Exploring job satisfaction of IT workers in Taiwan, Japan, and China: The role of employee demographics, Job Demographics, and Uncertainty Avoidance

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The purpose of this study is to explore the drivers of job satisfaction among IT workers in the East Asian context, particularly in Taiwan, Japan, and China. Using data collected from IT workers, decision tree analysis was employed to identify the predictors of job satisfaction. Results indicate that the level of education has no effect on job satisfaction. In Taiwan and Japan, higher uncertainty avoidance results in higher job satisfaction, and more experienced IT workers appear to be less satisfied. As Taiwanese and Japanese IT workers get older, they are likely to hold senior positions, spend more time on the job, and become increasingly dissatisfied with their jobs. The effect of uncertainty avoidance is less clear in China. The job role and industry matter only in China. Thus, management efforts to enhance job satisfaction among IT workers in China may be tailored towards specific industries and job roles.

Keywords: IT workers | uncertainty avoidance | job satisfaction | global IT

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Abstract

The purpose of this study is to explore the drivers of job satisfaction among IT workers in the East Asian context, particularly in Taiwan, Japan, and China. Using data collected from IT workers, decision tree analysis was employed to identify the predictors of job satisfaction. Results indicate that the level of education has no effect on job satisfaction. In Taiwan and Japan, higher uncertainty avoidance results in higher job satisfaction, and more experienced IT workers appear to be less satisfied. As Taiwanese and Japanese IT workers get older, they are likely to hold senior positions, spend more time on the job, and become increasingly dissatisfied with their jobs. The effect of uncertainty avoidance is less clear in China. The job role and industry matter only in China. Thus, management efforts to enhance job satisfaction among IT workers in China may be tailored towards specific industries and job roles.

Keywords

IT workers; uncertainty avoidance; job satisfaction; global IT.

Introduction

The IT industry is integral to the economies of Taiwan, Japan, and China (Baller et al. 2016), and the retention of IT employees is among these countries' top priorities. Since employee retention generally depends on job satisfaction levels (Kuo and Chen 2004), our research goal is to investigate the drivers of job satisfaction among IT workers in the East Asian context, specifically in Taiwan, Japan, and China. Our study addresses three research gaps. First, it is an extension of Kuo and Chen's (2004) work on the drivers of job satisfaction among IT workers in Taiwan. It has been more than 10 years since Kuo and Chen (2004) published their study, and it has not been updated. This is a timely review to ascertain if there have been changes. Second, Kuo and Chen's (2004) analysis does not include cultural factors, which can influence job satisfaction (Bigliardi et al. 2012). The present investigation extends Kuo and Chen's (2004) study by

including uncertainty avoidance (UA), along with employee demographics and job demographics, in the analysis. Third, there have been few studies comparing Taiwan with China, and none that we are aware of that focuses on IT workers. Taiwan is sometimes not politically recognized as an independent country, as many studies on China either include only Mainland China, or the Greater China region, that comprises Mainland China, Hong Kong, and Taiwan as a single entity. Furthermore, the inclusion of Japan, whose cultural attributes have been assimilated in part to the Taiwanese cultural fabric, and which has similar Confucian roots as Taiwan, serves as an additional comparison among the East Asian countries. These comparisons enhance the richness of the analysis of culturally similar countries.

Literature Review

Taiwan, Japan, and China are among the top countries in harnessing IT for innovation (Baller et al. 2016). Historically, Taiwan, Japan, and China have had close relations and been culturally similar. Taiwan was originally a part of China but has been politically separated, and is currently a self-governing democracy. Taiwan was also a Japanese colony between 1895 and 1945, with some Japanese cultural traits lingering in its cultural fabric. These historical underpinnings suggest their inherent cultural connections. All three countries are racially homogenous, with Confucian roots and high growth potential (Chew and Putti 1995; Zhang et al. 2005). In view of the research gaps, we proceed to review relevant literature on employee demographics, job demographics, and UA in relation to job satisfaction for inclusion in our empirical comparative analysis of the three countries. We acknowledge that there are other variables that can influence job satisfaction. However, our study is restricted to these variables.

Predictors of Job Satisfaction

Job satisfaction is an employee's overall assessment of his or her job (Spector, 1997). Higher job satisfaction increases organizational commitment, which in turn, reduces job turnover intentions (Serenko et al. 2015) and turnover (Thatcher et al. 2002). There is also a positive relationship between job satisfaction and job performance (Judge et al. 2001). Studies have looked at predictors of job satisfaction but very few have focused on IT workers in all three countries of our interest.

Employee Demographics

In their study of IT workers in Taiwan, Kuo and Chen (2004) find that IT workers aged 35 to 40 years old are significantly more satisfied than their counterparts who are between 20 and 30 years old (Kuo and Chen 2004), corroborating earlier studies showing that older workers are more satisfied with their jobs (Lee and Wilbur 1985; Reiner and Zhao 1999). However, other studies find that younger and older workers are more satisfied than those aged in the middle (Eichar et al. 1991; Kacmar and Ferris 1989). Kuo and Chen (2004) report no significant differences in job satisfaction levels across gender, corroborating earlier arguments that no universal conclusions have been drawn in this area (Witt and Nye 1992), and that there is no difference in job satisfaction levels between men and women (Clark 1997). Nevertheless, it is reasonable to assume that there may be gender differences in the participation of IT work in the three cultures due to different societal expectations (see Chew and Putti 1995; Trauth et al. 2008; Zhang et al. 2005). Kuo and Chen (2004) also document no significant differences in job satisfaction levels across education levels. However, more highly educated workers may also have higher expectations, leading to disappointment (Ross and Reskin 1992) and lower job satisfaction (Clark 1997).

Job Demographics

Job demographics can influence job satisfaction. Kuo and Chen's (2004) study finds that job satisfaction does not differ among IT workers with different IT work experience levels. On the contrary, Bedeian et al. (1992) report that workers who are more experienced at their jobs are more satisfied than those who are less experienced. Additionally, Kuo and Chen (2004) also find that managerial IT workers have significantly higher job satisfaction levels than their clerical colleagues. McKnight et al. (2009) show that IT workers in different jobs, such as programmers and analysts, value different things that influence job turnover. Furthermore, Kuo and Chen (2004) find no significant differences in job satisfaction levels across different industries. However, they operationalized industries as three broad categories: basic information, second

grade information, and others, which may not be sufficient to capture inherent industry differences. In this study, we include 17 different industries for more in-depth analyses.

Uncertainty Avoidance

Kuo and Chen's (2004) study does not include the possible impact of culture, which has been found to influence job satisfaction among knowledge workers (Bigliardi et al. 2012). Since our extension of Kuo and Chen's (2004) study includes multiple country comparisons, the inclusion of cultural variables can enrich the analysis. Hofstede's (1980) cultural framework is useful in assessing cultural differences across countries. It is widely used in IS research and has the advantage of simplicity in measurement (Palvia et al. 2017). In this investigation, we focus specifically on uncertainty avoidance, which is one of many aspects of culture. UA refers to the extent to which individuals prefer unambiguous, clear, and well-structured situations, and it reflects people's tendency to evade uncertainty and the unknown. UA has been found to be positively correlated with job satisfaction (Ang et al. 2003). It makes one's job easier (Palich et al. 1995), and higher UA is associated with adherence to rules and policies, which makes one's job more predictable and, subsequently, more satisfactory (Chew and Putti 1995).

Research Questions

From the preceding literature review, we advance the following research question. Figure 1 provides a general research model and illustrates the three constructs of interest – employee demographics, job demographics, and uncertainty avoidance – as potential predictors of job satisfaction.

RQ: Do employee demographics, job demographics, and uncertainty avoidance drive job satisfaction among IT workers in Taiwan, Japan, and China?
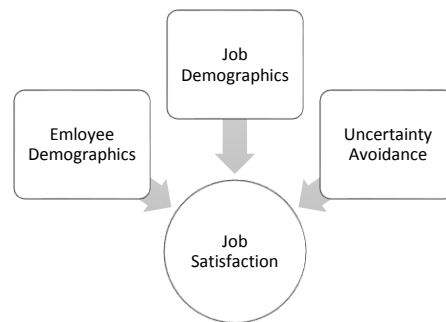

Figure 1. Research Model

Method

A survey instrument comprising 160 questions was translated and administered in Taiwan, Japan, and China as part of a larger study titled the World IT Project; and the method is well-documented (cf. Palvia et al. 2017). In this study, we used a small subset of items pertaining to the four constructs in Figure 1. Their corresponding operationalizations are given in Table 1. Work-related cultural values may change over time (Wu 2006). Given that Hofstede's work is over three decades old, it is important to assess a measure of UA of the respondents. For each respondent, a UA score is computed using the formula provided by Hofstede et al. (2008 p. 9). Job satisfaction is obtained as a composite of three survey items. Respondents were asked to rate their agreement with the following three statements: "In general, I like working here", "All in all, I am satisfied with my current job", and "In general, I don't like my current job" (negatively worded). A higher score indicates a higher job satisfaction level. After removing the third item from China, all satisfaction constructs exhibited acceptable reliability with Cronbach's Alphas and item-to-total correlations over 0.7.

We use Chi-Squared Automatic Interaction Detection (CHAID) decision tree induction to identify the predictors of job satisfaction among IT workers. Decision tree has been used in data mining applications for predictions (Andoh-Baidoo et al. 2012) in medicine (Murphy and Comiskey 2013) and marketing (Amir et al. 2015; Legohérel et al. 2015), but seldom in IS research (Osei-Bryson and Ngwenyama 2014). We use this method for three reasons. First, several independent variables in the study are nominal or ordinal. As

such, using a regression for this study requires the creation of too many dummy variables. On the other hand, decision tree can process nominal and ordinal data effectively. Second, decision tree induction can handle non-linear relationships among variables and do not require the satisfaction of assumptions about data frequency distributions (Pal and Mather 2003). Third, unlike regression analyses that provide a coefficient of impact for each independent variable, decision tree induction generates value ranges of significant variables that predict the outcome, adding additional depth to the analysis.

Construct	Operationalizations	Measurement level
Employee Demographics	Age	Ordinal
	Gender	Nominal
	Education	Ordinal
Job Demographics	Job role	Nominal
	Years of IT work experience	Ordinal
	Job position	Ordinal
	Industry	Nominal
Culture - Uncertainty Avoidance	Uncertainty Avoidance	Continuous
Jobs satisfaction	Job satisfaction scale	Continuous

Table 1. Summary of Variables

To use decision tree induction, we compute the job satisfaction of IT workers for each country as a nominal (high vs. low) variable, using the respective mean values as the cut-off point. Computing job satisfaction at two levels simplifies decision trees and yields more useful results for informing theory and management as recommended by Esposito et. al. (1997). This approach is consistent with previous studies (cf. Yeo and Grant 2017, 2018). Given the length constraints, we focus on the predictive analyses. Descriptive analyses and interaction effects are also important, but they are beyond the scope of this study.

Findings

Taiwan

The decision tree shows that the predictors have a 65.02% accuracy (Table 2) in predicting job satisfaction among IT workers in Taiwan (Figure 2). We discuss the significant predictors. From the first branch, the results show that IT respondents with UA scores of 55.00 or less tend to exhibit low job satisfaction levels (χ^2=13.72, p = 0.002) (Node 1). Next, we look at IT workers from the second branch, who have a UA score of above 55.00. Among these IT workers, those who are not part of the management or are in the middle management tend to exhibit high job satisfaction levels (χ^2=7.58, p = 0.041) (Node 3). Those who are in lower or senior management, and with less than or equal to 9 years of IT work experience, exhibit high job satisfaction (χ^2=6.82, p = 0.036) (Node 5), while those who have more than 9 years of IT work experience tend to exhibit low job satisfaction (χ^2=6.82, p = 0.036) (Node 6). These suggest that satisfied IT workers are those who tend to avoid uncertainty (Nodes 1 and 2). However, the IT work environment may have taken its toll, making the more experienced lower or senior managers less satisfied (Nodes 5 and 6).

Job Satisfaction	Low (Predicted)	High (Predicted)
Low (Actual)	119	44
High (Actual)	62	78

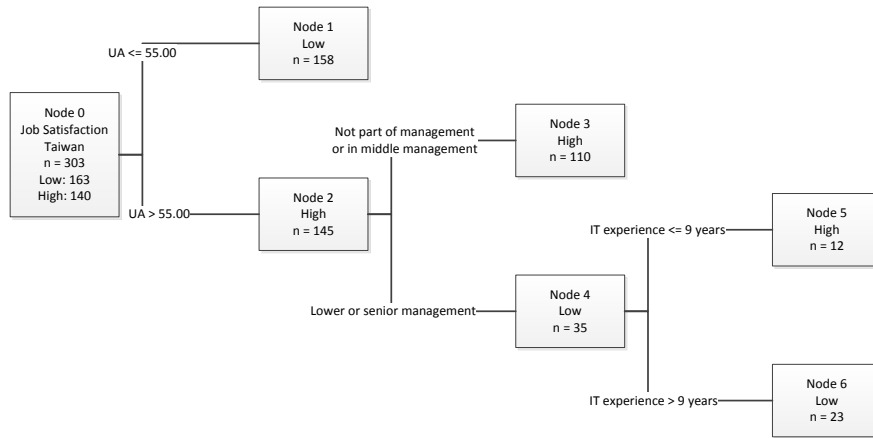**Table 2. Confusion Matrix for Decision Tree Induction, Taiwan**

Figure 2. Decision Tree for Job Satisfaction in Taiwan

Japan

The decision tree yields an accuracy of 64.52% (Table 3) in predicting job satisfaction among IT workers in Japan (Figure 3). We discuss significant predictors. IT workers who are 39 years old or younger generally exhibit high job satisfaction (Node 1) (χ^2=32.27, p < 0.001). For those over 39, their level of UA becomes important. Among these older IT workers, those who have a UA score of 60 or less and have less than 30 years of IT work experience generally have high job satisfaction (Node 6); whereas those with 30 or more years of IT work experience have low job satisfaction (Node 7) (χ^2=10.49, p = 0.005). Among IT workers who are older than 39 years old and have a UA score of more than 60.00, males generally exhibit high job satisfaction, whereas females do not (Nodes 8 and 9) (χ^2=6.33, p = 0.012). The findings show that in Japan, more experienced and female IT workers seem to exhibit low job satisfaction levels.

Job Satisfaction	Low (Predicted)	High (Predicted)
Low (Actual)	28	83
High (Actual)	7	160

Table 3. Confusion Matrix for Decision Tree Induction, Japan
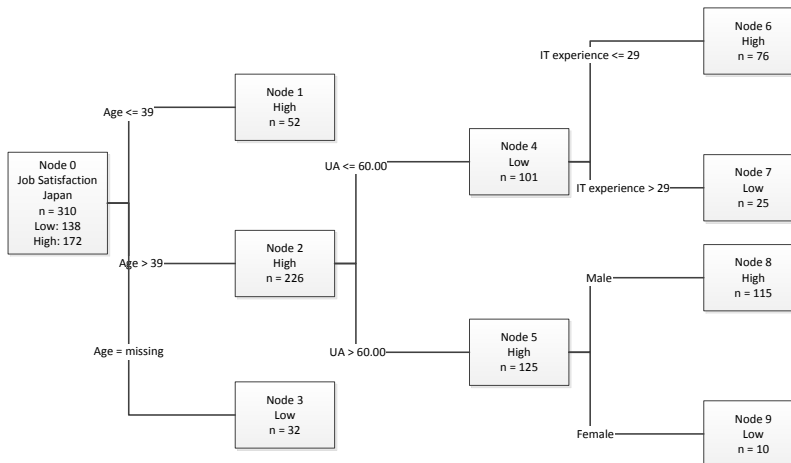

Figure 3. Decision Tree for Job Satisfaction in Japan

China

The decision tree has an accuracy of 67.00% (Table 4) in prediting job satisfaction among IT workers in China (Figure 4). The first split of the decision tree is based on UA (χ^2 = 20.94, p = 0.009). We discuss the

significant predictors. IT workers with a UA score below 10.00 generally exhibit low job satisfaction (Node 1). In the second branch, IT workers in China with a UA score between 10.00 and 30.00 generally enjoy high job satisfaction levels (Node 2) ($χ^2$ = 20.94, p = 0.009). In this subset, those working in the manufacturing, education, financial institutions, leisure/hospitality, and IT industries (Node 5) ($χ^2$ = 22.53, p = 0.001), and have a UA score of less than 20.00 (but more than or equal to 10.00 as this is a subset from Node 2) tend to have low job satisfaction levels (Node 7) ($χ^2$ = 5.487, p = 0.019). However, those working in these industries with a UA score of more than 20.00 (but less than or equal to 30.00 as this is a subset from Node 2) generally enjoy high job satisfaction levels (Node 8) ($χ^2$ = 5.487, p = 0.019). Within the second branch of Node 2, those working in the retail services, construction, transportation, professional services, and healthcare industries (Node 6) ($χ^2$ = 22.53, p = 0.001), and are mostly involved in programming, analysis and design, maintenance, operations, testing, and telecommunications, generally exhibit high job satisfaction levels (Node 9) ($χ^2$ = 16.812, p = 0.005). However, those involved in integration and consulting tend to exhibit low job satisfaction (Node 10) ($χ^2$ = 16.812, p = 0.005). However, there are only 3 cases recorded in Node 10, and this specific finding must be interpreted with caution. In the third branch, IT workers with UA scores between 30.00 and 60.00 generally exhibit low job satisfaction (Node 3) ($χ^2$ = 20.94, p = 0.009), while in the fourth branch, those with UA scores of more than 60.00 tend to have high job satisfaction (Node 4) ($χ^2$ = 20.94, p = 0.009). Overall, the findings suggest that in China, UA does not have a straightforward relationship with IT workers' job satisfaction levels, and demographics do not matter. Rather, their job satisfaction levels vary by industry and job roles.

Job Satisfaction	Low (Predicted)	High (Predicted)
Low (Actual)	85	38
High (Actual)	60	114

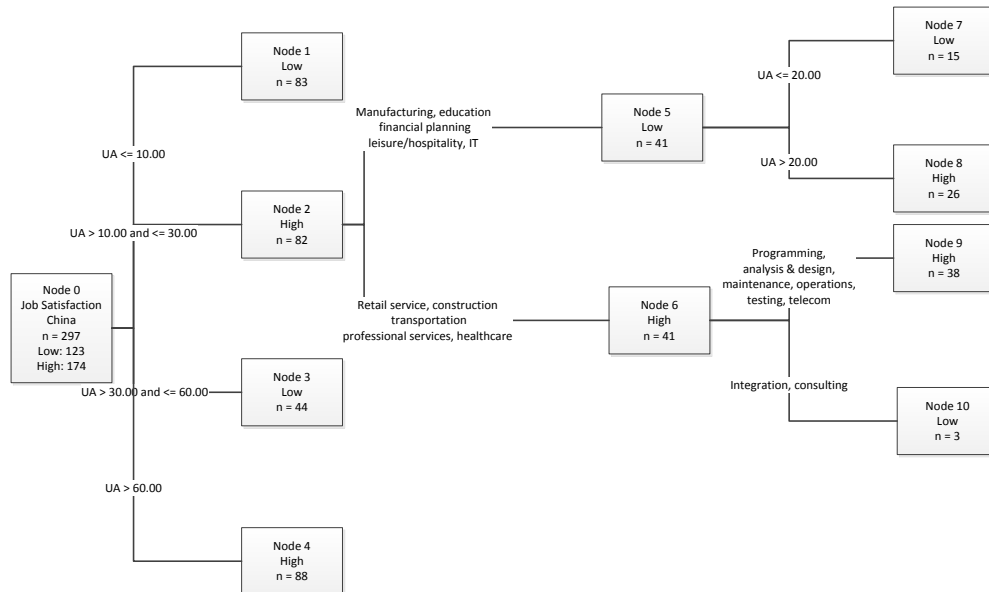**Table 4. Confusion Matrix for Decision Tree Induction, China**

Figure 4. Decision Tree for Job Satisfaction in China

Discussion and Conclusion

Pertaining to our research question, we show that UA is a common predictor in all three countries, suggesting the importance of cultural attributes to job satisfaction. Job demographics are more important predictors than employee demographics in Taiwan and China, contrary to the previous findings on IT workers in Taiwan (Kuo and Chen 2004). In Japan however, employee demographics, specifically, age, and, to a lesser extent, gender, matter along with various job demographics.

Drivers of Job Satisfaction

Looking at employee demographics, age and gender are only significant in Japan but not in Taiwan and China. The level of education plays no role in job satisfaction. In Japan, younger IT workers are generally more satisfied with their jobs. However, as they get older, their satisfaction levels become dependent on other factors. Those who exhibit low UA scores are less satisfied with their jobs. In Japan, it is a cultural norm for an employee to stay at his or her job from graduation till retirement. It is plausible that after many years at the same job, IT workers may be disillusioned by the work environment, and desire less uncertainty in their lives and work environment, resulting in lower levels of job satisfaction. Gender may also matter in Japan, where female IT workers are less satisfied than male IT workers.

Job role and industry matter in China but to a small extent, and they do not matter in Taiwan and Japan. In China, IT workers in the retail service, construction, transportation, professional services, and healthcare industries, who are involved in programming, analysis and design, maintenance, operations, testing and telecommunications, exhibit high job satisfaction. In contrast, those in integration and consulting have low satisfaction. IT workers who are in manufacturing, education, financial planning, and leisure/hospitality and who do not avoid uncertainty are less satisfied.

In Taiwan and Japan, the number of years of IT work experience is a predictor of satisfaction, but not in China. More experienced IT workers appear to be less satisfied. As Taiwanese IT workers get older, and are hence likely to hold senior positions thus spending more time on the job, they become increasingly dissatisfied. Consistent with this finding, Duffy et al. (1998) reported a negative correlation of 0.17 ($p < 0.05$) between one's job tenure and job satisfaction.

Uncertainty avoidance has a positive relationship with job satisfaction (Ang et al. 2003), and our results corroborate this. In all three countries, UA is a significant predictor, whereby higher UA leads to higher job satisfaction levels. This conclusion though, is less clear in China, possibly due to cultural differences across its vast geography (Miller 1995; Ralston et al. 1996). Altogether, we demonstrate that UA, a dimension of culture, can influence job satisfaction among IT workers, and that Hofstede's (1984) cultural dimensions can be used as a theoretical foundation for analysis.

Implications

Taiwan

Consistent with the findings by Hu et al. (2005), IT workers in Taiwan who have worked longer in IT and those who do not avoid uncertainty are generally less satisfied. The finding on the impact of job position is not straightforward. This corroborates the literature where, on the one hand, IT managers are found to be more satisfied than lower level workers (Kuo and Chen 2004), and, on the other, East Asian cultural values emphasizing hierarchy and harmony imply that job positions do not matter (Zhang et al. 2005). Experienced IT workers appear disillusioned by IT work compared to those who are new.

Therefore, a key to increasing job satisfaction among IT workers in Taiwan lies in addressing the gap among the job positions, rather than in employee demographics as the literature posits (Kuo and Chen 2004). Management practices and policies have to focus on the longer serving IT workers to bridge the gap in job satisfaction between them and their younger colleagues. Management practices can look into incentives for long serving IT workers in order to ensure they are compensated and rewarded in accordance to their experience and job positions.

Japan

In Japan, younger IT workers avoid uncertainty more and are generally more satisfied with their jobs. Those with low UA and a lot of IT work experience have lower job satisfaction. Traditional Japanese are taught to value the collective above the individual (Lopez et al. 2009) and have a preference for structure (Money and Crotts 2003). The stereotypical Japanese white collar worker is expected at a job for the entire career (Iida and Morris 2008), is overworked, and tends to experience psychological job stress (Kawakami and Haratani 1999). Therefore, it is possible that older workers become disillusioned and less satisfied as job frustrations and extreme pressure set in. As such, they may not deal with uncertainties well leading to, in extreme cases, even suicide, whose rate has increased among middle-aged Japanese workers (Hirokawa et al. 2012).

Even though workers may not leave their jobs, enhancing their job satisfaction levels can improve their job performances and productivity. Towards this end, management practices and policies in Japan have to include incentives and recognition for long-serving IT workers. Career development opportunities to revitalize the older IT workers may help reduce disillusionment and uncertainties.

China

The drivers of job satisfaction among IT workers in China are comparatively less clear. Although UA is a predictor, the relationship is not very clear, as the results cannot ascertain whether higher or lower UA leads to different levels of job satisfaction. This may be due to the vast cultural differences across China, which is a larger and more culturally complex country than Taiwan and Japan. Although its societal core in Confucianism remains unchanged (Ralston et al. 1995), there are subtle differences in work values across the country (Miller 1995; Ralston et al. 1996), resulting in a much more complex culture. Pertaining to findings on the other variables, job satisfaction in China differs across industries. The cultural differences between cosmopolitan and local Chinese (Ralston et al. 1996) may also explain these industry.

Thus, management efforts to enhance overall job satisfaction among IT workers in China may be tailored towards specific industries and job roles. Given China's vast geography and regional cultural differences (Miller 1995; Ralston et al. 1996), there may be other factors, not included in this analysis, that can better predict job satisfaction.

Limitations and future directions

Despite being a comprehensive comparative analysis of IT workers in three countries, this study has some limitations. First, China is a vast country, and there are cultural differences across its geography. As such, a larger sample of IT workers may be able to provide more in-depth details on how industry types and job roles influence job satisfaction. Second, Hofstede's (1984) work provides several dimensions of culture. In this study, we focused on uncertainty avoidance alone. Future studies can include other dimensions to investigate their possible impact on job satisfaction.

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