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The Retention of Software Development Employees in the IT Industry in Taiwan

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ABSTRACT

Taiwan's IT industry has been suffering from a shortage of IT knowledge workers. Despite the economic downturn highly skilled workers such as software programmers are still in big demand. This research, undertaken in late 2008, presents the results of a retention survey undertaken with 362 software development employees, namely software engineers, project leaders, and assistant managers in Taiwan. The retention factors this study tested for were: financial compensation, training and development, promotion, recognition, challenging work, innovation and creativity, leadership style, autonomy, work-life balance, and job satisfaction. Ten factors were significant for software engineers. However, challenging work was not significant for the project leaders, and both financial compensation and challenging work were not significant for the assistant managers.

Keywords: IT, Knowledge Workers, Retention, Software Development Employees, Taiwan.

LITERATURE REVIEW

Knowledge workers are important assets of companies, as knowledge is a source of profit, skill, and sustainable competitive advantage. So, retaining these knowledge workers is the means for a sustainable competitive advantage for companies in today's fast-changing environment. It is more critical in Taiwan's IT industry, because there is a strong demand for economic transformation with a shift from quantity to quality in today's knowledge-based economy (Chen & Liu, 2003). In addition, the Taiwanese IT industry has been suffering from the impact of a national shortage in its labor force as well as a shortage of IT knowledge workers (CEPD, 2006). Although training is an important approach to solving the shortage within the labor force, retention of existing software development employees is important and is the focus of this research.

Background of the Taiwanese IT Industry

In the Taiwanese IT industry, there are and will be an estimated 45,000 jobs unfilled annually from 2005 to 2015 (CEPD, 2007). More importantly, the lack of high-level professional workers has mainly contributed to the job vacancies (CEPD, 2007). The quality and skills base of IT knowledge workers has been another issue, which has also negatively impacted on the IT industry in Taiwan. The official language of Taiwan is Mandarin, yet the English language is dominant in the Internet network so many IT professionals lack the higher level English language skills to operate effectively in this online environment (Masuyama & Vandenbrink, 2003). In addition, the emphasis of rote memorization in the education system confines the quality of changes that Taiwanese people can make towards an innovation-oriented thinking (Masuyama & Vandenbrink, 2003).

According to Executive Yuan DGBAS (2007), the voluntary turnover rate is about 86% in the IT industry in Taiwan. The costs of recruitment and compensation for the knowledge loss all add up, as the total costs of replacing an employee amount to 150% to 175% of the salary costs of the departing worker (Nelson & Todd, 2004). It appears that the IT companies in Taiwan need to find a way to keep the IT knowledge workers they already have. This is because voluntary turnover is highly associated with high labor costs, loss of skills and company knowledge, low morale, poor customer satisfaction, and financial losses (Frank, Finnegan, & Taylor, 2004).

Perspectives on Retention

Retention strategy, used in the human resource management discipline, aims to keep knowledge employees within an organization. De Cieri and Kramar (2005) stress that retention strategies must be enforced if there is not to be an ongoing rise in employee turnover rates, which are highly associated with increasing costs. In particular, IT professionals typically changed jobs twice during their working life ten years ago, but today they will change jobs more than five times over their career span (De Cieri & Kramar, 2005).

Within organizations, job satisfaction plays a key role in ultimately determining voluntary turnover in the IT industry (Nelson & Todd, 2004). That is, job satisfaction is a key motivator to intrinsically influence employees' appreciation of their job, whereas extrinsic motivators such as money can only prevent employees from job dissatisfaction. It is believed that monetary compensation can influence employees for short-term goals, but cannot sustain a long-term employment relationship because self-achievement is not satisfied (Agarwal & Ferratt, 2001).

Self-achievement is regarded as an active career-actualization, which is related to the realization of personal goals and values in one's career vis-à-vis the facilitation and constraining conditions of the work situation (Kuijpers, Schyns, & Scheerens, 2006), and involves intrinsic and extrinsic career success. An intrinsic career success is subjectively compared with the person's own appreciation of his or her career actualization (achievement, future perspectives, recognition, and career satisfaction), whereas extrinsic career success relates to external appreciation (salary and occupational status) (Kuijpers, et al., 2006). It is believed that a longer tenure can be expected from the employees if both employees and organizations are consensual upon the employees' career development program.

Retention strategy is firmly related to job satisfaction while motivation plays a key role in determining employees' career actualization. Therefore, five main hypotheses with ten retention factors have been identified as a conceptual model for this research. These include: financial compensation (Dychtwald, Erickson, & Morison, 2006); training and development (Hager, 2004); promotion (Chen, Chang, & Yeh, 2006; Curtis & Wright, 2001); recognition (Messmer, 2006); challenging work (Lock, 2003);

innovation and creativity (Jaskyte & Kisieliene, 2006); leadership style (McShane & Travaglione, 2007); autonomy (Davenport, 2005); work life balance (Hytter, 2007); and job satisfaction (De Cieri & Kramar, 2005). Table 1 provides a summary of research hypotheses for this study.

Insert Table 1 here

METHODOLOGY

Quantitative research methodology was adopted for this study, as it is an appropriate method to answer the research questions that examined the relationship between the retention factors and the software development employees' decisions to stay in the IT industry. The participants were full-time software development employees working in the Research and Development (R&D) departments of companies located in the HsinChu Science Park (HCSP). HsinChu Science Park is representative of Taiwan's economic development, and is the major contributor to industrial economic performance. Total revenues of US$32.5 billion were recorded in 2004 (HCSP, 2009). This industrial park consists of six main industries with a total of 384 companies and 10,918 R&D-related professional employees, which represent 11% of its total employees (HCSP, 2009).

An online web-based survey was used for this research, as these types of software development employees, namely software engineers, project leaders, and assistant managers, are highly computer literate. The choice of the sample was important, because small samples can affect the results of findings, whereas large samples can undermine the efficiency of research (Ruane, 2005). Therefore, a sample size of between 30 and 500 is suitable for most social research (Sekaran, 2003). In this study, a sample size of around 400 was anticipated because a sample size of between 300 and 500 is good for data analysis (Manning & Munro, 2007).

The total number of the target population for this study was 1,000 software development employees. Their membership status was empirically confirmed by the Human Resource Bank in Taiwan, which aided in the dissemination of the survey. HR Bank is a job-seeker company, which holds personal information of the job-seekers in the database system. The target participants were randomly selected throughout the large samples of email distribution by HR Bank, participation in the survey was voluntary and anonymous. There were 415 respondents from a total of 1000 respondents who had been invited to participate, giving a response rate of 41.5%. More importantly, there were 362 valid responses (274 software engineers, 63 project leaders, and 25 assistant managers) for subsequent analysis. As the sample size of the three groups of respondents was unequal and some were relatively small, results about findings have been interpreted in more tentative terms throughout the following findings section.

Measurement

The questionnaire consisted of two sections and was developed on the basis of the literature review and hypotheses. In Section One, there were 55 closed questions using a Likert-type 5-point interval scale ranging from “strongly disagree” to “strongly agree”. Section Two focused on personal details using nominal and ordinal scales. The measured indicators of questionnaire items were mainly retrieved from the existing source (Connolly & Connolly, 2005), which ensures the accuracy of information it gathers.

In order to increase the relevance and accuracy of the information, the questionnaire items were reviewed by academic and practitioner experts before conducting the survey. Firstly, words and wording used for this research were reviewed by some software development employees and an expert panel of professors. This ensures that target respondents are properly communicated with using the same language, that the questions are developed using simple and conversational language, and that leading and ambiguous questions are avoided (Zikmund, 2003). Secondly, the respondents are Taiwanese, so a translation of the English version to plain Mandarin was conducted by the researcher and reviewed by a third party, who is a teacher at a senior high school in Taiwan. This provided significant information for some corrections. Thirdly, a pilot study was also conducted to increase valid and reliable data, as the comments made in the pilot study could apply equally well to the main study (Gorard, 2003). Finally, SPSS software was used for analysis of the data.

Pearson product-comment correlation was used for this study as it is commonly used to measure the strength (ranging from -1 to 1) of relationship and determines the direction (positive or negative) of the relationship between two interval-scale variables (Davis, 2005). For instance, the value of “0” means no relationship between two variables, whereas the value of “1” means a perfect relationship between two variables; and the sign (+ or -) of correlation means the direction (+ is positive or – is negative) (Coakes, Steed, & Dzidic, 2006). When two-tail significance with $p<0.05$, it concludes that there is a significant relationship between two variables at a level of 95% confidence.

FINDINGS

Conclusions about the research hypotheses

As the research focused on software development employees of IT companies located in the HsinChu Science Park, the results of the findings may be more likely to represent this area of the target population. Ten retention factors were examined under the five main hypotheses in this study, and the results of correlation for software development employees, namely software engineers, project leaders, and assistant managers, are shown as follows.

Training and development could be positively related to software development employees’ retention

This hypothesis was supported for software engineers ($r=0.61$, $p<0.05$), project leaders ($r=0.49$,

$p<0.05$), and assistant managers ($r=0.49$, $p<0.05$). In the correlation analysis, the question, "I receive the training I need to do my job" received the highest score. This indicates that offering an opportunity of training and development could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, software engineers' responses could evidence a stronger correlation with the training and development variable than do responses from project leaders and assistant managers.

Prior studies have shown that 86% of IT professionals see self-improvement as important to success, while 97% see up-to-date skills as crucial (Shah, Sterrett, Chesser, & Wilmore, 2001, p.22). It is deemed that IT professionals usually earn high salaries, so self-improvement becomes a focus of retention efforts, leading to increased employee satisfaction (Acton & Golden, 2003; Shah, et al., 2001).

Promotion could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.66$, $p<0.05$), project leaders ($r=0.55$, $p<0.05$), and assistant managers ($r=0.58$, $p<0.05$). In the correlation analysis, the question, "I have opportunities for career advancement at this organization" received the highest score. This indicates that offering an opportunity of promotion could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, software engineers' responses could evidence a stronger correlation with the promotion variable than do responses from assistant managers and project leaders.

Prior studies have shown that IT professionals tend to stay longer if organizations provide long-term career opportunities (Acton & Golden, 2003; Kochanski, Mastropolo, & Ledford, 2003). Whitaker (1999) also supports the view that career development is an important factor in retaining IT workers, especially those who are under 30 years of age. It is deemed that promotion signifies an employee's abilities, which implies not only a motivation factor but also a subtle means of evaluating the employment relationship (Huang, Lin, & Chuang, 2006).

Recognition could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.60$, $p<0.05$), project leaders ($r=0.51$, $p<0.05$), and assistant managers ($r=0.43$, $p<0.05$). In the correlation analysis, the question, "I am adequately recognized for my contributions" received the highest score. This indicates that recognition could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, software engineers' responses could evidence a stronger correlation with the recognition variable than do responses from project leaders and assistant managers.

Prior studies have shown that IT professionals would stay longer if they were appreciated as valued members of the organization (Luftman, 2008; Young, 2008). In addition, recognition is deemed to be more effectively practised through the use of bonuses and innovative awards. For instance, a $100 bonus for an employee-of-the-month award is not a significant amount of money, but employees appreciate receiving this type of award and feel that they are being valued (DeMers, 2002).

Innovation and Creativity could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.65$, $p<0.05$), project leaders ($r=0.57$, $p<0.05$), and assistant managers ($r=0.62$, $p<0.05$). In the correlation analysis, the question, "I feel encouraged to come up with new and better ways of doing things" received the highest score. This indicates that creating an innovative environment could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, software engineers' responses could evidence a stronger correlation with the innovation and creativity variable than do responses from assistant managers and project leaders.

Prior studies have shown that IT professionals are captivated by doing something spectacular that has never been done before in their work (Amabile, 1997; DeMers, 2002). However, the innovative environment must be supported from the highest-level of management through to the middle-level of supervisors who can directly foster creativity when communicating with the IT professionals. This is because creativity involves risk-taking and can be effectively diminished during a downsizing of an organization (Amabile & Conti, 1999). It is noted that only about 36% of the leaders surveyed actually agree that encouraging risk-taking and innovation within their team was important and only 42% rate themselves as effective (Barry, 2007).

Leadership Style could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.67$, $p<0.05$), project leaders ($r=0.49$, $p<0.05$), and assistant managers ($r=0.53$, $p<0.05$). In the correlation analysis, the question, "I am satisfied with the amount of support I receive from my boss" received the highest score. This indicates that management support could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, software engineers' responses could evidence a stronger correlation with the leadership style variable than do responses from assistant managers and project leaders.

Prior studies have shown that supportive senior managers and direct supervisors can determine IT professionals' turnover intentions, as they have well-being and socio-emotional needs that want to be satisfied (Lacity, Iyer, & Rudramuniyaiah, 2008). In addition, good employee-supervisor relationships, with honest communication, can strengthen the support from the management that influences IT

professionals' decisions to stay within an organization (Luftman, 2008; Young, 2008). It is deemed that effective communication can create an environment of trust and thus promote a positive work environment (Cleveland, 2005).

Autonomy could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.52$, $p<0.05$), project leaders ($r=0.40$, $p<0.05$), and assistant managers ($r=0.52$, $p<0.05$). In the correlation analysis, the question, "I have personal control over the way my work is done" received the highest score. This indicates that personal control could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, software engineers and assistant managers' responses could equally evidence a stronger correlation with the autonomy variable than do responses from project leaders.

Prior studies have shown that IT professionals are independently motivated by the nature of their work and prefer a high level of discretion and control (Barry, 2007). This is because IT professionals are natural problem solvers, and want their work to make a difference, which reflects the relatively high level of autonomy in professional employees.

Work-life balance could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.50$, $p<0.05$), project leaders ($r=0.52$, $p<0.05$), and assistant managers ($r=0.48$, $p<0.05$). In the correlation analysis, the question, "I am provided with the flexibility needed to balance the demands of my work and personal life" received the highest score. This indicates that work-life balance could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, project leaders' responses could evidence a stronger correlation with the work-life balance variable than do responses from software engineers and assistant managers.

Prior studies have shown that work-life balance is a trend among professionals in Western countries such as Australia to remain in a long-term employment relationship (Cooper, 2006; De Cieri, et al., 2008). More particularly, work-life balance is more important than money, as values in society may be shifting towards a greater emphasis on quality of life and less on material gain (Blyton & Jenkins, 2007; Tynan, 2006). It is noted that 60% of IT professionals rate time and flexibility as key factors in deciding whether or not to take or keep a job (Tynan, 2006). However, only 35% of employers rate it as important (Tynan, 2006), so employers' attitudes play a key role in determining flexible work schedules within an organization (Trinczek, 2006).

Job satisfaction could be positively related to software development employees' retention

This hypothesis was supported for software engineers ($r=0.76$, $p<0.05$), project leaders ($r=0.68$,

$p<0.05$), and assistant managers ($r=0.84$, $p<0.05$). In the correlation analysis, the question, "I enjoy my job" received the highest score. This indicates that job enjoyment could be positively related to these software development employees' decisions to stay in the IT industry in Taiwan. In addition, assistant managers' responses could evidence a stronger correlation with the job satisfaction variable than do responses from software engineers and project leaders.

Prior studies have shown that IT professionals are generally young, ambitious, and expect high pay, so they are fascinated by new jobs and interesting assignments which offer technical challenges or opportunities for self-development (Holland, Hecker, & Steen, 2002; Sigler, 1999). In addition, turnover and absenteeism is reduced when IT professionals perceive that their jobs meet their important values (De Cieri, et al., 2008; McMurtrey, Grover, Teng, & Lightner, 2002). Therefore, it is deemed that IT professionals can be strategically retained through the fulfillment of that person's important job values, as each of the individuals is different in respect to job satisfaction.

Financial compensation could be partially related to software development employees' retention
This hypothesis was partially supported, as it was supported for software engineers ($r=0.58$, $p<0.05$), project leaders ($r=0.58$, $p<0.05$), but not for assistant managers ($r=0.38$, $p>0.05$). In the correlation analysis, the question, "People at this organization are paid fairly according to their job performance" received the highest score. This indicates that a fair pay level could be positively related to software engineers and project leaders' decisions to stay in the IT industry in Taiwan. In addition, software engineers and project leaders' responses could be equally correlated in relation to the financial compensation variable.

Prior studies have shown that although money is temporarily a successful motivator, a fair and comparable salary can significantly attract and retain top talents (Gee & Burke, 2001; Huang, et al., 2006; Mosley & Hurley, 1999). It is noted that top-tier IT companies pay 32% more than average for their IT professionals, and especially use stock as a form of compensation (Hansen, 2001; Tynan, 2006). Chiu, Luk, and Tang (2001) also argue that IT professionals always rationally evaluate various work behaviors and choose those that lead to the work-related rewards that they value most. However, it is interesting that responses of assistant managers were not significantly correlated with the financial compensation variable, which is contrary to the evidence cited. It could be that they have already received a higher comparable financial compensation such as annual bonus of stocks in a given position, so this factor becomes insignificant.

Challenging work could be partially related to software development employees' retention
This hypothesis was partially supported, as it was supported for software engineers ($r=0.44$, $p<0.05$), but not for project leaders ($r=0.09$, $p>0.05$), and assistant managers ($r=0.25$, $p>0.05$). In the correlation analysis, the question, "My job is challenging" received the highest score. This indicates

that challenging work could be only positively related to software engineers' decision to stay in the IT industry in Taiwan.

Prior studies have shown that the nature of work content for IT professionals is governed primarily by their own expertise rather than by a routine or system (Kochanski & Ledford, 2001). Lacity, Iyer, and Rudramuniyaiah (2008) also stress that IT professionals do not like programming from predefined specifications, because task variety or skill set utilization are the major reasons for their satisfaction. It is deemed that IT professionals value and thrive on interesting work that challenges them and uses their skills and talents (Kochanski & Ledford, 2001). However, it is interesting that responses of project leaders and assistant managers were not significantly correlated with the challenging work variable, which is contrary to the evidence cited. This could be because project leaders are more likely to experience higher pressures from project tasks that have to be finished on time, whereas assistant managers are more likely to play safe to secure their positions.

Summary

Ten retention factors have been identified as significant and positive for the software engineers, but not for the project leaders and the assistant managers. Project leaders were significant for the nine retention factors, but not for the challenging work. This could be that they are more realistic about project tasks that have to be finished on time. They have more pressures to complete the project tasks than do the software engineers. Assistant managers were significant for the eight retention factors, but not for the financial compensation and the challenging work. It could be that they have already received a higher comparable financial compensation such as an annual bonus of stocks in a given position, so they care more about other retention factors such as job satisfaction. In addition to the challenging work, it could be that they are more likely to play safe to meet the requirements of project tasks rather than risking themselves in taking on challenging work.

CONCLUSION

The correlation results indicate that the ten retention factors could be positively related with software engineers' decisions to stay in the IT industry in Taiwan. In addition, job satisfaction received the highest score (r=0.76), followed by leadership style (r=0.67), promotion (r=0.66), innovation and creativity (0.64), training and development (r=0.61), recognition (r=0.60), financial compensation (r=0.58), autonomy (r=0.52), work-life balance (r=0.50), and challenging work (r=0.44).

The correlation results also indicate that the nine retention factors could be positively related with project leaders' decisions to stay in the IT industry in Taiwan. In addition, job satisfaction received the highest score (r=0.68), followed by financial compensation (r=0.58), innovation and creativity (0.57), promotion (r=0.55), work-life balance (r=0.52), recognition (r=0.51), training and development (r=0.49), leadership style (r=0.49), and autonomy (r=0.40).

The correlation results also indicate that the eight retention factors could be positively related with assistant managers' decisions to stay in the IT industry in Taiwan. In addition, job satisfaction received the highest score (r=0.84), followed by innovation and creativity (0.62), promotion (r=0.58), leadership style (r=0.53), autonomy (r=0.52), training and development (r=0.49), work-life balance (r=0.48), and recognition (r=0.43).

Three types of the software development employees all highlight that job satisfaction could be the most important factor that determines the turnover intentions in the IT industry in Taiwan. It is deemed that for IT professionals, high demands in trying new technologies and having meaningful assignments are enjoyable. In addition, assistant managers received the highest score in job satisfaction in comparison to the other two groups, which indicates that assistant managers could highly value their jobs more than the other two groups. However, challenging work ranked last in the responses of software engineers, and was not significant in the responses of project leaders and assistant managers. This indicates that challenging work was not a priority option for the Taiwanese software development employees. It could be that the Taiwanese software development employees have suffered from the nature of the IT industry where work content is highly involved with long hours and high pressure. Although this was a surprising result for the researchers, it supports the findings of a Canadian survey that challenging work was rated last from the top five options for the IT employees (Young, 2008).

Recommendations

The results from the findings could provide human resource managers with a set of guidelines appropriate to the IT industry in Taiwan. It is deemed that retaining existing software development employees could alleviate the impact of a national shortage in its labor force, as well as a shortage of IT knowledge workers. This not only concerns the costs of departing employees that are always high, but is highly concerned with a key to success for the business. This is because software development employees are knowledge workers who represent a source of skills, profits, and sustainable competitive advantages for IT companies. Based on the findings, a set of retention guidelines between different types of the software development employees is suggested for the Taiwanese IT companies as follows:

- The emphasis of an individual's value could be a key in retaining software development employees, because of the individual's fulfillment relying heavily on the measurement of their job satisfaction. This could include being well-paid and having opportunities for self-development and advancement. Three types of the software development employees all highly value job satisfaction as the most important retention factor.
- A positive work environment could be promoted by a supportive management because good

relationships between employees and supervisors could positively influence the decision of job termination. This is because good leadership could influence software development employees' willingness to perform a task and lower their job stress through an open and honest communication. The responses from software engineers indicate that they value leadership style as being more important than do the responses from assistant managers and project leaders.

- A long-term employment relationship could be promoted through the use of individual career development within the organization. This could be a way to retain IT professionals, as they continuously pursue career aspects that they feel their skills merit. The responses from software engineers and assistant managers equally value promotion as being more important than do the responses from project leaders.
- An innovative environment could be promoted to intrinsically motivate IT professionals, and could be supported by the higher level of management through middle level supervisors. This is because creativity is involved with risk taking, which is undermined under the downsizing of the organization. The responses from assistant managers value innovation and creativity as being more important than do the responses from project leaders and software engineers.
- Ongoing training and development programs could be suggested to make software development employees feel that they have gained opportunities for self-development and career advancement. This could be important as they are interested in trying new technologies by learning up-to-date skills. Training in interpersonal communication skills could also be fundamental, because they are often promoted to managerial positions based on technical skills and little is done to assess their leadership skills. The responses from software engineers value training and development as being more important than do the responses from assistant managers and project leaders.
- A recognition program could be promoted to appreciate software development employees as valued members of the organization. The use of small money incentives and an employee-of-the-month award could be highly suggested as a practical motivator. The responses from software engineers and project leaders equally value recognition as being more important than do the responses from assistant managers.
- Financial compensation is an exchange for employees' efforts and ideas for an organization, so it could be suggested that offering a comparable salary could attract and retain IT professionals. This is because they rationally evaluate a fair and comparable salary with others. The responses from project leaders value financial compensation as being more important than do the responses from software engineers. However, the responses from assistant managers do not correlate to this factor.
- A certain level of individual autonomy in decision-making over project tasks could be suggested because these types of software development employees want to be led rather than managed. In particular, the more opportunities they have to be involved in the process of decision-making, the more the investment in their projects could be linked highly to self-achievement. The responses from assistant managers value autonomy as being more important than do the

responses from software engineers and project leaders.

- A certain level of flexible work arrangements, such as flexible working hours, could be suggested to retain a long-term employment relationship. This is because the values of the software development employees tend towards a greater emphasis on quality of life. The responses from project leaders value work-life balance as being more important than do the responses from assistant managers and software engineers.
- A certain level of challenging work in the job design could be suggested because these types of software development employees could be happy to learn new skills through challenging work. Although challenging work rated last in the responses of software engineers, and was not significant for the responses of project leaders and assistant managers, the researchers still believe that this is an important motivating factor to intrinsically inspire the software development employees.

Areas for Further Research

The research has utilized a quantitative, exploratory approach to retention factors for the Taiwanese software development employees, so it does not offer a finely grained analysis of motives or aspirations. Therefore, qualitative techniques such as interviews could be undertaken to understand more deeply the reasons behind these workers' intentions to stay within the organization. For instance, interviews could probe the top values of software development employee, in terms of job satisfaction, as well as to understand why challenging work rates last in importance. The survey could also be repeated within the next few months, as the global financial crisis could have impacted on retention factors.

Limitations

A focus on HsinChu Science Park was the first limitation identified in this research as Taiwan has many industrial bases. This might restrict the results as findings may tend towards more regional aspects. Another limitation could be that the survey period was running from October to December, 2008, when the impact of the economic downturn started hitting the economy of Taiwan, especially as Taiwan's IT industry is heavily reliant on export business. This could distort the intention of the data presented from the software development employees, because layoff activities had been active during that period of time.

Contribution

The results of the findings are developed on the basis of the literature and hypotheses, which provide a set of retention guidelines appropriate to the Taiwanese IT companies. This entirely contributes to the knowledge of retaining software development employees for the best interests of the IT industry in Taiwan. This study also believes that the IT companies in Taiwan could be alerted to advance their human resource management on retention, which is a contribution to the industry.

TABLES

Table 1: Summary of Research Hypotheses

Financial Compensation	
H1a:	Financial compensation is positively related to software development employees' decisions to stay in the IT industry
Career Development	
H2a:	Training and development is positively related to software development employees' decisions to stay in the IT industry
H2b:	Promotion is positively related to software development employees' decisions to stay in the IT industry
Self-Actualization	
H3a:	Recognition is positively related to software development employees' decisions to stay in the IT industry
H3b:	Challenging work is positively related to software development employees' decisions to stay in the IT industry
H3c:	Innovation and creativity is positively related to software development employees' decisions to stay in the IT industry
Environmental Factor	
H4a:	Leadership style is positively related to software development employees' decisions to stay in the IT industry
H4b:	Autonomy is positively related to software development employees' decisions to stay in the IT industry
H4c:	Work life balance is positively related to software development employees' decisions to stay in the IT industry
Job Satisfaction	
H5a:	Job satisfaction is positively related to software development employees' decisions to stay in the IT industry

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