (pai)	F(3, 204) = 3.48, p < 0.05 **

* approaching significant ** p < 0.05 significant *** p < 0.01 highly significant

Table 1. Results from ANOVA Tests

The results from the ANOVA tests indicated that the effect of subcultures is highly significant ($p < 0.01$) on user perceptions towards collaborative share space, integration to work processes and self-development. Subculture has significant effect ($p < 0.05$) on user perceptions towards participation and incentives in KMS while the influence of subcultures on knowledge yellow pages and building and managing knowledge stocks are approaching significant. Table 1 illustrates the ANOVA results.

However, ANOVA only test the effect of subculture on the dependent variable. It does not indicate how the subcultures differ with respect to the dependent variable - post hoc tests are needed. Hence, significant effects detected by ANOVA tests were further investigated using Tukey's HSD to find out which of the subculture differs from the others.

In examining the post-hoc test for collaborative shared space, Tukey's HSD tests found that Craftsmen differ from Technocrats ($p = 0.074$) and Artists ($p = 0.0155$). Craftsmen have low perception of CSS and this is highly significantly different from both Technocrats and Artists who have high perceptions towards CSS. Thus H1 is partially supported.

Although ANOVA tests show that the influence of subcultures on knowledge yellow pages and building and managing knowledge stocks are approaching significant ($p = 0.0522$, $p = 0.0596$), post hoc tests analysis revealed that the four subcultures were not statistically different from each other, thus H2 and H3 are not supported.

In understanding subcultures and their perceptions towards KMS for integration to current work processes, Craftsmen differ from Conformists ($p = 0.0175$), Technocrats ($p = 0.0018$) and Artists ($p = 0.0024$). Craftsmen have low perception towards KMS for Integration to Work Process and this is highly significantly different from the rest who hold high perception. Similarly, when using KMS for self-development, the perception of Craftsmen differs from Conformists ($p = 0.0030$), Technocrats ($p = 0.0454$), and Artists ($p = 0.0040$). Craftsmen have low perception towards KMS for Self-Development and this is highly significantly different from the rest who have high perception. Thus H4 and H5 are both supported.

Finally, in understanding subcultures and their perceptions towards Participation and Incentives in KMS, Tukey's HSD Tests found that Conformists differs from Artists ($p = 0.0383$). Conformists have low perception of KMS for Participation and Incentives and this is significantly different from the Artists who have high perception. Thus H6 is not supported.

Table 2 shows the results of the post hoc tests and Table 3 summarizes the hypotheses tests.

Dep. Variable	Conformists		Craftsmen		Technocrats		Artists		F(df =3, 204)
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
css	14.22	0.24	12.18 _{ab}	0.81	15.83 _a	0.78	14.86 _b	0.36	4.34 ^{***}
kyp	19.57	0.33	16.64	1.14	20.58	1.09	19.86	0.50	2.62 [*]
mks	24.33	0.39	21.73	1.33	26.17	1.28	23.39	0.59	2.51 [*]
iwp	9.03 _a	0.19	7.00 _{abc}	0.66	10.33 _b	0.63	9.57 _c	0.29	5.58 ^{***}
sde	32.71 _a	0.59	25.27 _{abc}	2.03	32.68 _b	1.95	32.91 _c	0.90	4.30 ^{***}
pai	17.89 _a	0.37	17.55	1.25	20.42	1.20	19.68 _a	0.55	3.48 ^{**}

_a Means sharing the same subscript differ at p<0.05 (Tukey's HSD)

* approaching significant ** p < 0.05 significant *** p < 0.01 highly significant

Table 2. Results from the Tukey's HSD Tests

	Subculture	
H1: Collaborative Shared Space (css)	Cr < Co, Te, Ar	(partially supported)
H2: Knowledge Yellow Pages (kpy)	Co < Cr, Te, Ar	(not supported)
H3: Building and Managing Knowledge Stocks (mks)	Cr < Co, Te, Ar	(not supported)
H4: Integration to Work Processes (iwp)	Cr < Co, Te, Ar	(supported)
H5: Self-Development (sde)	Cr < Co, Te, Ar	(supported)
H6: Participation and Incentives (pai)	Te < Co, Cr, Ar	(not supported)

Co = Conformists Cr = Craftsmen Te = Technocrats Ar = Artists

Table 3. Summary of Hypotheses Tests

6. Discussion and Implications

MANOVA result has confirmed the overall influence of subcultures on user perceptions towards KMS. Researchers such as De Long et al. (2000) agreed that the cultures and particularly subcultures shape assumptions about what knowledge is and which knowledge is worth managing.

As predicted, among the four types of knowledge workers, Craftsmen have the lowest perception towards using the KMS as a collaborative shared space, for integration to their current work processes and for self-development. The high degree of intervention by the management in planning and making decisions for the Craftsmen has resulted in knowledge workers who are heavily dependent on the management for directions. Craftsmen's informal style of interacting has led to them working in a "comfort zone" where it is easy for them to obtain information and knowledge. They have no wish to move out and embrace new

technologies as evidenced in their low perceptions towards the above three features. Such findings highlight that *management who wish to introduce KMS to Craftsmen face numerous difficulties*. Such difficulties could be alleviated through greater empowerment to the Craftsmen and encouraging them to exhibit initiatives and embrace changes.

Analysis found that the four types of knowledge workers were not statistically different in their perceptions towards using the KMS for knowledge yellow pages and for building and managing knowledge stocks. Clearly, both features allow knowledge workers to complete their tasks easily. For example, they can use the yellow pages to locate experts on certain topics and have their queries answered. They can also make use of the retrieval mechanism in the knowledge repositories to obtain data. Regardless of which type of knowledge workers, all of them have the same desire to complete their job in the best possible way. Hence their perceptions towards both features are not statistically different from each other. This implies that *management who wish to introduce new features into their KMS but have no prior understanding of their subcultures could embark on the above two features: KMS knowledge yellow pages and building and managing knowledge stocks*.

Finally, the most interesting finding comes from the Technocrats. We hypothesize that the lowest perception towards participation and incentives in KMS will come from Technocrats as they are in a self-seeking environment where people keep to themselves and are secretive about work. We initially predicted that such an environment will lead to the Technocrats being skeptical about KMS and hence will not participate. However, the results proved otherwise. Technocrats emerged among other types of knowledge workers, having the highest perceptions towards participation and incentives. We believe such high perceptions is due to two reasons: (1) Technocrats are highly reactive to new changes and are comfortable with unfamiliar work situations and (2) the secretive work environment have handicapped them in the process of obtaining knowledge and information, with such a system to overcome this handicap, they will naturally appreciate and have high perceptions. This implies that *management will reap the greatest benefits from the KMS if they have Technocrats*. This group of knowledge workers appreciates the advantages of such a system and will use them to improve their work processes.

7. Conclusions

Knowledge and culture are inextricably linked. As demonstrated in this study, the effect of subcultures is highly significant on how user perceives the KMS. The motivation for this study comes from the challenges that organizations face when designing and implementing their KMS. We embarked on this problem and have used subcultures as the differentiating factor in understanding user perceptions towards KMS.

We have provided a literature review of KMS features and PCI. In the KMS features, we have explained six features that are commonly discussed by researchers. We proceed to review the area of PCI where an instrument has been developed by Moore et al. (1991) in measuring user perceptions toward innovations. Using both cluster and discriminant analyses, we elaborated on the process of identifying subcultures among knowledge workers. We proceed to explain the integrative framework used in this study and the various hypotheses derived. In the data analysis section, we have provided the respondents' profiles and tested the KMS instrument for reliability and validity. We then present the results of the hypotheses and proceed to discuss the results and its implications.

The findings in this study indicate that even if management have no understanding of its knowledge workers, it can safely implement knowledge yellow pages and data repositories. Both features will be embraced by their knowledge workers regardless of their subcultures. Among the four types of knowledge workers, Craftsmen proved to be the group that management will encounter problems when implementing new features in their KMS. They are reluctant to move away from their “comfort zone” to embrace new features in KMS. Technocrats have been suppressed in an environment where people are secretive about their work. Hence they are the type of knowledge workers that will appreciate the advantages that KMS will bring to them. Management are likely to derive greatest benefits when introducing new features of KMS to Technocrats in the organization.

Through this study, we hope to contribute to the literature of KMS design through the lens of subcultures. We have also provided management and IS planners a convenient categorization of the types of knowledge workers that exist and their perceptions towards common KMS features. The inextricable relationship between knowledge and subcultures provide many directions for future research. One can make use of the four types of knowledge workers and study their perceptions towards other enterprise systems. They can also validate the existence of the four types of subcultures among knowledge workers by using respondents from different countries.

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Appendix A Detailed Description of each subculture

Subculture 1 – Conformists

In an organization, Conformists are the conventional type of workers who perceive that the organization is only interested in the work that they do, and not in their personal and family matters. Such work-centric attitude reinforces as they feel there is little attention paid to improve their physical work environment. Conformists paint a negative picture of their organization as they feel that the organization has no special ties with the local communities and they do not try to be market leaders in the industry. The sense of belonging to the organization is not prominent in Conformists as they seldom talk about the history of the organization and they even perceive their own department to be the worse performing in the organization. In the Conformists' work environment, meeting times are kept punctually and the people are frank and direct with each other. However, such direct relationship does not lead to greater cohesiveness as the Conformists feel that there is no cooperation and trust between departments in the organization. With such negative perceptions relating to their work environment, Conformists naturally feel that each day of work does not bring about new challenges. Despite such pessimism, they are knowledge workers who put in maximum effort in whatever they do. Conformists feel that the results of the work are more important than the procedures involved and there is a major emphasis in trying to meet its customers' needs.

Subculture 2 – Craftsmen

In the Craftsmen work environment, mistakes are tolerated. Even though there is room for learning, Craftsmen feels there is a high degree of intervention by the management in the organization. For example, they feel that the management decides and make changes to work processes and they also play a role in all matters such as budget control and being 'stingy with trivial things'. Despite the high degree of management intervention, Craftsmen still feel that decision-making happens not only at the top of hierarchy, but throughout the organization. In the Craftsmen work environment, the style of dealing with each other is informal. The organization and people are open to each other and are not secretive about their work. Unlike the Conformists, Craftsmen paint a positive picture about their work environment. They feel that each day of work brings about new challenges. They perceive the procedures of the work as more important than the results, which is completely different from the Conformists. To summarise, the Craftsmen are knowledge workers who are characterize by continuous daily learning, with their skills and ideas slowly refined and accumulated over time and that explains why it takes new employees more than a year to integrate and feel at home in a Craftsmen environment.

Subculture 3 – Technocrats

Unlike the Conformists, Technocrats have a closer relationship with their organization. They feel that the organization not only pays attention to improve the internal physical work environment, but only cares about the external environment as they provide financial contributions to special groups in the society. Although Technocrats are well-dressed for work, they are less reserved in their behaviors as they always joke about the organization and their work. People in the Technocrats work environment are highly self-seeking. For

example, the managers will retain only people who have shown good results in their own department and the Technocrats feel that the organization and people tend to keep among themselves and are secretive about work. In such a self-seeking environment, newcomers do not receive much help in the organization and employees are seldom complimented when a good work job is done. Despite the 'coldness' of their work environment, Technocrats are knowledge workers who are highly responsive to external stimuli. They react fast to unfamiliar and changing work situations and they are generally comfortable when facing unfamiliar work situations.

Subculture 4 – Artists

In the Artists work environment, people in the organization exhibit initiatives in their work. Artists are independent knowledge workers where important decision-making tasks are often made by individuals and not as a group. Artists break radically with conventional wisdom and are someone who sees what others do not. They are not punctual about meeting times and seldom compliment others, only when a good job is done and is up to the Artists' standard. Hence Artists can be perceived as knowledge workers who prefer working independently, avoiding collaboration and teamwork.

Appendix B– Questionnaire



Thank you for your interest in this questionnaire!

This questionnaire is part of a research project at the National University of Singapore, School of Computing. Please take your time to answer all questions.

This research is to obtain a greater understanding of users' perception to Knowledge Management Systems (KMS). A brief definition of KMS defines it as a class of information systems applied to managing organizational knowledge. That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/ retrieval, transfer and application.

This KMS questionnaire consists of two parts and a 7-point scale ranging from Highly Unlikely to High Likely has been used.

Part A: User Perception of Knowledge Management Systems (KMS)

Part B: Organizational Culture and Work Practices

If you have any questions about this research, you are welcome to send your enquiries to isc90422@nus.edu.sg.

Thank you and please proceed to the questions starting from Page 2.

Part A: User Perception of KMS

Collaborative Shared Space: The KMS is a collaborative environment where users can create network of shared virtual spaces. This shared space enable users to share and exchange ideas, thus enabling greater communication.

- | | Highly unlikely ----- Highly likely |
|--|-------------------------------------|
| 1. How likely is it that the advantages of this shared collaborative environment will outweigh the disadvantages? | 1 2 3 4 5 6 7 |
| 2. How likely is that the network of shared space will increase your effectiveness in the job and improve your productivity? | 1 2 3 4 5 6 7 |
| 3. How likely is it that the collaborative design of shared space in KMS will be easy for you to use? | 1 2 3 4 5 6 7 |
| 4. How likely is it that using this collaborative design in KMS to manage large amounts of data will require a lot of mental effort? | 1 2 3 4 5 6 7 |
| 5. How likely is the network of shared space compatible with your existing work style? | 1 2 3 4 5 6 7 |
| 6. How likely is the network of shared space to be compatible with all aspects of your work? | 1 2 3 4 5 6 7 |

“Knowledge Yellow Pages”: This feature in KMS contains pointers to experts within the organization on key knowledge topics and facilitates contact and knowledge transfer between knowledgeable people and those who have seek their knowledge.

- | | Highly unlikely ----- Highly likely |
|--|-------------------------------------|
| 1. How likely is it that the advantages of the “knowledge yellow pages” will outweigh the disadvantages? | 1 2 3 4 5 6 7 |
| 2. How likely is it that using the “knowledge yellow pages” in the KMS will result in an increase in my | 1 2 3 4 5 6 7 |

work productivity?

- 3. How likely is it that using the "knowledge yellow pages" in the KMS will allow greater knowledge transfer in my organization? 1 2 3 4 5 6 7
- 4. How likely is it that using the "knowledge yellow pages" will be compatible with all aspects of my work? 1 2 3 4 5 6 7
- 5. How likely is it that the KMS will be compatible with my work style of accessing sources of knowledge? 1 2 3 4 5 6 7
- 6. How likely is it that the "knowledge yellow pages" will be cumbersome to use? 1 2 3 4 5 6 7
- 7. How likely is it that the interaction with the "knowledge yellow pages" will be clear and understandable? 1 2 3 4 5 6 7
- 8. How likely is it that I have no difficulty telling others that the "knowledge yellow pages" provide me with a wider breath and depth of knowledge access? 1 2 3 4 5 6 7
- 9. How likely is it that my image will be improved if I am "listed" as experts in the "knowledge yellow pages"? 1 2 3 4 5 6 7
- 10. How likely is it that because of my use of the "knowledge yellow pages," others in my organization see me as a more valuable employee? 1 2 3 4 5 6 7

Building and Managing Knowledge Stocks: KMS carry out the functions of gathering, storing and transferring knowledge easily and efficiently. Managing knowledge stocks also include effective search and retrieval mechanisms for locating relevant knowledge.

Highly unlikely ----- Highly likely

- 1. How likely is it that the advantages of using the KMS to build and manage knowledge stocks will 1 2 3 4 5 6 7

- 2. How likely is it that the KMS gives you greater control at building and managing knowledge stocks? 1 2 3 4 5 6 7
- 3. How likely is it that the KMS will be efficient in accessing and retrieving contents? 1 2 3 4 5 6 7
- 4. How likely is it that managing and building knowledge stocks will be easy using KMS? 1 2 3 4 5 6 7
- 5. How likely is it that locating relevant information in the KMS will be easy? 1 2 3 4 5 6 7
- 6. How likely is it that using the KMS to manage knowledge stock is compatible with all aspects of your work? 1 2 3 4 5 6 7

Integration to work process: The KMS may be actively integrated into the work process and social practices of the Users. Sometimes, the usage of KMS may involve a redesign of the work process.

Highly unlikely ----- Highly likely

- 1. How likely is it that the advantages of integrating the KMS into work processes will outweigh the disadvantages? 1 2 3 4 5 6 7
- 2. How likely is it that integrating the KMS into my work processes will result in greater productivity? 1 2 3 4 5 6 7
- 3. How likely is it that a redesign of work processes due to KMS will be compatible to all aspects of my work? 1 2 3 4 5 6 7
- 4. How likely is it that the KMS will change my style of working? 1 2 3 4 5 6 7
- 5. How likely is it that I will have a great deal of opportunity to try out the KMS after its 1 2 3 4 5 6 7

integration into my work processes?

6. How likely is it that I can have adequate test runs after redesigning of the work processes due to the KMS? 1 2 3 4 5 6 7

Self-Development: The KMS may contain self-learning tools and techniques that enhance the individual intellectual developmental process.

- Highly unlikely ----- Highly likely
1. How likely is it that I will voluntarily use the learning tools and techniques in the KMS to enhance my intellectual capital? 1 2 3 4 5 6 7
2. How likely is it that my supervisor expects me to use the KMS learning tools and techniques to enhance my intellectual capital? 1 2 3 4 5 6 7
3. How likely is it that the KMS will provide better tools and techniques to enhance intellectual capital? 1 2 3 4 5 6 7
4. How likely is it that the advantages of using the KMS tools and techniques for self-development will outweigh the disadvantages? 1 2 3 4 5 6 7
5. How likely is it that using the KMS for self-development will enhance my image in the organization? 1 2 3 4 5 6 7
6. How likely is it that because of using the learning tools and techniques, others in the organization see me as more intellectual? 1 2 3 4 5 6 7
7. How likely is it that I will be able to tell others that my intellectual developmental process has been enhanced by the KMS learning tools and techniques? 1 2 3 4 5 6 7
8. How likely is it that I have no difficulty telling others that the learning tools and techniques are 1 2 3 4 5 6 7

Participation and Incentives: Since knowledge is being extracted from individuals or groups for others to use, it is likely that incentives or rewards will be given to participants for knowledge creation and contribution.

- Highly unlikely ----- Highly likely
1. How likely is it that the process of knowledge creation and contribution to the KMS will be cumbersome? 1 2 3 4 5 6 7
2. How likely is the interaction with the KMS clear and understandable when administering the documents? 1 2 3 4 5 6 7
3. How likely is it that I will participate voluntarily towards updating the KMS with information? 1 2 3 4 5 6 7
4. How likely is it that my supervisor will expect me to participate voluntarily towards updating the KMS with information? 1 2 3 4 5 6 7
5. How likely is it that I will share my knowledge voluntarily with others, given no incentives in sharing? 1 2 3 4 5 6 7
6. How likely is it that my supervisor will expect me to share my knowledge with others, given no incentives in sharing? 1 2 3 4 5 6 7
7. How likely is it that a high level of participation in the KMS will improve my image in the organization? 1 2 3 4 5 6 7
8. How likely is it that others will perceive me as a valuable employee if I have receive no rewards for sharing my knowledge? 1 2 3 4 5 6 7
9. How likely is it that I can use the KMS to see tangible rewards I have obtained for sharing my 1 2 3 4 5 6 7

knowledge with others?

- 11. In my organization, mistakes are tolerated. 1 2 3 4 5 6 7
- 12. The people in the organization are optimistic about work and their future. 1 2 3 4 5 6 7
- 13. The organization is open to outsiders and newcomers. 1 2 3 4 5 6 7
- 14. The managers help people who have shown good results in their work to advance in their career. 1 2 3 4 5 6 7

Part B: Organizational Culture and Work Practices

Factor P1: Process-Oriented vs. Results-Oriented

- | | Highly unlikely ----- Highly likely |
|---|-------------------------------------|
| 1. Employees are complimented only when a good job is done. | 1 2 3 4 5 6 7 |
| 2. The people in my organization react fast to unfamiliar and changing work situations. | 1 2 3 4 5 6 7 |
| 3. I generally feel comfortable when facing unfamiliar work situations. | 1 2 3 4 5 6 7 |
| 4. To me, each day of work brings about new challenges. | 1 2 3 4 5 6 7 |
| 5. The people in my organization exhibit initiatives in their work. | 1 2 3 4 5 6 7 |
| 6. Our style of dealing with each other during work is generally informal. | 1 2 3 4 5 6 7 |
| 7. The people in my organization are warm and friendly. | 1 2 3 4 5 6 7 |
| 8. The people in my organization try to lead the way in the industry. | 1 2 3 4 5 6 7 |
| 9. The people in my organization are direct and frank with each other. | 1 2 3 4 5 6 7 |
| 10. I put in maximum effort in whatever I do in work. | 1 2 3 4 5 6 7 |

Factor P2: Employee-Oriented vs. Job-Oriented

- | | Highly unlikely ----- Highly likely |
|---|-------------------------------------|
| 1. Important decision-making tasks are often made by individuals and not as a group. | 1 2 3 4 5 6 7 |
| 2. The organization is only interested in work that I do and not in my personal and family welfare. | 1 2 3 4 5 6 7 |
| 3. Only people at the top of the hierarchy carry out decision-making. | 1 2 3 4 5 6 7 |
| 4. The managers will try to keep people who have shown good results in their own department. | 1 2 3 4 5 6 7 |
| 5. Changes to work processes are made and decided by the management. | 1 2 3 4 5 6 7 |
| 6. The newcomers do not receive much help in the organization. | 1 2 3 4 5 6 7 |
| 7. The management dislikes union members. | 1 2 3 4 5 6 7 |
| 8. The organization has no special ties with the local community. | 1 2 3 4 5 6 7 |
| 9. In my department, there is little concern for my personal problems. | 1 2 3 4 5 6 7 |

Factor P3: Parochial vs. Professional

	Highly unlikely ----- Highly likely						
1. In my department, an individual's private life is their own business.	1	2	3	4	5	6	7
2. In my organization, job competence is only criterion in hiring people.	1	2	3	4	5	6	7
3. I plan for my career three years or more down the road.	1	2	3	4	5	6	7
4. I am strongly aware of competition among my colleagues.	1	2	3	4	5	6	7
5. There is cooperation and trust between departments in my organization.	1	2	3	4	5	6	7

Factor P4: Open System vs. Closed System

	Highly unlikely ----- Highly likely						
1. It is hard for people with different values and culture to fit into our organization.	1	2	3	4	5	6	7
2. Our department is the worse performing in the organization.	1	2	3	4	5	6	7
3. The management is stingy with trivial things.	1	2	3	4	5	6	7
4. There is little attention paid to improve the physical work environment.	1	2	3	4	5	6	7
5. Our organization and the people tend to keep among themselves and are secretive about what they do.	1	2	3	4	5	6	7
6. It takes new employees more than a year to integrate into our organizational culture to feel at	1	2	3	4	5	6	7

home.

Factor P5: Loose Control vs. Tight Control

	Highly unlikely ----- Highly likely						
1. Everybody in my department is cost-conscious.	1	2	3	4	5	6	7
2. Our meeting times are kept punctually.	1	2	3	4	5	6	7
3. People in my department dressed well for work.	1	2	3	4	5	6	7
4. We always joke about our organization and our jobs.	1	2	3	4	5	6	7

Factor 6: Normative vs. Pragmatic

	Highly unlikely ----- Highly likely						
1. In my organization, business ethics and honesty are considered more important than practical solutions.	1	2	3	4	5	6	7
2. Our organization provides financial contributions to the special groups in the society.	1	2	3	4	5	6	7
3. There is a major emphasis on meeting customer needs.	1	2	3	4	5	6	7
4. The result of the work is more important than procedures involved.	1	2	3	4	5	6	7
5. The people around me never talk about the history of the organization.	1	2	3	4	5	6	7

Personal Information

Finally, we would like to ask a few questions about you. Could you please indicate:

- 1. Age (a) 20-30 (b) 31-40 (c) 41-60 (d) >60
- 2. Gender (a) Male (b) Female
- 3. What is the highest level of education that you have completed?
 - a) Primary School
 - b) Secondary School (Junior High School)
 - c) Junior College/ Polytechnic/ ITE (High School)
 - d) Bachelor's Degree
 - e) Master's Degree
 - f) Doctoral Degree
 - g) Others, please indicate _____
- 4. Are you currently a student? (a) Yes (b) No
- 5. Do you have full-time working experience? (a) Yes (b) No

This section is for those who are currently working.

- 6. Years you have worked in your current department _____ years
- 7. Years you have worked in this organization _____ years
- 8. Please circle the following which best describe your job with respect to organizational level.
 - a) Executive/ Top Management
 - b) Middle Management
 - c) Supervisory
 - d) Professional
 - e) Technical
 - f) Clerical

g) Others, please indicate _____

- 9. What is your job title? _____
- 10. How many hours per day do you use the computer for your work?
 - a) <1 hour
 - b) 1-4 hours
 - c) 5-8 hours
 - d) > 8 hours

Thank you very much for your participation.

Appendix C– Results from Discriminant Analysis

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Process Oriented v Results Oriented - Qn1	.962	2.508	3	190	.060
Process Oriented v Results Oriented - Qn2	.949	3.386	3	190	.019
Process Oriented v Results Oriented - Qn3	.874	9.154	3	190	.000
Process Oriented v Results Oriented - Qn4	.924	5.218	3	190	.002
Process Oriented v Results Oriented - Qn5	.870	9.447	3	190	.000
Process Oriented v Results Oriented - Qn6	.836	12.433	3	190	.000
Process Oriented v Results Oriented - Qn7	.852	10.984	3	190	.000
Process Oriented v Results Oriented - Qn8	.792	16.654	3	190	.000
Process Oriented v Results Oriented - Qn9	.901	6.956	3	190	.000
Process Oriented v Results Oriented - Qn10	.919	5.563	3	190	.001
Process Oriented v Results Oriented - Qn11	.945	3.668	3	190	.013
Process Oriented v Results Oriented - Qn12	.973	1.743	3	190	.160
Process Oriented v Results Oriented - Qn13	.973	1.736	3	190	.161
Process Oriented v Results Oriented - Qn14	.977	1.513	3	190	.212
Employee-Oriented v Job-Oriented - Qn1	.954	3.034	3	190	.030
Employee-Oriented v Job-Oriented - Qn2	.945	3.675	3	190	.013
Employee-Oriented v Job-Oriented - Qn3	.902	6.914	3	190	.000
Employee-Oriented v Job-Oriented - Qn4	.956	2.887	3	190	.037
Employee-Oriented v Job-Oriented - Qn5	.967	2.181	3	190	.092
Employee-Oriented v Job-Oriented - Qn6	.949	3.416	3	190	.019
Employee-Oriented v Job-Oriented - Qn7	.969	2.058	3	190	.107
Employee-Oriented v Job-Oriented - Qn8	.927	4.954	3	190	.002
Employee-Oriented v Job-Oriented - Qn9	.972	1.802	3	190	.148
Parochial v Professional - Qn1	.980	1.276	3	190	.284
Parochial v Professional - Qn2	.973	1.788	3	190	.151
Parochial v Professional - Qn3	.994	.401	3	190	.752
Parochial v Professional - Qn4	.989	.699	3	190	.554
Parochial v Professional - Qn5	.949	3.377	3	190	.019
Open System v Closed System - Qn1	.982	1.153	3	190	.329
Open System v Closed System - Qn2	.914	5.962	3	190	.001
Open System v Closed System - Qn3	.936	4.297	3	190	.006
Open System v Closed System - Qn4	.901	6.964	3	190	.000
Open System v Closed System - Qn5	.945	3.720	3	190	.012
Open System v Closed System - Qn6	.880	8.667	3	190	.000
Loose Control v Tight Control - Qn1	.975	1.599	3	190	.191
Loose Control v Tight Control - Qn2	.957	2.832	3	190	.040
Loose Control v Tight Control - Qn3	.934	4.506	3	190	.004
Loose Control v Tight Control - Qn4	.959	2.689	3	190	.048
Normative v Pragmatic - Qn1	.971	1.903	3	190	.131
Normative v Pragmatic - Qn2	.941	3.999	3	190	.009
Normative v Pragmatic - Qn3	.929	4.834	3	190	.003
Normative v Pragmatic - Qn4	.936	4.316	3	190	.006
Normative v Pragmatic - Qn5	.939	4.143	3	190	.007

Classification Function Coefficients

	CASENUM			
	1	2	3	4
Process Oriented v Results Oriented - Qn1	-.046	.030	-.521	.215
Process Oriented v Results Oriented - Qn2	1.574	1.099	1.866	1.601
Process Oriented v Results Oriented - Qn3	1.568	.712	1.922	1.477
Process Oriented v Results Oriented - Qn4	-.316	.330	-.286	-.041
Process Oriented v Results Oriented - Qn5	.636	-.194	.464	.743
Process Oriented v Results Oriented - Qn6	.010	.731	.568	.560
Process Oriented v Results Oriented - Qn7	-1.363	-1.914	-1.578	-.552
Process Oriented v Results Oriented - Qn8	-1.565	-.017	-.455	-.731
Process Oriented v Results Oriented - Qn9	1.530	.613	1.208	.811
Process Oriented v Results Oriented - Qn10	4.781	3.980	4.444	4.159
Process Oriented v Results Oriented - Qn11	.694	1.026	.736	.750
Process Oriented v Results Oriented - Qn12	.044	.279	.261	.309
Process Oriented v Results Oriented - Qn13	2.440	1.696	2.309	2.238
Process Oriented v Results Oriented - Qn14	-.437	.117	-.716	-.237
Employee-Oriented v Job-Oriented - Qn1	.196	-.015	.234	.670
Employee-Oriented v Job-Oriented - Qn2	.933	.909	.373	.707
Employee-Oriented v Job-Oriented - Qn3	-1.030	-1.517	-1.408	-1.113
Employee-Oriented v Job-Oriented - Qn4	1.415	.560	1.662	.773
Employee-Oriented v Job-Oriented - Qn5	2.020	2.483	2.181	1.270
Employee-Oriented v Job-Oriented - Qn6	1.394	1.097	1.461	1.113
Employee-Oriented v Job-Oriented - Qn7	.759	1.584	.126	.540
Employee-Oriented v Job-Oriented - Qn8	2.088	1.678	1.747	1.612
Employee-Oriented v Job-Oriented - Qn9	-.441	-.722	.278	-.419
Parochial v Professional - Qn1	-1.032	-1.647	-1.259	-1.040
Parochial v Professional - Qn2	.408	.991	-.001	.910
Parochial v Professional - Qn3	-.485	-.607	-.231	-.425
Parochial v Professional - Qn4	.597	.784	.721	.363
Parochial v Professional - Qn5	-1.241	-.668	-1.104	-.943
Open System v Closed System - Qn1	-.166	-.256	-.211	-.146
Open System v Closed System - Qn2	2.276	1.980	2.199	1.717
Open System v Closed System - Qn3	.258	.608	.246	.319
Open System v Closed System - Qn4	.027	-.129	-1.377	-.202
Open System v Closed System - Qn5	.130	-.232	.782	.396
Open System v Closed System - Qn6	1.864	2.068	1.065	1.164
Loose Control v Tight Control - Qn1	1.361	1.507	2.442	1.712
Loose Control v Tight Control - Qn2	.636	.110	.153	-.182
Loose Control v Tight Control - Qn3	.473	.823	.916	.307
Loose Control v Tight Control - Qn4	1.610	1.172	2.145	1.624
Normative v Pragmatic - Qn1	1.316	1.448	1.896	1.238
Normative v Pragmatic - Qn2	2.154	1.457	2.341	2.066
Normative v Pragmatic - Qn3	1.147	.536	1.122	.994
Normative v Pragmatic - Qn4	.423	-.059	.280	.188
Normative v Pragmatic - Qn5	1.541	1.276	1.414	1.409
(Constant)	-68.675	-53.044	-73.129	-65.281

Fisher's linear discriminant functions

Appendix D– Results from Reliability and Factor Analyses

Common Features of KMS	Cronbach Alpha
Collaborative Shared Space (css)	0.7705
Knowledge Yellow Pages (kyp)	0.8553
Building and Managing Knowledge Stocks (mks)	0.8529
Integration to Work Process (iwp)	0.7778
Self-Development (sde)	0.8842
Participation and Incentives (pai)	0.8205

Results from Reliability Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.731	34.925	34.925	8.731	34.925	34.925	3.978	15.913	15.913
2	2.417	9.667	44.592	2.417	9.667	44.592	3.183	12.732	28.645
3	1.817	7.270	51.862	1.817	7.270	51.862	3.088	12.353	40.998
4	1.499	5.995	57.857	1.499	5.995	57.857	2.641	10.564	51.562
5	1.299	5.197	63.054	1.299	5.197	63.054	2.244	8.976	60.538
6	.995	3.980	67.034	.995	3.980	67.034	1.624	6.497	67.034
7	.896	3.586	70.620						
8	.735	2.940	73.560						
9	.637	2.549	76.109						
10	.598	2.393	78.502						
11	.571	2.283	80.785						
12	.510	2.038	82.823						
13	.479	1.916	84.739						
14	.450	1.800	86.540						
15	.447	1.786	88.326						
16	.428	1.711	90.037						
17	.359	1.437	91.474						
18	.331	1.323	92.797						
19	.309	1.235	94.033						
20	.302	1.208	95.241						
21	.272	1.086	96.327						
22	.268	1.074	97.401						
23	.244	.977	98.378						
24	.222	.887	99.265						
25	.184	.735	100.000						

Extraction Method: Principal Component Analysis.