Information Systems Specialists' Sub-Culture: An Empirical Investigation

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Abstract: *Information systems considered critical for organizational success. Therefore; innovative ways are required for using information systems. Information systems (IS) specialists' sub-culture is an important determinant of information systems success that not deeply discussed by researchers. Thus a comprehensive understanding of information systems success remains fuzzy and elusive in this area. Therefore, the main objective of this study is to provide a further insight into IS specialists sub-culture. In an attempt to address this situation, this study use an adapted instrument for measuring the IS specialists sub-culture, which includes eight constructs. Palestinian financial institutions have been investigated; which includes (39) institution, consists of banks, insurance companies, financial market, where (66) surveys were collected from the IS specialists in those institutions. The main findings of this study show that IS specialists have a clear culture; which characterized with a social image and consciousness of kind, self efficacy, esoteric knowledge, extreme or unusual demands, special IS-status, pervasiveness, and identification.*

Keywords: *Organizational culture, Sub culture, IS Specialists' sub culture, Information systems, Grid group*.

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1. Introduction

Business has always been complex, but it is more so today than ever before. The technology of business is becoming more complex, and the time for taking action is shrinking. Information is an organizational resource that could be used by all stake holders for different purposes. Therefore; information systems (IS) employees are important group because of their critical role in simplifying the use of information technology and have the responsibility for the quality of information. This makes organizations to establish units and departments to enable information specialists to provide expertise in the development and improvement to information systems.

In their review to Hofstede [8]; Ramachandran and Rao [9] find out that the importance of occupational culture stems from the argument that in an organizational setting, beliefs, values and attitudes guiding the employee's behavior could be influenced not only by the beliefs and value system of the organization they are part of. They may also be influenced by the belief and value systems inculcated into them at the national level, and, from the profession they belong. Therefore, understanding IS occupational culture will help in understanding some aspects of their behavior, their interactions with the organization at large, and the conflicts among IS occupational culture and organizational culture, and the resulting affects.

Empirical results about information systems specialists' sub-culture are inconsistent, and an overall synthesis across the numerous empirical studies seems lacking. Therefore, the main objective of this study is to provide further insight into IS specialists' sub-culture, and integrating the results with the prior researches in this area. Therefore, the study addresses the following questions:

- What is the IS specialists sub-culture?
- How to measure this occupational sub-culture?
- What are the characteristics of IS specialists sub-culture?

To pursue these questions, this study will provide further insight into IS specialists sub-culture, refine the required measures for this type of culture, besides testing those measures depending on the data that will be collected from the Palestinian Financial Institutions.

2. Background and Literature Review

2.1. IS Occupational Culture

Employees who practice the same profession tend to band together into occupational communities, draw their identities from the work they do and proceed to share a set of values, norms and attitudes, which collectively form a part of the culture of that occupation [10, 12]. Therefore, occupational subcultures within organizations refer to the unique clusters of ideologies, beliefs, cultural forms, and practices of individuals who pursue the same occupation [11].

Douglas [2, 3] presented the grid/group analysis – called theory of socio-cultural viability- (figure 1); which is composed of two dimensions, representing two types of control. One; is exerted for the group; a

personal control exercised by members over one another. The other is a rich variety of anonymous controls that do not directly stem from or support the group, they are collective responses to climate, technology, work, anything else that underpins the web of institutions. Where the two independent dimensions give four types of culture, which are: positional culture, individualism, Fatalist, and Enclave.

2.1.1. Positional Culture

This type of culture is characterized with a strong group, and strong regulations. Where all behaviors are subjecting to 'positional' rules showed by: heredity, or gender, or age, and combinations of all three. Little groups, such as families, organized in this way, may be incorporated in larger groups similarly organized.

2.1.2. Individualism

This cultural type corresponds with the personnel family, where the child trained to stand up for him/her, to speak up, and to challenge. This culture is classified as a competitive culture, where the well-being of the community does not come above the well-being of the individual. The prominent virtues are individual's courage, intelligence, perseverance, and success. Power and wealth are the rewards.

2.1.3. Fatalist

The group is at a minimum and regulation at a maximum. Everyone who is found in this situation must be an isolate, separated by the rules and regulations that control social relations. Conventions prevent them from joining groups, because they lack qualifications, wrong color, wrong accent, not enough money, or the wrong schooling.

2.1.4. Enclave

The combination of the two dimensions determines that this culture will have strong groups, and weak structure. That gives social groups with strongly barred frontiers and very feeble internal regulation of any kind.

Trice & Beyer [11] shows that; the group and grid dimensions developed by Douglas [3] are useful for dissecting occupational subculture. Where, the group dimension focuses on the seven forces that facilitate identity among members [11]: esoteric knowledge, extreme or unusual demands, consciousness of kind, primary reference group, social image of occupation, abundance of cultural forms and pervasiveness. Grid dimension provides the members with explicit guidelines on the hierarchy within the culture and the division of labor, and, thus guides their behavior towards one another [2, 3].

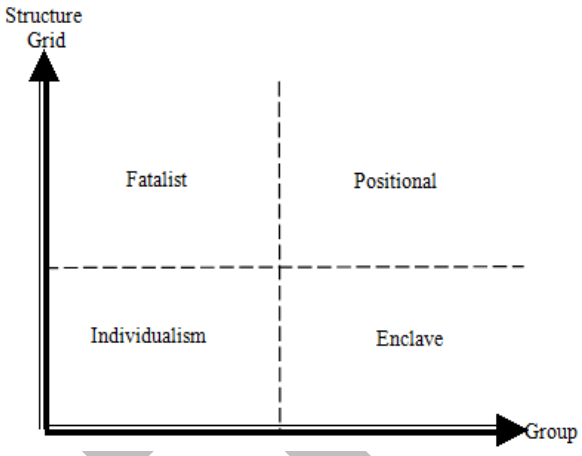

Figure1. The Grid/Group matrix. Source: (Douglas, 1982, 2005) [2, 3]

The grid dimension pertains to tangible structural features of an occupational culture through which members order their relations with one another (e.g., work rules, required certifications / apprenticeships, etc.). The grid dimension is weak in the IS occupation because of lack of formal regulatory structures surrounding certification and licensing [5, 6].

2.2. Measuring IS occupational culture

Guzman [4] focuses on the group dimension, which pertains to the social forces that promote cohesiveness among the members of an occupational subgroup and that regulate membership and status within the group. As a result of their study, Guzman [4] provides a tool that measures IT professional culture. This tool consists of eight constructs, mainly; self-efficacy, stereotypes, use of IS jargon, esoteric knowledge, extreme/unusual demands, consciousness, pervasiveness, status, and identification. The current study will adapt this tool to collect data, and then test its validity and reliability as a measurement tool for IS occupational culture.

- *Stereotype:* an individual's evaluations of the stereotypical labels of "geek" and "nerd" as applied to them and their colleagues.
- *Jargon: an individual's evaluations of widespread use of jargon within IT occupations.*
- *Self efficacy:* an individual's perceptions of self-efficacy in meeting the demands of an IS occupation.
- *Esoteric knowledge:* an individual's evaluations of learning the many areas of technique and knowledge in the IS field.
- *Extreme demands:* an individual's evaluations of the need to adapt to new problems, long hours, and constant change.
- *Pervasiveness leisure:* the extent to which an individual integrate IS into non-work leisure time and socializing.

- *Status:* an individual's evaluations of the social status benefits of IS expertise, particularly helping others.
- *Identification: the* social identity with the IS group and the occupation.

3. Methodology

3.1. Data collection

Data were collected from IS specialists (respondents) in Palestinian Financial Institutions (39 institution) using a questionnaire. 78 surveys were sent to the respondents, where 70 surveys were returned (89% response rate). 8 surveys were excluded, because of non validity of these surveys. Therefore 66 usable surveys were used (85%) in data analysis.

3.2. Demographics

Table (1) shows the demographics extracted from the collected data. Where, a total of 54 males and 12 females are participated in providing data for this study. All participants are degree holders, employed in all organizational levels; therefore, their impact will be at all those levels. In addition, participants reported previous work experience in the IS field, and performs managerial work as well as system development and data entry.

Table1. Frequency Table

	Frequency	Percent
Gender		
Male	54	81.8
Female	12	18.2
Degree		
General School	2	3.0
Diploma	13	19.7
BSc.	46	69.7
Graduate	5	7.6
Organizational Level		
Strategic	7	10.6
Tactical	17	25.8
Operational	42	63.6
Type of Work		
Managerial	21	31.8
Data Entry	25	37.9
System Developmen t	20	30.3
Experience		
Less than a year	10	15.2
1 - 5 years	28	42.4
6 - 10 Years	12	18.2
Greater than 10 years	16	24.2

3.2. Reliability and Validity

Data were collected from respondents using a questionnaire, which is designed to measure the information systems specialists sub culture. To ensure the reliability of the constructs used, a reliability analysis was conducted on the data. The criteria have given by Cristman, Van Aelst [1]; that an alpha reliability 0.6 or more is considered an adequate reliability coefficient was applied to determine the adequacy, and the reliability coefficient obtained for each construct.

To ensure the validity of the constructs used, a factor analysis was conducted on the data. The recommended guidelines by Hair [7], were used to determine the relative importance and significance of the factor loading of each item in the construct. Thus loading factor greater than 0.3 is considered significant, loading 0.4 is more important and loading of 0.5 or greater is considered as very significant.

Table (2) shows the internal consistency reliability, and the factor analysis, for the eight constructs used to measure the IS occupational sub-culture. The results show that item two in the jargon construct was not significantly correlated with the total construct; therefore it was deleted from the scale measure of the jargon construct. The same result becomes true for items four and five in self efficacy construct, and items one and two in the status construct; therefore, those items were deleted from the scale measures of the self efficacy and status.

Table 2. Experimental Scales for Information Systems Specialist's Sub-Culture. (See details in Appendix 1)

Scale Title	# of Items	Alpha Reliability Estimate	Minimum Items Loading	Scale Components
Stereotype	4	0.785	0.708	1
Jargon	3	0.683	0.725	1
Self- Efficacy	6	0.865	0.686	1
Esoteric Knowledge	4	0.757	0.602	1
Extreme Demands	4	0.792	0.690	1
Status	2	0.854	0.935	1
Pervasiveness Leisure	4	0.862	0.749	1
Identification	7	0.843	0.602	1

The results show that the remaining constructs items are significantly correlated with the total items and that the alpha reliability will not improve if any of the items is deleted. Where the values of alpha for the constructs were as follows: stereotype = 0.785, jargon = 0.683, self efficacy = 0.865, esoteric knowledge = 0.757, extreme demands = 0.792, status = 0.854, pervasiveness leisure = 0.862, identification = 0.843. In addition, the results show that all constructs items

fall under one dimension for each construct, with loading that exceeds 0.602. Thus, the measure was able to demonstrate level of construct validity.

4. Analysis and Results

Table (3) shows the means and standard deviations for all constructs. Recall that all these variables were on a one to five scale with a midpoint of 3. These results show that; participants have moderated feelings of their stereotype (2.965). Where, the stereotype item with lower mean is the other people thought of the IS specialist (2.27), and the highest mean is the IS specialist thought about their colleagues (3.48).

Table 3. Constructs Descriptive Statistics.

Construct	Mean	St.Deviation
Stereotype	2.965	1.005
Jargon	3.719	0.617
Self Efficacy	3.583	0.6890
Esoteric Knowledge	3.863	0.593
Extreme Demands	3.859	0.631
Status	3.54	1.092
Pervasiveness	3.367	0.973
Identification	3.268	0.708

Participants show that they have their own jargon that distinguishes them from other groups of people (3.719). Where all jargon items scores a mean greater than the scale midpoint; therefore, IS specialist like IS jargon, enjoy using technical terms to communicate with other members of the occupation, spend time on their computer surfing the web, and When they not at work they often tinker with their own computers and software.

Concerning, self-efficacy; participants show that they feel with high self-efficacy (3.583). Where all self-efficacy items scores a mean greater than the scale midpoint; therefore, IS specialist thinks that; they can solve difficult information systems problems, accomplish all IS-related tasks, efficiently deal with unexpected IS-related events, remain calm when facing IS-related difficulties, and find the best solution when confronted with an IS-related problem.

IS workers showed high enjoyment about being updated with IS knowledge (3.863). They enjoy learning how to solve IS-related problems and obtaining hands-on experience with IS, and learning about the newest technologies in the IS field.

Meanwhile, the findings show that; IS specialists can adapt with extreme demands in the area of information systems (3.859). They enjoy adapting to constant change in the field and the fast pace of the IS field, and they would not mind IS job that required an unusual work schedule. Participants have good feelings of their Status (3.54). They like being members of the IS experts' club, and proud with their IS expertise.

Information systems pervasive in the life of IS specialists (3.367). Where, they enjoy console or PC gaming, enjoy spending leisure time playing with information systems, and like socializing with other IS people. In addition, information systems specialists have their own identification (3.268). They strongly identify with the IS profession, care a lot about what others think of the IS field, enjoy IS field's successes.

Figure 2 depicts IS occupational culture, this type of culture has its own characteristics, which includes; stereotype, jargon, self-efficacy, esoteric knowledge, extreme demands, status, pervasiveness, and identification.

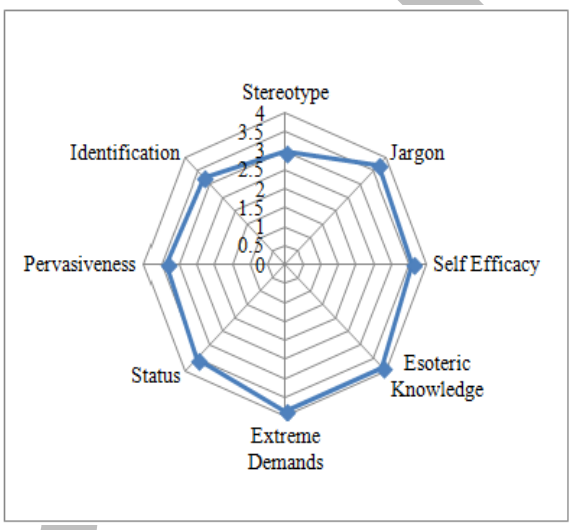

Figure 2. IS Occupational Culture.

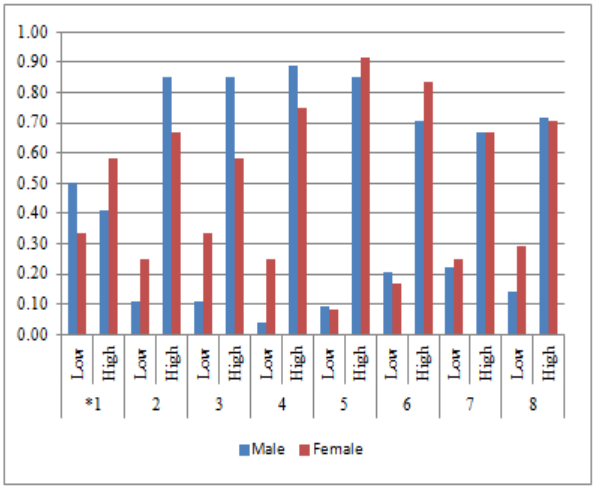

Figure3: Gender Differences in IS Occupational Culture.
*1: Stereotype 2: Jargon 3: Self Efficacy 4: Estoric Knowledge 5: Extreme Demand 6: Status 7: Pervasiveness 8: Identification

Figure 3 shows the differences based on participants gender. The main findings can be summarized as follow:

- Most of females (64%) have positive perception towards stereotype, where, most of males (55%) have negative perception.
- Males and females reported more positive perceptions towards the other IS occupational subculture features.
- The results show different perceptions among males and females in all IS occupational culture features.
- Estoric knowlege scores the highest positive perception (89%) among males, while; extreme demands scores the highest positive peception among females.

Figure4 shows the differences based on participants type of work. The main findings can be summarized as follow:

- Nevertheless the type of work, all IS workers reported more positive perceptions towards all IS occupational subculture features.
- IS worker in managerial jobs, reported negative perception (29%) towards stereotype.
- The results show convergent perceptions among IS workers regardless of their work type in all IS occupational culture features.
- Estoric knowlege scores the highest positive perception (90%) among IS workers in managerial jobs, while; extreme demands scores the highest positive peception among IS workers in both system developments (88%), and data entry (95%).

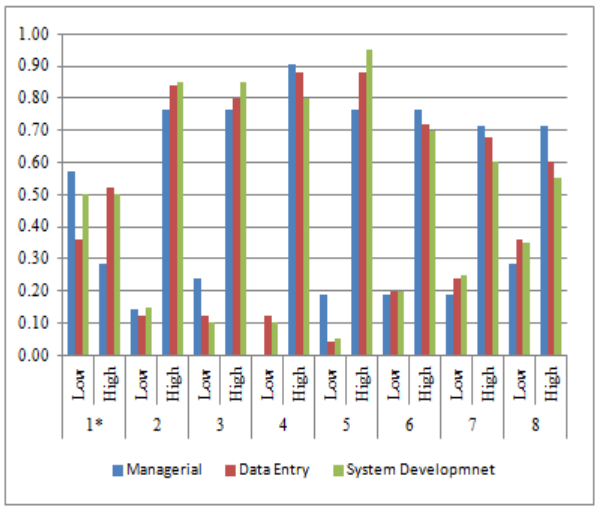

Figure4: Work Type Differences in IS Occupational Culture.
*1: Stereotype 2: Jargon 3: Self Efficacy 4: Estoric Knowledge
5: Extreme Demand 6: Status 7: Pervasiveness 8: Identification

Figure 5 shows the differences based on participants degree. The main findings can be summarized as follows:

- IS workers with a genaral school degree, don't have a clear occupational culture features.
- IS workers with diploma, and BSc. degree, reported more positive perceptions towards all IS occupational subculture features.
- IS workers with a graduate degree, reported negative perception towards stereotype (20%), and jargon (40%), menawhile they reported positive perceptions (80%) towards the other IS occupational culture features.

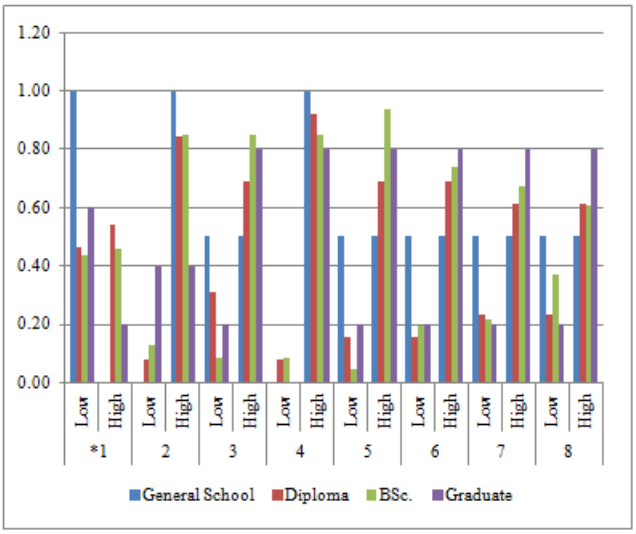

Figure 5. Degree Differences in IS Occupational Culture.
*1: Stereotype 2: Jargon 3: Self Efficacy 4: Estoric Knowledge
5: Extreme Demand 6: Status 7: Pervasiveness 8: Identification

Figure 6 shows the differences based on participants position in the organization. Where the main findings can be summarized as follows:

- IS workers in the strategic and tactical levels tends to have negatvie perception towards stereotype feature. Menawhile, the workrs in the operational level have a positive perception.
- IS workers in all levels of the organization, reported more positive perceptions towards the rest of IS occupational subculture features.

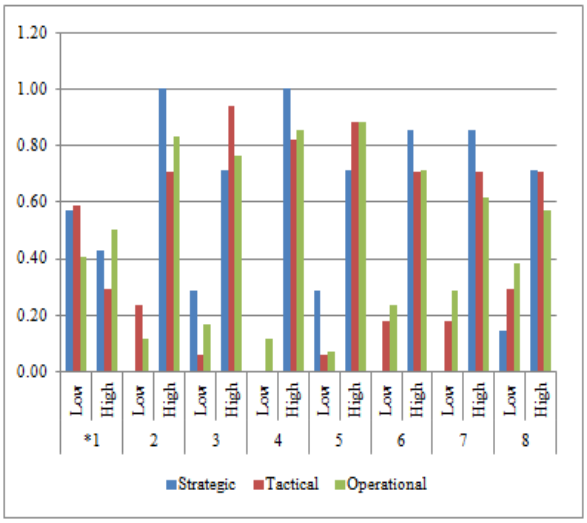

Figure 6. Organizational Level Differences in IS Occupational Culture.
*1: Stereotype 2: Jargon 3: Self Efficacy 4: Estoric Knowledge
5: Extreme Demand 6: Status 7: Pervasiveness 8: Identification

Figure 7 shows the differences based on participants experience in their work at the organization. Where the main findings can be summarized as follow:

- Participants with more work experience in IS field reported negative perceptions towards stereotype.
- Experienced participants show a clear IS occupational features.

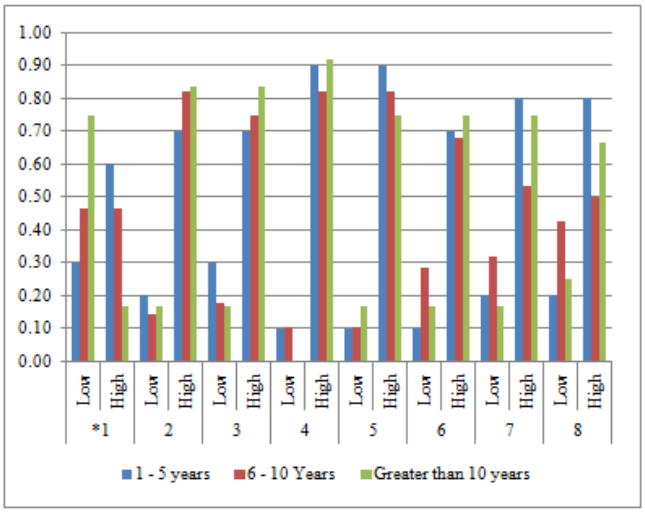

Figure 7. Experience Differences in IS Occupational Culture.
**1: Stereotype 2: Jargon 3: Self Efficacy 4: Estoric Knowledge 5: Extreme Demand 6: Status 7: Pervasiveness 8: Identification*

5. Conclusion and Recommendations

The results of this study provides implications about IS occupational culture; that can help organizations in understanding the various features of IS professionals' subculture, and thus; initializing an innovative environment for those specialists.

The results showed that IS specialists enjoy using technical terms, spend time on their computer surfing the web, and When they not at work they often tinker with their own computers and software. This implies that; organizations that provide their IS specialists with the required technology inside, and outside the work office, those specialists will invest their efforts in beneficial work for organization.

IS specialists thinks that; they can solve difficult information systems problems, accomplish all IS-related tasks, efficiently deal with unexpected IS-related events, remain calm when facing IS-related difficulties, find the best solution when confronted with an IS-related problem. Besides that they enjoy adapting to constant change in the field and the fast pace of the IS field, and they would not mind IS job that required an unusual work schedule. This implies that IS specialist can cope with any work in the organization, especially; when this work related with IS profession. Thus, organizations can depend on those specialists in the work seasonal type, besides their original work in the IS profession.

The results showed that IS people enjoy learning how to solve IS-related problems and obtaining hands-on experience with IS, and learning about the newest technologies in the IS field. This enables them to acquire more IS knowledge and skills. Therefore, organizations can dedicate part of IS specialist work time for learning and training, to raise their experience, and to be up-to-date with the latest technological advancements.

Other derived features of IS specialists' occupational culture are; their socialization with other IS people; such as being members of IS experts' club, care a lot about what the others think of the IS field, and enjoy IS field's successes. These features enable IS specialist to be effective people in the society, and thus; search ways to connect with the society. Therefore, organizations can get the major benefits using the socialization feature of IS people. These benefits exceed customer relationship management, to supply chain management and other e-technologies.

The results showed that; participants have moderated feelings of their stereotype. This implies that; there is a problem in the view of IS specialist towards themselves, they must be the most careful people towards themselves, and to possess a stereotype that distinguish them from other groups. Thus organizations must have a clear program; such as training, and meetings with other groups, that can help in changing the negative perceptions stereotype.

The results showed different perceptions among males and females in information system occupational culture features. Meanwhile, there is convergent perceptions among IS workers regardless of their work type in all IS occupational culture features. Where IS workers with diploma, and BSc. degree, reported more positive perceptions toward IS occupational subculture features. And experienced participants show a clear IS occupational features. These results imply that; undergraduate and more experienced IS people, nevertheless of their gender and type of work, possess a clear IS occupational culture features. Therefore organizations can depend on those people in achieving its IS plans to gain advantages.

This study showed that IS specialists have a clear culture, which affects its members inside and outside organizations. Further researches are required to know how this culture interacts with other sub-cultures and its impact on information systems success and organizational success in general.

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Appendix 1:

Reliability and Component Matrix Analysis of Constructs items

Construct	Construct Items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Loading	Component
Stereotype Items: 4 Alpha: 0.785	1. I think other people do think of me as a geek or nerd	0.676	0.691	0.840	1
	2. I don't consider myself a nerd or geek	0.624	0.716	0.809	
	3. My family thinks of me as a computer nerd	0.571	0.743	0.766	
	4. Some of my colleagues are definitely computer nerds	0.506	0.777	0.708	
Jargon Items: 3 Alpha:0.683	1. I like IS jargon	0.251	0.746	0.453	1
	2. When I start a new IS project, I don't mind learning all of the new names of products and technologies.	Deleted	----	----	
	3. I enjoy using technical terms to communicate with other members of the occupation	0.590	0.541	0.817	
	4. When I'm not at work I spend time on my computer surfing the web.	0.604	0.519	0.846	
	5. When I'm not at work I often tinker with my own computers and software.	0.451	0.627	0.725	
Self-Efficacy Items: 6 Alpha: 0.865	1. Solve difficult information technology problems	0.565	0.860	0.686	1
	2. Accomplish all IS-related tasks designated to me	0.589	0.855	0.707	
	3. Efficiently deal with unexpected IS-related events	0.695	0.843	0.801	
	4. Use my resourcefulness with technology to successfully handle unforeseen situations	Deleted	----	---	
	5. Solve the majority of IS-related problems if I invest the necessary effort	Deleted	---	---	
	6. Remain calm when facing IS-related difficulties	0.663	0.843	0.768	
	7. Find the best possible solution when confronted with an IS-related problem	0.766	0.822	0.862	
	8. Handle whatever comes my way when dealing with IS	0.733	0.830	0.840	
Esoteric Knowledge Items:4 Alpha: 0.757	1. I enjoy learning how to solve IS-related problems	0.655	0.651	0.847	1
	2. I enjoy obtaining hands-on experience with IS	0.764	0.576	0.911	
	3. I really like learning about the newest technologies in the IS field	0.392	0.799	0.602	
	4. Keeping up with the latest knowledge in my field is fun for me	0.460	0.748	0.696	
Extreme Demands Items: 2 Alpha: 0.792	5. It is tough to do well in the IS field, but I like it that way	0.600	0.744		1
	6. I enjoy adapting to constant change in the field	0.488	0.798		
	7. For me, the fast pace of the IS field makes it enjoyable	0.697	0.690		
	8. I would not mind IS job that required an unusual work schedule	0.636	0.723		
Status Items: 4 Alpha: 0.854	1. I enjoy knowing that other people depend on my services	Deleted	---	---	1
	2. I enjoy being asked for computing help	Deleted	---	---	
	3. I like being a member of the IS experts' "club."	0.749	.(a)	0.935	
	4. When people recognize my IS expertise, I get a good feeling	0.749	.(a)	0.935	
Pervasiveness Items: **4** Alpha: .0 862	1. I enjoy console or PC gaming quite frequently	0.585	0.871	0.749	1
	2. I enjoy spending my leisure time playing with information technology	0.845	0.763	0.922	
	3. One of the things that I share with some of my closest friends is their love of information technology	0.673	0.839	0.825	
	4. Socializing with other IS people is fun for me	0.745	0.810	0.865	
Identification Items: **7** Alpha: .0 843	1. I strongly identify with the IS profession	0.560	0.828	0.677	1
	2. When someone criticizes the IS field, it feels like a personal insult	0.550	0.834	0.661	
	3. I care a lot about what others think of the IS field	0.617	0.819	0.751	
	4. When I talk about the IS field, I usually say 'we' rather than 'they'	0.537	0.831	0.659	
	5. The IS field's successes are my successes	0.791	0.794	0.880	
	6. When someone praises the IS field it feels like a personal compliment	0.746	0.802	0.844	
	7. When the media criticizes the IS field, I feel embarrassed	0.462	0.842	0.602	