Effects of occupational culture of IT professionals on job satisfaction in Japan

By: Osam Sato, Prashant Palvia, Tim Jacks, and Hiroshi Sasaki

Abstract:

Information technology (IT) professionals develop and maintain quality information systems (IS). As capable IT professionals are scant resource, many organizations work hard to attract and retain them within the organization. Therefore, maintain and improve job satisfaction of IT professionals are critical theme for organizations, and it is an important theme for IS researchers too. We believe many factors affect job satisfaction of IT professionals. According to literature review, we suppose IT occupational culture (ITOC) and IT organization structure (ITOS) affect job satisfaction. We apply ASPIRE framework to investigate ITOC. Also we suppose the effect of age too. Based on above inference, we conducted a set of empirical study with our data from Japanese IT professionals. The result supports hypotheses for ITOC and age, but ITOS affects differently. We discuss these results.

Keywords: ASPIRE framework | job satisfaction | IT professionals | IT organization structure | Japan

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Effects of Occupational Culture of IT Professionals on Job Satisfaction in Japan

Completed Research

Osam Sato
Tokyo Keizai University
osamsato@tku.ac.jp

Prashant Palvia
University of North Carolina at Greensboro
pcpalvia@uncg.edu

Tim Jacks
Southern Illinois University Edwardsville
tjacks@siue.edu

Hiroshi Sasaki
Rikkyo University
sasaki-h@rikkyo.ac.jp

Abstract

Information technology (IT) professionals develop and maintain quality information systems (IS). As capable IT professionals are scant resource, many organizations work hard to attract and retain them within the organization. Therefore, maintain and improve job satisfaction of IT professionals are critical theme for organizations, and it is an important theme for IS researchers too. We believe many factors affect job satisfaction of IT professionals. According to literature review, we suppose IT occupational culture (ITOC) and IT organization structure (ITOS) affect job satisfaction. We apply ASPIRE framework to investigate ITOC. Also we suppose the effect of age too. Based on above inference, we conducted a set of empirical study with our data from Japanese IT professionals. The result supports hypotheses for ITOC and age, but ITOS affects differently. We discuss these results.

Keywords

ASPIRE framework, job satisfaction, IT professionals, IT organization structure, Japan.

Introduction

Information technology (IT) professionals develop and maintain efficient and effective information systems (IS). As capable IT professionals are scant resource, many organizations work hard to attract and retain them within the organization. Therefore, maintain and improve job satisfaction of IT professionals are critical theme for organizations, and it is an important theme for IS researchers too.

Job satisfaction refers to "the emotional reactions of individuals to their jobs and their job experiences" (Baroudi & Igbaria, 1994; Dinger et al., 2015). Job satisfaction of IT professionals is an important IS research theme and has been studied previously (Joseph et al., 2007). Improving job satisfaction of IT professionals is important for business because good IT engineers are scant resource and many organizations work hard to attract and retain them. This is a universal requirement and also true in Japan. Therefore we focus on job satisfaction of IT professionals in this study.

We believe that there are many important aspects or factors that affect the level of job satisfaction of IT professionals. First, we think that culture of IT professionals affects the level of their job satisfaction. We have a lot of literature about national and organizational culture (Leidner and Kayworth, 2006), but we find few studies about occupational culture. Because of the challenging (occupational) culture of IT professionals, they work hard to complete difficult IS projects. That is, even though it is hard to complete an IS development project, IT professionals work hard to finish it, and in the course, they find job satisfaction within the hard work. However, IT culture includes many aspects, and we do not know which aspects of IT occupational culture (ITOC) affect job satisfaction.

Second, we think that IT organizational structure (ITOS) affects job satisfaction of IT professionals. It is known that bureaucratic organizational structure is associated with lower employee job satisfaction (Finlay and Marin, 1995). Similarly, some IT organizational structure may be more comfortable for IT professionals than other organizational structure and may affect job satisfaction of IT professionals. We study effects of IT occupational culture and organizational structure to job satisfaction of IT professionals with ASPIRE framework with Japanese data.

Background and Theory

IT Professionalism

IT workers recognize themselves as professionals. Here, "professionalism refers to the mindset with which individuals view their occupation" (Hall, 1968). Professionalism comes "from various sources, including professional education, certification process, experience in the workplace, or socialization with other professionals" (Lui et al., 2003; Dinger, 2015). Past research suggests that professionalism positively impacts job satisfaction (Bartol, 1983; Dinger et al., 2015). IT employees feel efficacy as professional engineers, which in turn positively affects job satisfaction. And "job satisfaction positively influences affective organizational commitment" (Dinger et al., 2015).

Dinger et al. (2015) studied effects of IT professionalism on job satisfaction. Their professionalism includes five sub constructs. They are (1) feeling of public service, (2) self-regulation, (3) sense of calling, (4) professional autonomy, and (5) identification with professional organizations. Although Dinger et al. (2015) hypothesized that public service, sense of calling and professional autonomy affect job satisfaction directly, the former two relationships were not significant and only the last one was significant. According to their results, both sense of calling and professional autonomy affect job satisfaction through intrinsic motivation indirectly.

The effect of professionalism to job satisfaction has been studied widely (Norris and Niebuhr, 1984; Boyt and Lusch, 2001). The effect of IT professionalism on job satisfaction appears natural on the basis of prior studies. So, we wonder why other direct effects from sub-constructs of professionalism were not found. There are several sub-constructs of IT professionalism (see later), these sub constructs must have a strong correlation, and at least many of them might have some impact on job satisfaction.

Based on qualitative studies, Jacks (2012) and Jacks et al. (2018) propose ITOC model called ASPIRE. It includes six sub-constructs; Autonomy, Structure, Precision, Innovation, Reverence for Knowledge, and Enjoyment. Here, ITOC is defined as "the values, norms, and symbols shared by those who work in the occupation of IT" (Jacks & Palvia, 2014), and it is a source of IT professionalism.

IT Organizational structure

Another important factor that affects job satisfaction is ITOS (Luftman & Ben-Zvi, 2010) or IS structure (Brown & Magill, 1994). ITOS is a common factor examined in the alignment literature in terms of whether the IT group or IT resources are (1) centralized, (2) decentralized or (3) federated (or hybrid) (Brown & Magill, 1994; Luftman & Kempaiah, 2007; Luftman & Ben-Zvi, 2010).

Chan & Reich (2007) summarize the research on IT/business alignment. It includes both alignment of business level (strategic fit), i.e. alignment between business strategies and IS strategy, and staff level (functional integration), i.e. alignment of business people in functional departments and engineers in IT departments (Brown & Magill, 1994). We focus on the latter level in this study. The level of alignment brings different levels of satisfaction of both business staff and IT engineers.

Centralized ITOS means that corporate IT resources, including IT engineers, are integrated into a central IS department. Decentralized ITOS means that functional departments have their own IT resources within their departments. And federated or hybrid ITOS "refers to a design in which the locus of responsibility for the management of technology functions is highly centralized, but the locus of responsibility for the management of the use of technology is highly decentralized" (Brown & Magill, 1994). Management of technology includes computer operations, communications/networking, emerging technologies, and planning-technology. Management of use of technology includes system development, end-user computing support, and planning-applications (Dixon & John, 1989). Luftman & Kempaiah (2007) define federated

as "some parts of IT are centralized (e.g., IT infrastructure, standards, common systems) and other parts are decentralized (e.g., application resources specific to the business units)". Luftman & Kempaiah (2007) show that "organizations with a federated IT had significantly higher alignment maturity than those with centralized or decentralized structures". According to this result, federated is the most mature, followed by decentralized, and centralized is last.

Age

It is known that "age is positively related to job satisfaction" (Rhodes, 1983; Reuter, 2007; Ng & Feldman, 2010). Gibson and Klein (1970) suggested the existence of "linear positive correlations between age and satisfaction variables." However, so far as we know, the relationship has not confirmed for IT professionals. Because IT culture is idiosyncratic, the effect may be different.

Hypotheses

On the base of above theoretical background, we infer that the strength or strong belief in ITOC values can be employed as a measure of IT professionalism. Therefore, we set the following research hypothesis.

> H1: Strength of ITOC, that is measured by ASPIRE, positively affects job satisfaction.

We suppose that the more mature the alignment of IT organizational structure, the more IT engineers feel job satisfaction. Therefore, our second hypothesis is:

> H2: The more ITOS improves from centralized through decentralized to hybrid (federated), the more IT engineers feel job satisfaction.

Age is usually included as control variable in past studies, but because we know age affects job satisfaction as explained in Background and Theory section, we set the third hypothesis as:

> H3: Job satisfaction increases with age.

We employ gender, highest level of education, and years of IT experience as demographic control variables. Gender is a typical demographic variable. IS research literature acknowledges the importance of examining the role of individual differences such as gender, and education (Zmud, 1979; Robey, 1983; Ragu-Nathan et al., 2008; Srivastava et al., 2015). Highest level of education and years as an IT employee control for education level and IT experience respectively (Ng & Feldman, 2010). Figure 1 summarize our research model and hypotheses.
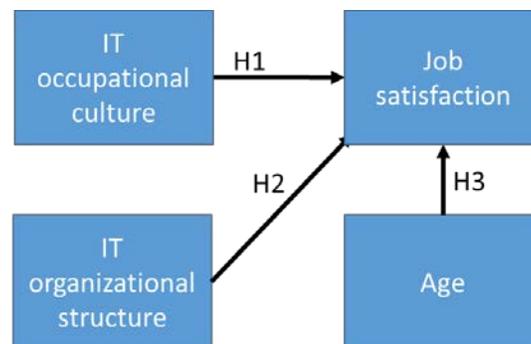
Figure 1. Research model and hypotheses

Research Method

Data and Items

Our empirical analysis is based on the Japanese data set from the World IT Project (Palvia et al, 2017), which was gathered in 2016. We conducted a web survey to IT employees from September to November 2016 with help from a web survey company in Japan. We collected 380 responses, but removed 72 responses because of missing or dirty values, or response from non-IT employees, resulting in a sample size

of 308 from Japanese IT employees. The dataset we employ in this study is a part of a larger questionnaire survey (World IT Project) dataset. Our questionnaire includes demographic questions, and items for many constructs (Table 1-3).

Questions related to the ASPIRE values were previously validated in Jacks (2012). They were measured by means of multi-item five-point Likert scales, where 1 means 'very important' and 5 means 'of no importance'. Table 1 shows items for constructs that were employed for measurement.

Items for Constructs
A1: Having less bureaucracy for getting approval to take action is...
A2: Having a high level of freedom in order to do my job well is...
A3: Having a "flatter" organizational structure (i.e., fewer layers of management) is...
A4: Empowerment for employees to make decisions independently of management is...
S1: Having a high level of access to raw data is....
S2: Having everyone consistently adhere to hardware and software standards is...
S3: Sticking to the original project plan (instead of making last minute change requests) is...
S4: Clearly defined job roles and responsibilities are...
S5: Enforcing rules is...
S6: Orderliness is....
S7: Ensuring that timelines and deadlines are reasonable, not rushed, is...
P1: A high level of technical detail when communicating with others in the organization is...
P2: Using exactly the right words when speaking is...
P3: Precision in communication is...
P4: Communicating specific expectations, instead of general expectations, is...
P5: Communication of precise project timelines is...
I1: Playing with the latest and even unproven technology is
I2: Embracing new technology is...
I3: Building clever new solutions is...
I4: Showing creativity is...
I5: Figuring out a better way to do things is...
I6: Technical problem solving skills are...
I7: Critical thinking skills are...
R1: Earning respect based on intelligence is...
R2: Being known for my intelligence is...
R3: Learning new skills every day is...
R4: Being motivated to learn new skills on your own is....
E1: Having fun at work is....
E2: Laughing and joking with others at work is....
E3: Having a sense of humor is....
E4: Going out to lunch with my co-workers is....
E5: Variety in my daily tasks is...

Table 1. Items for Constructs
(A=Autonomy, S= Structure, P= Precision, I=Innovation, R= Revere for knowledge, E= Enjoyment)

Job satisfaction was measured with 3 questions (Table 2, Hackman and Oldham, 1980). They are 5 level Likert scales from 1 is "strongly agree" to 5 is "strongly disagree". J3 is reversed question, therefore a value (=6- J3) was computed for the measurement.

Items for Job Satisfaction Construct
J1: In general, I like working here.
J2: All in all, I am satisfied with my current job.
J3: In general, I don't like my current job. (Reverse question)

Table 2. Items for Job Satisfaction

ITOS was measured by a question that asked to "select one answer" from the options in Table 3 (Luftman & Brier, 1999; Jacks, 2012). Based on Luftman & Kempaiah (2007), we supposed that ITOS improved from Centralized, through Decentralized to Federated, and assigned a value from 1 to 3 respectively. Therefore this is computed as an ordinal variable.

Items for ITOS: Structure of the IT function is:
O1: Centralized, which means that most of our IT infrastructure and IT personnel are located at central corporate locations.
O2: Decentralized, which means that most of our IT infrastructure and IT personnel are distributed to each individual location.
O3: Federated, which means that more of the IT infrastructure is centralized while IT personnel are distributed to each location for application support.

Table 3. Items for ITOS

Analysis

First, we compare job satisfaction level among control variables with ANOVA. Test results for homogeneity of variance (Levene, Table 4) are not significant. Job satisfaction levels are significantly different by Years of IT experience but not for the other control variables.

Control Variables	Levene (p.)	ANOVA F (p.)
Gender	0.468 (0.495)	0.657 (0.512)
Highest level of education	0.633 (0.639)	0.256 (0.906)
Years of IT experience	1.340 (0.255)	4.277 (0.002)

Table 4. Results of ANOVA

Table 5 shows averages of job satisfaction by control variables. Job satisfaction is the sum of the three items measuring it, and a lower score indicates higher satisfaction. Based on Table 5 and above ANOVA results (Table 4) we find that:

(1) Job satisfaction is larger for those over 30 years of IT experience than others.

Measure	Values	Average
Gender	Male	8.2087
	Female	7.8750
Highest level of education	High School or less	8.1765
	Associate degree (2 year degree) or some college	7.8485
	Bachelor's degree	8.1942
	Master's degree	8.3061
	Ph.D.	8.6667
Years of IT experience	0-4	8.6327
	5-9	7.9091
	10-19	8.8382
	20-29	8.0698
	over 30	7.2075

Table 5. Comparison of averages of job satisfaction

Next, we conducted Confirmative Factor Analysis (CFA) for the ASPIRE questions in Table 1. We used Amos v. 25 for the analysis. As Jacks (2012) and Jacks et al. (2018) already conducted Explorative Factor Analysis (EFA) to select items for each construct, we conducted CFA only. Table 6 shows the results. Although some results are not high enough in Table 6, we did not drop them to maintain comparability and congruity to original ASPIRE constructs.

	A	S	P	I	R	E
A1	0.438					
A2	0.486					
A3	0.528					
A4	0.563					
S1		0.199				
S2		0.351				

S3		0.406				
S4		0.598				
S5		0.326				
S6		0.457				
S7		0.398				
P1			0.642			
P2			0.427			
P3			0.744			
P4			0.477			
P5			0.202			
I1				0.511		
I2				0.344		
I3				0.764		
I4				0.577		
I5				0.625		
I6				0.441		
I7				0.542		
R1					0.648	
R2					0.639	
R3					0.434	
R4					0.399	
E1						0.399
E2						0.651
E3						0.662
E4						0.385
E5						0.437

Table 6. CFA result

(A=Autonomy, S= Structure, P= Precision, I=Innovation, R= Revere for knowledge, E= Enjoyment)

We also generated the ITOS variable on the assumption that ITOS improves from O1 through O2 to O3 in Table 3. It means that we coded 1 as O1, 2 as O2, and 3 as O3. We compared the average level of satisfaction by ITOS type. The average of job satisfaction is highest for centralized, decentralized follows, and federated showed the least job satisfaction (Table 7, note that job satisfaction is a reversed scale in our questionnaire). We also conducted ANOVA to check for differences in job satisfaction. The Levene statistic was 0.700 and not significant (p=0.497). The F value of ANOVA was 2.197 and the difference was not significant (p=0.113).

ITOS type	Frequency	Average
1. Centralized	177	7.7345
2. Decentralized	80	8.0750
3. Federated	51	8.5098
Total frequency and Average value	308	7.9513

Table 7. Job satisfaction by ITOS type

We checked Pearson correlations among constructs and sub-constructs that are computed above. Six sub-constructs (A, S, P, I, R, E) are computed as simple sums of questions in each constructs. Sub-constructs of ASPIRE correlate strongly as well as with AS (ASPIRE variable as a whole which is the simple sum of all items in table 1). Note that job satisfaction (J) is different from enjoyment (E). The distinction is endorsed by the non-significant correlation coefficient (0.098) between these two constructs.

	J	A	S	P&I	R	E	AS	ITOS
J	1	.156**	0.025	.115*	.155**	.126*	0.098	.161**
A	.156**	1	.295**	.273**	.391**	.359**	.298**	.609**
S	0.025	.295**	1	.422**	.265**	.269**	.238**	.631**
P	.115*	.273**	.422**	1	.505**	.403**	.315**	.705**
I	.155**	.391**	.265**	.505**	1	.464**	.367**	.745**
R	.126*	.359**	.269**	.403**	.464**	1	.396**	.689**
E	0.098	.298**	.238**	.315**	.367**	.396**	1	.674**

AS	.161**	.609**	.631**	.705**	.745**	.689**	.674**	1
ITOS	.119*	-0.033	-.119*	-0.068	-0.065	-.133*	-0.052	-.116*

Table 8. Pearson Correlation among sub-constructs

(J=Job satisfaction, A=Autonomy, S= Structure, P= Precision, I=Innovation, R= Revere for knowledge,

E= Enjoyment, AS=Total of ASPIRE, ITOS=IT Organizational Structure)

**: p<0.01, *: p<0.05

Research Results

We computed multiple linear regressions. The dependent variable is job satisfaction (J) that is measured as a simple sum of J1, J2, and J3 (reversed) in Table 2. Independent variables are the control variables, age, ITOS and AS (ASPIRE as a whole variable). Table 10 shows the result. According to it, job satisfaction increases with age and ASPIRE values, but ITOS affects job satisfaction negatively. Other control variables have no effect. Therefore, H1 and H3 are supported. AS is a measure of ITOC overall and ITOC increases job satisfaction for IT professionals (H1). Job satisfaction increases as workers, IT professional engineers in this case, becomes older (H3).

However, H2 (ITOS) is not supported. Table 7 shows opposite and significant results from our hypothesis H2. IT engineers prefer centralized structure of IT function much more than decentralized or federated. It may be that because culture and language of IT engineers are different from users, a federated structure is much more uncomfortable than decentralized and centralized structure for IT professionals.

We computed VIF to check multi-collinearity in Table 9, and find that it is not a problem. The linear regression model is significant as the F-value is 4.333 (p<0.001). However, the adjusted R-square is 0.067 and not high. It means that there are other more important variables that affect job satisfaction for IT professionals. We believe that salary (annual income), work conditions and work environment such as office may be more important factors to determine job satisfaction. We did not include them in this study.

	Beta	t-value	P.	VIF
Constant		4.554	0.000	
Age (H3)	-0.166	-2.556	0.000	1.254
Highest level of education	0.030	0.503	0.914	1.028
Gender	-0.070	-1.168	0.238	1.064
Year of IT experience	-0.070	-1.065	0.171	1.300
ASPIRE (H1)	0.147	2.482	0.014	1.045
ITOS (H2)	0.139	2.298	0.022	1.086

Table 9. Regression Result (1)

We also conducted a multiple linear regression that explains job satisfaction, in which we add the six ASPIRE variables (A, S, P, I, R, E) separately instead of adding a single ASPIRE as a whole variable (AS) to test the effect of each dimension of the ASPIRE values on job satisfaction (Table 10). The result shows that Age and ITOS have significant effects. A surprise is that none of the ASPIRE dimension have a significant effect on job satisfaction. The F value is 2.648 (p=.003) and the adjusted R-square is 0.061. Because of large correlation coefficients (Table 8), VIFs are higher among ASPIRE dimensions than others, but not significant. Although six dimensions of ASPIRE correlate with each other as Table 8 shows, and ASPIRE as a whole has a significant effect on job satisfaction (Table 9), each dimension of ASPIRE alone does not have a significant effect on job satisfaction (Table 10).

	Beta	t-value	P.	VIF
Constant		4.600	0.000	
Age	-0.166	-2.496	0.013	1.302
Highest level of education	0.037	0.623	0.534	1.034
Gender	-0.076	-1.250	0.212	1.082
Year of IT experience	-0.073	-1.083	0.280	1.327
ITOS	0.135	2.211	0.028	1.099

Autonomy	0.062	0.917	0.360	1.337
Structure	-0.046	-0.677	0.499	1.354
Precision	0.002	0.028	0.978	1.653
Innovation	0.079	1.035	0.302	1.714
Revere for knowledge	0.081	1.144	0.254	1.474
Enjoyment	0.035	0.524	0.601	1.289

Table 10. Regression Result (2)

Conclusions

This study focused on factors affecting job satisfaction of IT engineers. We studied the effect of ITOC, ITOS, and age on job satisfaction. First, we assumed that IT organizational culture (ITOC) is the source of motivation and pride as professional engineers, which in turn affects job satisfaction. Therefore, we hypothesized that the strength of ITOC affects job satisfaction positively (H1). We employed the ASPIRE framework and questions (Jacks, 2012; Jacks et al. 2018) to measure ITOC. Our result supported the hypothesis.

Second, it can be said that ITOS maturity improves as organization change from centralized through decentralized to federated (hybrid). We therefore hypothesized that maturity of IT organization structure (ITOS) improves job satisfaction (H2), with the assumption that maturity improves job satisfaction. However, the result was in the opposite direction and significant. We infer that IT engineers feel uncomfortable as ITOS changes from centralized through decentralized to federated. IT engineers who felt uncomfortable might resist the change, which makes ITOS improvement difficult. Note the following story from the space shuttle Challenger case. "So he (the general manager) turns to him and said 'take off your engineering hat and put on your management hat'" (NASA, 2007). When the boss requested engineers to change hats, we think engineers must have felt uncomfortable and obeyed unwillingly. Because federated ITOS requests IT engineers to put on management's hat as well as an engineer's hat and talk in management (foreign) language, they might have felt uncomfortable.

Our third hypothesis was that as IT engineers become older, they tend to feel more job satisfaction (H3). This relationship for workers has already been known and our data supports it as well. This tendency was true also for IT engineers.

Another surprise was that although ASPIRE as a whole affects job satisfaction and correlations among the six sub-constructs of ASPIRE were significant, each sub construct alone by itself did not have a significant effect on job satisfaction. We suspected multi-collinearity, but VIFs were not large. Although we questioned the result reported by Dinger et al. (2015) in our literature review, we come up with a similar result.

Merits of This Study

We found the above relationships with data taken from Japanese IT professionals as a part of the World IT Project. We believe that there are several merits in this study. First, this is a study of Japanese IT engineers' job satisfaction. Although there have been many studies about job satisfaction published, studies that targeted Japanese IT engineers are limited (e.g. Serenko et al., 2017). This study fills that gap.

Second, because the ASPIRE framework for ITOC (Jacks, 2012; Jacks et al., 2018) is rather new, we do not have many studies that employed it. Therefore, its merits and effectiveness are yet to be fully explored. The ASPIRE model was carefully studied and designed by Jacks (2012) and Jacks et al. (2018), and we highlight its usefulness in the Japanese context. We believe our study adds support for the benefits of its use in research. We believe occupational culture is a source of professionalism, and professionalism is a source of high motivation and keep high job satisfaction.

Third, although ITOS (centralized, decentralized, and federated) are well known, studies about its effects on job satisfaction of IT engineers are, as far as we know, nonexistent. We believe this is the first empirical study about this relationship. Although the change of ITOS means improvement for the company and management, IT engineers felt uncomfortable, and we believe that is a factor preventing the change.

We employed questions and classification of ITOC from Jacks (2012) and Jacks et al. (2018). However, we found that our Japanese data did not match for some questions. For example, the CFA results (Table 6) for some items are not good. We believe that comes from country differences. Of course, the ASPIRE framework as a whole is applicable in a Japanese setting, but some parts should be interpreted differently because of country/national cultural differences. Finding and studying country/national cultural differences is an important part of the World IT Project (Palvia, 2017).

This is a single country study. We believe we found some differences of interpretation between the original U.S. and Japanese data being employed in this study. We believe that the ASPIRE framework is universal but interpretations of some of the questions are different because of national cultural differences. More comparative studies are called for in order to compare and extract the differences between these two countries and between other countries.

Limitations

There are some limitations in this study. First, our dataset includes only 308 responses in Japan. We need to repeat the same study with different, and hopefully more data to further test/endorse our results. Second, some of the CFA results (Table 6) for some items were weak. We need to scrutinize the cause, source, and reasons. We believe that it comes partly from country cultural difference.

Third, we need to study cultural difference of IT job satisfaction in Japan from other countries and factors that affect it. Many past researches of job satisfaction were conducted either in the U.S.A. or Europe. ASPIRE framework itself was published in the U.S.A. We believe that ASPIRE framework is, in general, applicable universally and this paper illustrated it. However, some measures of included factors should be different depending on cultural difference. Although Asian research has been published recently, we find few Japanese researches in this area. We need to study more about cultural difference. Because of page and time limitation, we cannot help but postpone the study to future research theme.

Despite the above limitations, we believe this study makes an important contribution.

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