



**Identifying work-related factors influencing job satisfaction using
job descriptive index questionnaire:
a study of IT companies in Hanoi**

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Received: 16 June 2020; **Revised:** 26 January 2021; **Accepted:** 02 February 2021

<https://doi.org/10.38203/jiem.021.1.0023>

Abstract

IT professionals' job satisfaction is important in minimizing turnover, improving job performance, minimizing absenteeism, and increasing the level of job involvement. The primary purpose of this study is to measure the job satisfaction of IT professionals and to identify which factors influence job satisfaction the most in Hanoi's IT companies. The study also investigates the relationship between job satisfaction factors and the overall job satisfaction by using the Job Descriptive Index (JDI) and Job General Index (JGI) questionnaire to evaluate the construct validity of factors. Data were gathered from a survey of 326 IT professionals in systems development to capture perceptions regarding work-related factors on job satisfaction and organizational commitment. The results of this study indicate that compensation and benefits, co-worker, promotion opportunities, nature of work, and supervision are positively related to job satisfaction. Based on these findings, the study provides implications to business executives in the IT businesses.

Keywords: Work-related factors, Job satisfaction, Job descriptive index

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1. Introduction

Job satisfaction has recently become a rising research topic for organizations and businesses (Aydogdu and Asikgil, 2011; Spector, 1997). Job satisfaction has been linked to employee performance, absenteeism, and turnover (Agarwal, 2016; Al-zu, 2010; Aydogdu and Asikgil, 2011; Hom and Griffeth, 1995). The importance of job satisfaction, beyond the individual level, is clear regarding its relationship with organizational behaviors related to the “health” of each organization. It is central to processes and as diverse as organizational commitment (Klaus *et al.*, 2014; Mathieu and Zajac, 1990). Because of the importance of job satisfaction for an organization, many theories have tried to investigate and illustrate the factors affecting it. Some of these could be grouped in process theories and content theories or satisfaction of needs (Rast and Tourani, 2012; Stamps, 1997).

The process theories emphasize how one’s characteristics of personality affect his/her professional behavior and, thus, job satisfaction. The personality characteristics of individuals, according to these theories, play a major role in employee behaviors both in the workplace and personal life (Rast and Tourani, 2012; Spector, 2008; Stamps, 1997). The content theories, or needs satisfaction, are based on the feeling of joy that an employee feels when he or she has fulfilled his or her professional goal, which is the pleasant feeling that covers his or her desire and need. An important role of these theories is presented by the mental processes a person utilizes for decision making (Gruneberg, 1979; Luthans, 2006; Rast and Tourani, 2012).

This research applied the content theories to explore the concept of job satisfaction and used the JDI questionnaire to evaluate the construct validity of determinants of job satisfaction and the JGI to examine theoretical issues surrounding its use as a measure of job satisfaction.

There are several reasons for examining determinants of job satisfaction in an IT context. Firstly, studies have shown that IT professionals have different work practices (Kirlidog *et al.*, 2009) and are different from population norms for nearly all personality scales (Wynekoop and Walz, 1998). The premise for IT personnel research is that IT professionals and their work settings are unique to merit specific studies. Secondly, although factors of job satisfaction proposed in this study have been individually studied in various settings, only some have been examined in the IT setting and few studies have focused on job satisfaction regarding IT professionals. Although the topic has been given attention in developed countries, there is a shortage of research on job satisfaction in certain countries like Vietnam (Pham, 2016). The argument even goes so far as indicating that studies on job satisfaction in Vietnam are severely limited (Duong, 2013). This study is aimed to provide additional insights into the job satisfaction of employees in Vietnam. It focuses on a sample of workers, who are IT employees in Hanoi. Thirdly, this study is focused on recommendations that can be used by organizations to better manage their IT personnel.

This study is divided into 7 sections: (1) Introduction, (2) Literature review of job satisfaction, (3) Research framework, (4) Methodology, (5) Results, (6) Discussion and (7) Conclusion and policy implications.

2. Literature review

2.1 Concepts of job satisfaction

Job satisfaction has attracted the attention of researchers and executives because it influences an individual's behavior in organizations (Locke, 1976; Spector, 1997; Wright and Kim, 2004). Job satisfaction is the most widely researched concept in the field of industrial and organizational psychology, social psychology, and organizational behavior literature (Hackman and Oldham, 1974; Parnell and Crandall, 2003).

Despite its wide usage in research, there is no agreement on what job satisfaction is. Due to this shortcoming, the concept of job satisfaction is one of the important issues for researchers and organization executives. Some of the most frequently cited definitions of job satisfaction are analyzed in the following paragraphs.

Job satisfaction could be defined as the emotional response of an employee towards the tasks and the natural and social environment of the work (Al-zu, 2010; Drakou *et al.*, 1997). Locke (1976) and Oshagbemi (1999) define job satisfaction as positive feelings and emotional attitudes towards work. Hoppock (1935) defines job satisfaction as any combination of psychological, physiological, and environmental circumstances that cause a person truthfully to say that he/she is satisfied with his/her job. According to this approach, although job satisfaction is influenced by many external factors, it remains something internal relating to how an employee feels. Job satisfaction presents a set of factors that cause a feeling of satisfaction. Vroom (1964) links job satisfaction with the individual's role in the workplace and defines job satisfaction as affective orientations on the part of individuals toward work roles that they occupy. Job satisfaction represents a combination of positive or negative feelings that workers have towards their work (Spector, 1997). In other words, job satisfaction is when a worker in an organization brings with him or her needs, desires, and experiences, which determine expectations that he or she has dismissed. Davis (1982) argues that the concept is double-sided and describes job satisfaction as an individual's satisfaction or dissatisfaction with the work. The term job satisfaction refers to the attitudes and feelings people have about their work. Positive and favorable attitudes toward a job indicate job satisfaction. Negative and unfavorable attitudes toward a job indicate job dissatisfaction (Armstrong, 2006). Job satisfaction is closely linked to an individual's behavior in the workplace (Davis *et al.*, 1985).

Job satisfaction is the collection of feelings and beliefs that people have about their current job. People's levels of job satisfaction range from extreme satisfaction to extreme dissatisfaction. People have attitudes about various aspects of their jobs, such as the kind of work they do, their co-workers, supervisors or subordinates, and their payment (George *et al.*, 2008).

To summarize, it is argued that job satisfaction describes the emotion of a person reflecting how much he or she likes his or her job. When we say that an individual has high job satisfaction, we mean that the he or she and values the job highly and feels positive about it. This study applies the concepts of Spector (1997), which describes job satisfaction as to how people feel about their jobs and different aspects of their jobs. It is the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs.

2.2 Factors affecting job satisfaction

2.2.1 Classification of factors affecting job satisfaction

Job satisfaction is influenced by a series of factors. Little consensus has been achieved on the determinants of job satisfaction (Spector, 2008). The factors and their levels of impact are different in the sense that the individuals who are doing the same work in the same environment do not have the same level of satisfaction because of the complexity of the psychological perspectives of each worker.

Many factors, including environmental and personal factors, affect job satisfaction (Giannikis and Mihail, 2011; Spector, 2008; Vakola and Nicholaou, 2012). Personal factors include a person's personality, gender, age, and social differences (Agarwal, 2016; Aydogdu and Asikgil, 2011; Judge *et al.*, 2001; Rast and Tourani, 2012). Controversy exists among researchers about the influence of these factors on job satisfaction.

Among the environmental factors, there are work-related factors such as job's characteristics, which refer to the nature and responsibilities of the job, the salary, the fairness in the workplace, payment, promotion, training, and development, or supervisor and colleague relationship (Alam, 2012; de Graaf- Zijl, 2012; Lottrup *et al.*, 2015). Other environmental factors are regarded as the relationship of culture and national differences with job satisfaction. It has been shown that when colleagues differ in nationality, culture is the factor affecting employee satisfaction (Bhandari *et al.*, 2015; Hauff *et al.*, 2015). Spector (2008) among other researchers argues that the work-related factors positively affect employee job satisfaction. How demographic factors affect job satisfaction is, however, a controversy among researchers. This study, hence, focuses on identifying the impact of work-related factors on job satisfaction.

2.2.2 Work-related factors influencing job satisfaction

Relation with co-worker

Co-workers are people working in the same department or the same organization (Bateman, 2009). Relation with co-workers increases job satisfaction when colleagues' relationship is harmonious and trusting and when employees cooperate efficiently and provide help in a friendly working environment. Hodson (1997) argues that social relations of the workplace may make a key contribution to employees' job satisfaction, productivity, and well-being. The present study has its focus on employee perceptions of co-worker support because co-workers are in contact on a day-to-day basis. Co-worker support refers to co-workers' assistance to one another in their tasks by sharing knowledge and expertise and providing encouragement

and support (Zhou and George, 2001). A welcoming and supportive working relationship increases the work contentment of employees (Johns, 1996; Kreitner and Kinicki, 2001).

The nature of work

Locke (1976) argues that satisfaction is determined by a discrepancy between what one wants and what one has in a job or a work. The nature of the job is reflected through multiple aspects such as qualification requirements, employee's skill set and abilities, work knowledge, or chances for advancement. Luddy (2005) and Chau (2009) show statistical proof of the nature of work affecting job satisfaction.

Attitudes toward supervisors

Within an organization, employees need guidance, direction, and management from their supervisors. The support of supervisors is one of the most important factors for employee retention, which can be shown through fair treatment, subordinate assistance, vision, and management ability (Robins *et al.*, 2002). Supervisor support is defined as the extent to which leaders and administrators care for the welfare of their employees and value their contribution (Neog and Barua, 2014). When employees feel that they are receiving support, care, and assistance from their supervisors, they develop a viewpoint that they are being appreciated, heard, and cared for. Hence, they feel satisfied with their jobs. Furthermore, supervisors' behaviors and attitudes play an important role in mediating employees' level of cooperation by encouraging their development and controlling dissatisfaction at the right time. Previous studies have presented this relationship between supervisors and job satisfaction (Koustelios, 2001; Luddy, 2005; Tran, 2005).

Opportunities for promotion

According to Pergamit and Veum (1999), Peterson *et al.* (2003), and Sclafane (1999), promotion opportunities connect directly with employee's job satisfaction. This perspective is supported by the study of Ellickson and Logsdon (2002), investigating government employees' work contentment and find a positive assessment of the work advancement factor. Nonetheless, Kreitner and Kinicki (2001) propose that this positive relation depends fairly on the equity awareness of employees.

Compensation and benefits

Monetary compensation and benefits are considered the most important factor for employees' work satisfaction. Compensation ranks first in determining job satisfaction (Neog and Barua, 2014). Monetary payment or salary is one of many reasons for which people work. Salary is defined as the monetary benefit given to the employees by a company in return for the services that the employees render towards the company. Employees can still experience job dissatisfaction, even with high payment (Luddy, 2005). Nevertheless, in developing countries such as Vietnam, salary remains a crucial factor contributing to job satisfaction (Tran, 2005; Pham, 2012).

2.4 Research gap

The magnitude of job satisfaction is considered a strong predictor of a worker's behavior. This measure has been used to predict separations, resignations, and productivity of workers (Clark *et al.*, 1996; Shields and Price, 2002). Furthermore, job satisfaction is one of the 5 most crucial predictors of overall well-being (Argyle and Martin, 1989; Clark *et al.*, 1996).

The implications of job contentment have spurred a significant amount of research on the dimensions of satisfaction factors. Smith *et al.*, (1969) have researched job satisfaction descriptive index at Cornell University and evaluated 5 factors including work nature, promotion opportunities, supervisor support, colleagues, and payment. The study by Spector (1985) in the field of services indicates that there are 9 factors affecting employees' contentment with their jobs, including the JDI facets with the addition of job desire, information communication, unexpected rewards, and welfare. Luddy (2005) finds that 3 out of 5 factors in the JDI model positively impact job satisfaction while the remaining 2 prove dissatisfaction in health services in South Africa.

In the context of Vietnam, the concept of employee job satisfaction has been widely studied. Recent studies have a focus on determinants of job satisfaction in educational institutions and mechanical companies (Nguyen and Nguyen, 2013; Nguyen, 2011; Nguyen, 2005).

Although the researchers mentioned above share the same research interests in job satisfaction, they have little consensus on determinants of job satisfaction in the IT businesses. The factors and their levels of impact are different in various industries (Spector, 2008). Individuals doing the same work in the same environment do not all have the same level of satisfaction because of the complexity of their psychological perspectives. Many studies in this field are limited by sample size, scope, and subject matter, whereas many studies are focused on the impact of a large group of influencing factors. This study seeks to extend research insights into job satisfaction and work-related antecedents in IT companies located in Hanoi, Vietnam, and then suggest recommendations to enhance the job satisfaction of IT professionals.

3. Research framework

3.1 Proposed research model

The study identifies the work-related determinants of job satisfaction, which include relation with co-workers (coworker), the nature of work (job), attitudes toward supervisors (supervision), opportunities for promotion (promotion), and compensation and benefits (pay).

Figure 1 shows 5 independent variables and one dependent variable. The independent variables are hypothesized to be correlated with and have a direct influence on job satisfaction as indicated by Arrows from H1 to H5. This job satisfaction model is derived from theories and tested for its applicability to measure the overall work contentment level of employees in an organization based on JDI (Smith *et al.*, 1969).

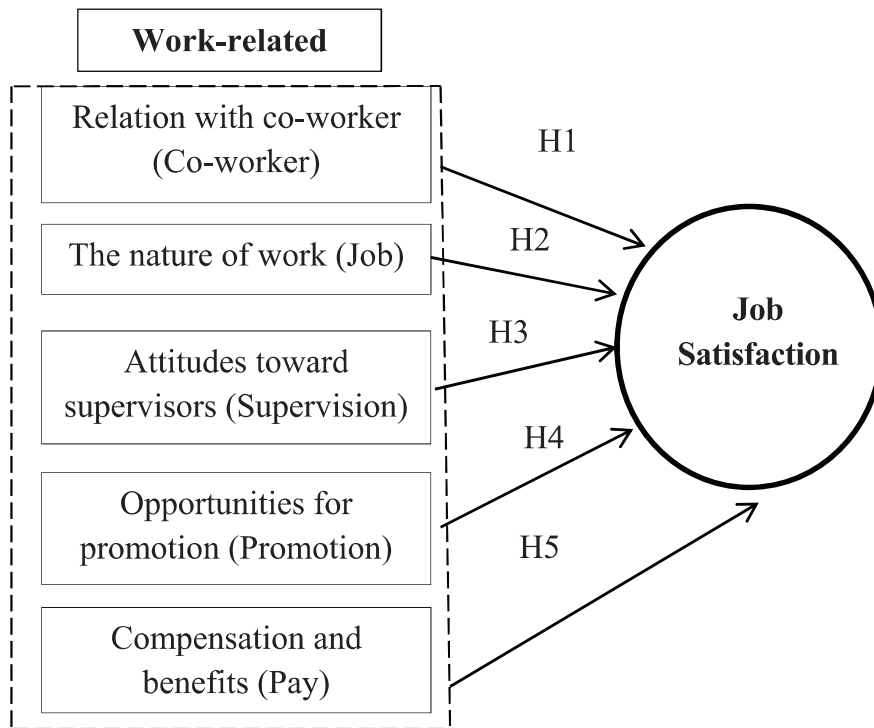


Figure 1. Hypotheses model

Source: Proposed by authors

3.2 Hypothesis development

Relation with co-worker and job satisfaction

Co-workers work together in the same position with similar work contents or in a chain of professional works related to each other in an organization. The relations between co-workers are competitive and supportive. Employees will feel satisfied with their jobs if they have supports from their co-workers and their colleagues are friendly and helpful. Employees are satisfied if they have fair competitiveness of awards and promotion opportunities in the company. The main elements of satisfaction with co-worker relations are trust, dedication in work, and friendliness. In other words, employees will feel more satisfied with their jobs if they have a good relationship with their co-workers. This argument is confirmed by Ramayah and Muhamad (2001), Luddy (2005), Tran (2005), Nguyen (2011), and Pham (2012). Thus, in this study the following hypothesis is advanced:

H1: The relation with co-workers positively affects the general job satisfaction of employees.

The nature of work and job satisfaction

The work factor reflects the compatibility of job characteristics and an employee's job qualifications, expectations, and capacities. By arranging a job in an efficient and organized way, employers can boost positive emotions, encourage self-development, exploit the potentials of employees, and increase productivity. In other words, employees will feel satisfied with assigned works if they suit their capacities. This argument is supported by Ramayah and

Muhamad (2001), Kinicki *et al.* (2002), Luddy (2005), Tran (2005), and Nguyen (2011). Findings from these studies show that employee satisfaction with the nature of work influences their satisfaction on the job. Therefore, the authors advance the following hypothesis:

H2: The nature of work positively affects the general job satisfaction of employees.

Attitudes toward supervisors (Supervision) and job satisfaction

According to Cumbey and Alexander (1998), the relationships between job satisfaction and effective supervisory are verified. Their results affirm that effective supervisory on employees has a positive effect on job satisfaction. Bradley *et al.* (2004) conduct a study with supervision as an independent variable and job satisfaction as a dependent variable. The study presents the supervision preferred by workers, which is to have close supervision of work since workers enjoy visual assessment of their performance. This finding suggests that monitoring is desirable. They find a positive relationship between supervision and job satisfaction. Great supervisors demonstrate capability, vision, and management ability to support subordinates in their work (Robins *et al.*, 2002). Keashly and Jagatic (2000) argue that poor supervision leads to dissatisfaction of workers. Karasek and Theorell (1990) find that poor supervision does not only cause dissatisfaction with employees' work but also leads to higher turnover. Besides, a supervisor's workplace control has a significant effect on employee satisfaction and reduces employee turnover (Harmon *et al.*, 2007). For this reason, the following hypothesis is advanced:

H3: The attitudes toward supervisors positively affect the general job satisfaction of employees.

Opportunities for promotion and job satisfaction

One of the most important factors that significantly affect an individual's satisfaction process is a promotion (Luthans, 1973). The individuals that do not have any expectation of being promoted are more satisfied than the employees that are waiting to be promoted. It is expected that this promotion expectation positively affects an individual's performance but negatively affects individual job satisfaction (Bassett, 1994; Oshagbemi, 1999). Individuals with experience, business knowledge, and skills hope to have better conditions and be promoted in their work (Price and Mueller, 1986). If this promotion expectation is not achieved, it will have negative effects on job satisfaction (Oshagbemi, 1999). By using the promotion mechanism, employees will feel more satisfied when they realize that they have made career progress and have a significant position in the organization and society. In this study, the promotion has been considered as a factor affecting job satisfaction. Therefore, this study proposes a hypothesis as follows:

H4: The opportunities for promotion positively affect the general job satisfaction of employees.

Compensation, benefits, and job satisfaction

Compensation and benefits are human resource practices used by an enterprise to attract talent, retain employees, and minimize job dissatisfaction (Churchill *et al.*, 1974). Employees will perceive that fairness of pay comes from comparing their contribution or efforts in terms of their received rewards with those of their co-workers. They will be satisfied if the rate they

expect is lower than or equal to the level they get and they will be disappointed if they do not get what they expect (Luthans, 1973, Wright and Kim, 2004). Salary and bonuses are among the most common influencing factors for employee satisfaction (Spector, 1997). As supported by Ting (1997), there were 2 different types of pay practices that have effects on job satisfaction, including the pay itself and financial prospects in the future. Thus, this study hypothesizes that:

H5: The compensation and benefits positively affect the general job satisfaction of employees.

4. Methodology

4.1 Measurement

The scale development procedure was conducted in 6 sections: (1) Literary definition of the concept; (2) Identification of the concept; (3) Generation of items; (4) Reduction of the scale; (5) Data collection; and (6) Testing of the scale. After reviewing theories of job satisfaction and work-related factors, the study conceptualized 5 factors that influence job satisfaction based on JDI.

Measuring factors of job satisfaction based on Job Descriptive Index

One of the most widespread and popular questionnaires is the JDI created by Smith *et al.* (1969). They measure factors of job satisfaction using words, mainly adjectives, to describe an employee's feelings about his or her job. Following their surveys and statistical analysis, they added other words to create a questionnaire that could assess factors affecting job satisfaction. These factors include relation with co-workers (Co-worker), the nature of work (Job), attitudes toward supervisors (Supervision), opportunities for promotion (Promotion), compensation, and benefits (Pay) (Spector, 1997). The original scale has a total of 72 items with either 9 or 18 items per subscale. Each item is an evaluative short phrase that is descriptive of the job.

To monitor the influence of different observed variables, designing suitable and trustworthy scales is compulsory to detect and analyze possible issues. The study uses the modified scales of Leck (2016) with 30 items, in which each factor has 5 items. The factor scales of job satisfaction are taken into consideration to complete the development of the constructs as shown in Table 1.

Measuring job satisfaction in general based on Job in General Index

To complement JDI, JGI was set up with 18 questions to assess overall satisfaction. The difference with JDI is that JGI evaluates some other aspects of the profession such as "how satisfied the employee is by customers" and the questions show the best overall satisfaction and have higher reliability. The questions of JGI are associated with long-term feelings and were designed to measure the overall satisfaction (Greenberk and Baron, 2013; Spector, 2008; Drakou *et al.*, 1997). According to the literature, it contains assessment questions, which have higher reliability as predictors of behavior. Measurement of factors of job satisfaction is shown in Table 1.

Table 1. Measurement of factors of job satisfaction

Factors	Items	Authors
Relation with co-workers (Co-worker)	Co-woker1 - Helpful Co-worker2 - Responsible Co-worker3 - Intelligent Co-worker4 - Stimulating Co-worker5 - Active	Smith <i>et al.</i> (1969), adapted by Leck (2016)
The nature of work (Job)	Job1 - Use my abilities Job2 - Give a sense of accomplishment Job3 - Can see the result Job4 - Exciting Job5 - Challenging	
Attitudes toward supervisors (Supervision)	Supervision1 - Around when needed Supervision2 - Supportive Supervision3 - Tell me where I stand Supervision4 - Knows job well Supervision5 - Up-to-date	
Opportunities for promotion (Promotion)	Promotion1 - Good opportunities for advancement Promotion2 - Promoting ability Promotion3 - Fairly good chance for promotion Promotion4 - Regular promotions Promotion5 - Fair promotion policy	
Compensation and benefits (Pay)	Pay1 - Well paid Pay2 - Adequate income for normal expenses Pay3 - Fair payment Pay4 - Enough to live on Pay5 - Comfortable	
Job satisfaction in general (Job-satisfaction)	Job-satisfaction1 - Make me content Job-satisfaction2 - Enjoyable Job-satisfaction3 - Acceptable Job-satisfaction4 - Pleasant Job-satisfaction5 - Worthwhile	Spector (2008); adapted by Leck (2016)

Sources: Spector (2008) adapted by Leck (2016)

Although JDI validity and reliability are testified through various studies and recognized as one of the most famous tools to measure job satisfaction, the original model only contains answers in the form of Yes or No. Many measurement scales, which are more reliable and appropriate for statistical analysis, have been developed since then (Kinicki *et al.*, 2002; Tasios and Giannouli, 2017). Among them, the Likert scale is a common measure in social science, particularly in the topic of job satisfaction. In principle, the more detailed the scale is, the more accurate it is. The 5-point Likert scale is appropriate for this study because its accurateness is similar to the 7-point Likert. A 5-point Likert scale is, thus, used and the choice for each item in JDI and JIG model is as follows: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree.

4.2 Data collection

Primary data are collected from a questionnaire survey. The main objective is to gain an in-depth understanding of the current level of job satisfaction of employees in IT companies. Both offline and online survey methods are applied. A total number of 326 responses have been returned.

The survey is used to understand the perceptions of IT professionals on work-related factors regarding relation with co-workers, the nature of work, attitude toward supervisors, opportunities for promotion, compensation, and benefits, and overall job satisfaction. The items used were pre-tested by several managers and IT professionals. Minor adjustments were made to a few items based upon pretesting the questionnaire to increase its comprehension and clarity. After that, the formal survey was conducted on a large scale with 8 IT companies located in Hanoi. These are all companies in the group of ten leading IT companies in Vietnam (Vietnam Report, 2020). The companies are mainly from 2 sub-industries, which are IT and Telecommunication and Services, Software Solutions, and System Integration Technology. IT professionals are identified as those who strategically implement technology to carry out companies' vision. Through interviews with IT managers, the authors can identify 5 key IT positions to be our respondents including programmers, systems analysts, senior systems analysts, project leaders, and database administrators. Table 2 presents a summary of the industry types and IT positions of our respondents.

The sample consists of 380 respondents. However, only 362 questionnaires are fully answered. Out of the respondents, 83% are male and 17% are female. This result shows that a major proportion of respondents are male, which is close to the proportion of 89% male respondents reported in the 2020 IT Industry HR report (VietnamworksInTECH, 2020). The 362 respondents are generally well educated and experienced in the information technology field, which is shown by their demographic statistics (see Table 2). Based on these observations, these IT professionals are representatives of those found in IT organizations.

Table 2. Surveyed respondents' demographics

Respondents' experience, by industry type	IT and Telecommunication	54%
	Services, Software Solutions & System Integration Technology	46%
IT position	Programmer/Analyst	25%
	Systems analyst	15%
	Senior systems analyst	20%
	Project leader	12%
	Database administrator	8%
	Other	20%
Gender	Male	83%
	Female	17%
Highest completed education	College	23%
	Bachelor's degree	63%
	Master's degree	14%
Age	21-30 years old	55%
	31-40 years old	34%
	41-50 years old	11%
Working experiences	< 5 years	25%
	6-10 years	40%
	> 10 years	35%

Source: Authors' calculation

4.3 Analysis method

The authors conduct qualitative analysis through interviewing experts in human resource management to evaluate the subscales of factors of job satisfaction and job satisfaction itself. Besides, a quantitative analysis is applied, which includes descriptive statistics to describe basic features of the data. The Cronbach's Alpha coefficient is used to assess the reliability, i.e. internal consistency, of factors impacting job satisfaction scales. The Exploratory Factor Analysis (EFA) is employed to analyze whether the components of job satisfaction have high adhesiveness and can be grouped. The regression analysis is applied to examine the relationship between work-related factors and the job satisfaction of employees.

5. Results

5.1 Reliability and validation of variables

5.1.1 Reliability test

The measure of internal consistency used in this research is Cronbach's Alpha coefficient. This coefficient measures how well a set of variables or items measure a single construct. The values of Alpha that are close to 0 indicate no or little correlation between the items that make up the variable whilst the values that are close to 1 indicate high inter-item correlations. From the calculation, the Cronbach's Alpha of the data is over 0.8 (see Table 3). This confirms the

work-related factors and job satisfaction scales are appropriate and reliable. Therefore, all observed variables can be used in the next step of EFA analysis.

Table 3. Results of variables' reliability

Variables	Cronbach's Alpha
Relation with co-worker (Co-worker)	0.861
The nature of work (Job)	0.917
Attitudes toward supervisors (Supervision)	0.871
Opportunities for promotion (Promotion)	0.919
Compensation and benefits (Pay)	0.861
Job satisfaction in general (Job satisfaction)	0.859

Source: Authors' calculation

5.1.2 Validity test

To measure the validity of each statement of the questionnaire, the software SPSS 20.0 with a correlation function is used. Out of thirty items, 6 items have been deleted because they have validity values smaller than 0.3, which are categorized as non-valid statements.

The results of EFA analysis with independent variables, which are work-related factors, indicated that these variables satisfied the requirement of validity for measurement scales, particularly: (1) An adequate fit of Kaiser-Meyer-Okin test (KMO) with significant Barlett test of sphericity; (2) $0.5 < \text{KMO coefficient} = 0.871 < 1$; (3) Extraction Sums of Squared Loadings = 78.239% > 50% (Williams *et al.*, 2010), which indicates the presence of sufficient inter-correlations in the data matrix and appropriateness of factor analysis. The 5 constructs of independent variables with 18 items were grouped into 5 factors, namely co-worker, job, supervision, promotion, and payment (Table 4).

Table 4. Validation of factors of job satisfaction

	Components				
	1	2	3	4	5
Co-worker1			0.777		
Co-worker2			0.818		
Co-worker4			0.865		
Co-worker5			0.835		
Job1	0.852				
Job2	0.852				
Job5	0.795				
Job4	0.863				
Supervision1				0.864	
Supervision4				0.875	
Supervision5				0.877	

Table 4. Validation of factors of job satisfaction (*continued*)

	Components				
	1	2	3	4	5
Promotion2		0.818			
Promotion3		0.835			
Promotion4		0.833			
Promotion5		0.866			
Pay2					0.828
Pay3					0.870
Pay5					0.847

KMO Measure of Sampling Adequacy: 0.871

Bartlett's Test of Sphericity:

Approx. Chi-Square:	3802.913
df	153
Sig	0.000
Extraction Sums of Squared Loadings	78.239%

Source: Authors' calculation

5.2 Multiple regression analysis of work-related factors and job satisfaction

5.2.1 Pearson product-moment correlation test

The Pearson 2-tailed correlation coefficient was used to find out the degree of association among the variables. The results show that all independent variables are significant and have a positive relationship with overall job satisfaction. It reveals that all five work-related factors in the study have a significant correlation with job satisfaction with Sig. value at the 0.01 level. These results are shown in Table 5.

Table 5. Pearson correlations between work-related factors and job satisfaction

Pearson correlations coefficient	Job satisfaction
Co-worker	0.321**
Job	0.396**
Supervision	0.279**
Promotion	0.405**
Pay	0.464**

Note: ** indicates that the correlation is significant at the 0.01 level (2-tailed)

Source: Authors' calculation

5.2.2 Multiple linear regression

The multiple linear regression analysis is conducted to estimate job satisfaction under the effects of independent variables. Classical assumption tests are required tests for multiple

linear regression to get a research model which is unbiased, well designed, and acceptable. Results from the multiple linear regression analysis are provided in Table 6.

Table 6. Multiple regression analysis for work-related factors and job satisfaction

Independent variables	Beta	Sig.	R	Adjusted R ²	Collinearity statistics	
			0.581	0.328	Tolerance	VIF
Co-worker	0.165	0.001			0.874	1.145
Job	0.139	0.015			0.642	1.557
Supervision	0.119	0.015			0.878	1.139
Promotion	0.149	0.010			0.633	1.581
Pay	0.294	0.000			0.783	1.278

Source: Authors’ calculation

In this study, a multicollinearity test is used to know whether there is a correlation or not between independent variables. The VIF values presented in Table 6 show that the VIF is greater than 1 and smaller than 2, suggesting that there is no multicollinearity problem among independent variables. The adjusted R² is 0.328, meaning that approximately 32.8% of the variability of job satisfaction is explained by the variables in the model.

Results from Table 7 show that the model for employee job satisfaction in Hanoi’s IT companies should be:

$$\text{Job-satisfaction} = 0.294*\text{Pay} + 0.165*\text{Co-worker} + 0.149*\text{Promotion} + 0.139*\text{Job} + 0.119*\text{Supervision}$$

It is found that payment, co-worker, promotion, and supervision have a positive relationship with employee job satisfaction with a positive Beta value, which is shown in Table 7. Based on the results of the EFA test and regression model development, several major findings are acknowledged. In conjunction with stated research hypotheses, initial conclusions are as follows.

Table 7. Results of tested hypotheses

Hypothesis	Beta coefficient	P-value	Hypothesis acceptance
H1: The relation with co-workers positively affects the general job satisfaction of employees.	0.165	0.001	Accepted
H2: The nature of work positively affects the general job satisfaction of employees.	0.139	0.015	Accepted
H3: The attitudes toward supervisors positively affect the general job satisfaction of employees.	0.119	0.015	Accepted
H4: The opportunities for promotion positively affect the general job satisfaction of employees.	0.149	0.010	Accepted
H5: The compensation and benefits positively affect the general job satisfaction of employees.	0.294	0.000	Accepted

Source: Authors’ calculation

6. Discussion of empirical results

6.1 Relation with co-worker and job satisfaction

Hypothesis H1 postulates a positive influence of relation with co-workers on employees' job satisfaction. The findings show that the hypothesis is supported. Previous studies in the existing literature also confirm a positive relationship between 2 variables such as Johns (1996) and Kreitner and Kinicki (2001). Herzberg's motivation-hygiene theory describes how the relationship with co-workers affects an employee's job satisfaction by placing the relationship with co-workers as a hygiene factor. In other words, the quality of the relationship with co-workers leads to satisfaction or dissatisfaction with the job depending on whether the employee perceives this relationship as being of a low or high quality. Relationship with co-workers involves aspects such as cooperation, team spirit, support, trust, exchange of information, and atmosphere among peers. Support from co-workers on an individual level means recognition, acknowledgment, acceptance, and involvement which are important factors in the foundation for an employee's sense of job satisfaction. Thus, the findings of a positive relationship between co-workers and employee's job satisfaction are consistent with the outcomes in studies by Luddy (2005) and Pham (2012).

6.2 The nature of work (Job) and job satisfaction

Hypothesis H2 indicates that there is a positive influence of the nature of work on job satisfaction. The compatibility between a job and the employee is reflected through multiple aspects related to job characteristics, including an employee's skill set, abilities, and knowledge or job natures, which can be required qualifications, motivational incentives, or challenges. That the nature of IT jobs enhances job satisfaction is a consistent finding with previous studies by Hackman and Oldham (1975) and Thatcher *et al.* (2003). The nature of IT professional's work focuses on job classifications and functions ranging from data center managers to computer operations personnel, rather than a sample across various industries. The nature of work is challenging to stimulate employee's skill set, abilities, and knowledge that support personal growth. When IT employees have a chance to improve personal capability and achieve their expectations in a job, they will satisfy with their work. Therefore, the nature of work has a relationship with job satisfaction.

6.3 Attitudes toward supervisors (Supervision) and job satisfaction

Hypothesis H3 signifies a positive influence of attitudes toward supervisors on employees' job satisfaction. Herzberg *et al.* (1959) outline that supervision is a critical extrinsic factor of work and positive observable supervisory behaviors, perceptions, and interactions lead to exceptional feelings of employee job satisfaction. Eisenberger *et al.* (2002) support the assumptions of Herzberg *et al.* (1959) that when supervisors take corrective action to ensure that employees view supervisors favorably, it will create stronger organizational connections. Further, Goleman (2000) mentions that a good supervisor should be able to develop achievable targets, spread positive attitudes throughout the organization, as well as increase the employees' awareness. Smith and Shields (2013) confirm that perceived experiences

between employees and supervisors are statistically significant predictors of employees' job satisfaction. Perceived supervisor support plays a role in increasing levels of employees' job satisfaction (Smith and Shields, 2013).

6.4 Opportunities for promotion (Promotion) and job satisfaction

Hypothesis H4 implies that there is a positive influence of opportunities for promotion on employees' job satisfaction. Career development of employees is seen through promotion because it makes a significant increase in the salary of an employee as well as in the span of authority and control (Murphy, 1985; Baker *et al.*, 1994). It will help employees themselves to feel that they are effective contributors (Bernhardt and Scoones, 1993) and thus they are satisfied with the respective status in the organization (De Souza, 2002).

6.5 Compensation and benefits (Pay) and job satisfaction

One of the main reasons motivating people to work is compensation (Dessler, 2008). The outcome aligns with the research of Neog and Barua (2014) where salary and compensation rank as the most influential determinants of work fulfillment. Besides, compensation impacts employees' living status in society, satisfaction, loyalty, and productivity (Aswathappa, 2008). Studies show that compensation is a significant lever to drive employee behavior towards the organization's goals and increase the level of work commitment, which leads to job satisfaction (Nielsen and Smyth, 2008). Inappropriate salaries can prevent employees from being satisfied at higher levels of achievement, responsibility, and autonomy in the job (Chang *et al.*, 2010).

7. Conclusion and policy implication

7.1 Policy implications

Research results on the relationship between work-related factors and job satisfaction for IT professionals help to make recommendations for managers as follows.

Firstly, managers should have appropriate compensation and benefit policies as these factors rank first in job satisfaction. In developing countries like Vietnam, salary remains a crucial factor contributing to job satisfaction (Tran, 2005; Pham, 2012). Employees of IT companies find their payment acceptable with their abilities and contributions. Thus, there should be a new approach to salary distribution by policy-makers of the company. The study highlights a reward system based on performance to motivate employees' efforts while it is an effective means to encourage better employee performance. Smart goals can be set so that all employees are aware of how their efforts are paid back. Preferably, employees' opinions should be included as to how payment budgets need to be adjusted. A reformation of salary policy stands a high chance of improving overall job satisfaction, motivating better work performance, and preventing labor drainage due to other competitions.

Secondly, co-workers and supervisors are considered to be important determinants of job satisfaction. This can be a useful tool for management when trying to stimulate employee satisfaction through improving the relation with co-workers and supervisors. It makes employees aware of the impact of relationships with co-workers on attitudes and behavior. The

arrangement in the organization should include inter-relationships of supervisors as well as co-workers, who work directly with employees. To strengthen this partnership, a relative balance should be created. Supervisors are expected to be strict but forgiving, demanding yet supportive, compromising enough for employees to come forward should problems arise. Instead of ruling their subordinates under dictation, supervisors should encourage free-thinking and innovative ideas from employees. If employees are treated kindly and equally, it can prevent internal conflicts and dissatisfaction. Moreover, supervisor positions must base on one's capability, vision, and skills to avoid power clashes. Regarding colleague relationships, the responsibility lies with the managers to promote friendliness and unification among employees. A strategy is to organize team-building activities outside work hours to strengthen internal relations. The goal is to enhance cooperation among employees, thus increasing work productivity.

Thirdly, employees are progressively prioritizing opportunities to promote in their careers over other job elements. According to the results, opportunities for promotion affect work fulfillment positively. Firms can use promotions as a reward for highly productive workers, creating an incentive for workers to exert greater effort. Promotions will only be an effective mechanism for eliciting greater effort if workers place significant value on the promotion itself. Otherwise, firms would simply use pay increases to reward effort and productivity. Compare to other work-related aspects, the promotion factor leans towards the long-term benefits and often associates with intangible rewards. A suggestion should be setting up a clear and cohesive promotional plan for IT job position. If employees are aware of their career ladder, they are more motivated to insert efforts for better work performance. This method can promote positive competition among employees and thus further increase productivity. Nonetheless, the organization must also provide its personnel with tools and chances to reach those achievements. It is essential to offer equal training for employees through professional courses or skill development programs. There should be transparency in promotion criteria regarding contributions, commitment issues, and performance level. Qualified and unqualified employees need to be informed of promotional policies and chances in their positions to avoid biases and internal conflicts.

7.2 Conclusion

The concept of job satisfaction has been the subject of interest for researchers in various studies dated as early as the 1930s. Since then, job satisfaction has become an area for psychometric research and has acted as a strong predictor of employees' behavior and work performance. In particular, with businesses and organizations, job satisfaction is used as a tool to predict separation, resignation and measure the productivity of employees. It is undeniable that job satisfaction is asserting its importance within every syndicate, now more than ever. The result of the study finds out that there are 5 work-related factors affecting job satisfaction positively, including compensation and benefits, relation with co-workers, opportunities for promotion, the nature of work, and attitudes toward supervisors. The study provides managers with new insights into job fulfillment's attributes and highlights major improvements that can be made to increase employees' job satisfaction. Nonetheless, future studies should suggest

more contemporary and in-depth information regarding the topic consistent with new factors that come along. New factors can also be added to further research to enhance the explanatory power of the model and to be consistent with new conditions. With proper resources, the probability is suggested to increase the sample size and observations for IT individuals of the future research to address this generalizability concern.

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