

## The Affects of Diffusion of Technology Innovation on Burnout

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### ■ ABSTRACT

*This study examines the perception of the Information Systems and Technology (IS&T) employees on the introduction of new technology. A survey was conducted amongst 115 IS&T workers. Results show that the lack of introduction of innovation can have a detrimental effect and can possibly contribute to staff burnout. Technological innovation adoption was found to be associated with the following favorable outcomes: improved communication, improved perception of management, increased satisfaction, enhanced job security, and decreased staff burnout. The implication for adopting technology to combat burnout is discussed.*

Keywords: **Technology Innovation, Burnout, Diffusion, Job Security, Satisfaction, Stress, Management Communication, Employee Perception, Information Systems Staff**

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### ■ I. INTRODUCTION

The business community has been adopting Information Systems and Technology (IS&T) on a regular and consistent basis in order to become more competitive. Oftentimes, the organizations' adoption of new technology can cause major paradigm shifts in the way that they do their business. Organizations use information technology in all aspects of their business to track events, to make decisions, and to communicate. They use it to "out-source" or to "in-source" new capabilities. Technology has helped change the structure of organizations from large vertical structures that "did it all" to horizontal associations that depend on each of its members and partners – with each member doing what it does best.

A re-occurring theme is the dependence on technology to lead to productive change for the business. In order to become more competitive, organizations have investigated and adopted innovative ways of applying technology. Some organizations were able to obtain longer-term advantages; some found only short-term non-sustainable gains, while others have to fight to keep from falling too far behind. Organizations are forced to adopt and adapt. However, benefits can be very short lived. Soon after an organization incorporates a "critical" success factor (CSF), its competitors can develop a similar function. Thus, a CSF can quickly become a critical failure factor, a requirement for doing business (Keen & McDonald, 2000).

Within the realm of rapid technological change, IS&T specialists have real concerns of becoming obsolete by new tech-

nology. While the IS&T personnel are maintaining the existing systems, they are under considerable stress to stay current with the newer technology; after all, to not keep up is to fall behind. Most IS&T personnel know that professional development (continuing education) is important. Failure to maintain currency exposes them to job security issues; either staying with the company or finding a new position with another. The employee with the current expertise is in hot demand, while those that have not been able to keep up are relegated to lesser roles. Yourdon (1994) indicates that “software engineers face a real dilemma: What’s the point in learning to be really good at something if it’s going to become obsolete at the rate of 20% per year?” Kaluziacky (2000) puts it into perspective stating that “few professionals are faced with as much direct obsolescence of key skills as are computer programmers.”

During times of great stress, organizations do what they “need” to do to survive. This often means changing priorities, shuffling hierarchies, adopting new technological approaches, and reducing staff. Layers of employees are often eliminated for the sake of efficiency. The surviving employees have to work harder and longer than they did before to cover for the missing people. At one point, the IS&T employees seemed immune to layoffs; after all they were the ones providing the engine that allowed the “survivors” to be more productive. However, each shift in technology caused some group of IS&T employees to become outmoded, making them susceptible to downsizing. In the end, many IS&T employees are forced to adopt new approaches, which often means taking unwanted and possibly risky shortcuts in order to cover for positions that were eliminated. At the same time they are doing “double duty”, they are under stress of trying to stay current with constantly evolving technologies. The added stress and tension contributes to errors, which then in turn cause them to work even harder. Consequently, it is almost inevitable that some people end up feeling that their lack of knowledge in any area will contribute to delays or errors in their work, which can ultimately put their position in jeopardy. This scenario causes people to ask questions such as: “Is it any wonder why employees no longer believe that their organization will take care of them?” (McGee, 1996)

People under constant stress are less likely to be efficient and productive; further, they are more likely to have higher levels of absenteeism and turnover. Research has also shown that prolonged exposure of high stress has been associated with employee burnout (Moore, 1997; Greshing, 1991; Lee, 1990; and Winnubs, 1993). Burnout is characterized by fatigue, depression, hopelessness and lack of enthusiasm. Symptoms often include low morale, health problems, and potential alcohol and/or drug abuse. Stress and burnout affects more than the individual, it also impacts those that surround them at work and home.

Employee burnout has important consequences to the organization. Burnout can result in decreased employee involvement with the job, organizational commitment and lower levels of job satisfaction (Moore 1997, 1999; and Mak & Sockel, 2001). Burnout may also result in increased levels of job turnover and absenteeism (Lee & Ashforth 1996; Maslach, 1982; and Maslach & Jackson 1982). Managers can spend considerable time dealing with personnel issues instead of proactively managing their departments. If the employee’s job becomes too stressful, the manager may have to find someone to either replace or assist the burnt-out employee.

The employees’ welfare is an important concern for the organization; the IS&T employees are often the key to the organization’s future capability and core competence. Thus, management understanding of the antecedents of burnout is important. If burnout can be avoided, then employees are more likely to remain productive and efficient and job slippage is less likely to occur. In this respect, innovation can be an aid. Besides the possibility of enhancing the development process it provides a variety of new ways for dealing with existing situations.

Cherlin (1981) indicates that employees get “fed up” when their job becomes “too routine”. Innovation can be the key to adding productivity into a shrinking staff or providing a stable size staff with the capability to do more. If adopted properly, innovation will expand the institutional knowledge and capability of the employees and the organization while reducing stress. Innovation can impact burnout in two important ways: it either contributes to it or it can become a weapon used to help fight against it. In this study we explore the relationship between diffusion of technology innovation and burnout.

Some argue that the organization should not be concerned with the employee. The organization should adopt an attitude that along the venue of theory “X” philosophy. That is hire young employees versed in new technologies or able to rapidly

assimilate new technologies, pay them well, work them long and hard, and then when they are burnt-out expel them like solid waste and repeat the process by hiring a set of new fresh employees to take their place for the next technological cycle. After all, with the failure of the “dot coms” there is a glut in people current in new technology readily available. However, these people fail to take into account that the organization’s operational systems, which includes its software represents the organization’s identity. The systems that help make the organization unique. Even when two organizations in the same industry use identical software, their internal systems differ because of their strategies, their operating procedures and data-codes that they use. This institutional knowledge is difficult and time consuming to learn. A large shift of employees causes a great deal of this knowledge to exit with them. This in turn has the effect of an organization training its competitors’ staff.

Further, if an organization becomes known for “*Burn them out*” type of philosophy, they will have a hard time attracting and retaining the kind of people that they really want. The current employees will begin to wonder how secure their job is and their loyalty can be compromised. The people that subscribe to this “*Burn them out*” philosophy often indicate that they are not talking about the organization’s direct employees, but are really addressing contract workers. In the case of work being done by outside contractors, in-house employees become more important, in that they are the ones controlling and directing the projects. Thus, even in a time of glut, the health of the in-house employee is important.

To investigate the relationships between employee burnout and the issues of the employee’s attitude towards technological innovation, we proposed a model and conducted a survey of IS&T professionals in the Midwest U.S., Section II discusses the model, Section III reviews the methodology and instrument of this research. Section IV is the analysis of the results and Section V concludes the paper with a discussion on implications for technology adoption.

### **A Model on IS&T Innovation and Burnout**

The primary focus of this research is on the effects of technical innovation on the IS&T employee. Specifically, the research is interested in how changes in technology, referred to as innovation, have an impact on employee burnout? Studies on diffusion are usually done from an organizational or end-user perspective (Rogers, 1983). These studies address the impact of technology on the organization, but do not reveal the impact of technologies on the employees. Experience in other disciplines indicates that inappropriate introduction of technology may heighten quality and productivity issues and increase stress on the worker.

Some employees view new technology as a threat to their hard developed skills and knowledge, while others are intrigued by it and desire to learn new techniques to keep their talents current with that of the industry. Stress can develop when the organization’s needs and employees’ desires are not in “sync”. Sometimes unwilling employees are forced to learn new ways, while others who want to learn are denied the opportunity. Besides the unwilling and/or those not up to the challenge, there are employees who believe that lack of training in new technology is a threat to their future livelihood. Still others view training as part of their informal contract with the organization; they expect that education be part of their compensation package. This construct is re-enforced by professional groups’ (i.e. ACM, IEEE and AITP) code of ethics, which includes statements to the following: “Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession” (AITP, p.3 2002). However, the organization may not be ready or able to adopt new technology or to train its employees when and how the employees desire it.

The employees’ perception of innovation has a direct impact on their level of satisfaction and how they view the organization. The employees’ attitudes affect their sense of communication and job security. Thus, a disorderly introduction of new technologies can cause a “misfit” with current employees’ desires and lead to lower job satisfaction and higher job stress. Stress has the potential to cause adverse effects on how the employee perceives management, creating lower efficiency, lower effectiveness, lower satisfaction and higher anxiety over issues of job security. Ultimately, technology depending on how it is introduced can either lead to higher levels of burnout, or be a tool to help fight burnout.

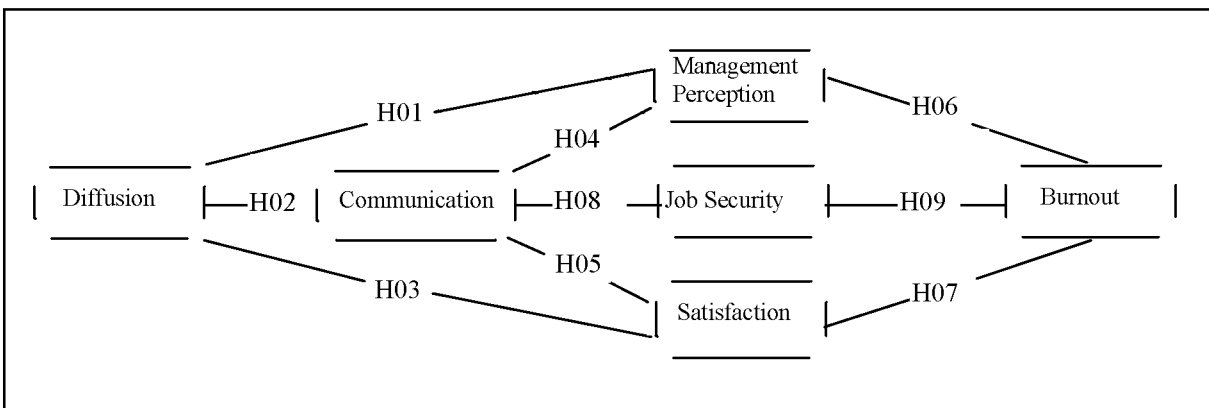
While considerable research has been done on diffusion of technology innovation, very little has been done to explore its impact on the knowledge worker. Griesser (1993) indicates that the type of person that pursues a career in IS&T may be dif-

ferent from the general population. He notes that IS&T personnel are more resistant to change than other professionals. However, he notes that individual attitudes are not homogeneous. Developers and maintenance personnel had significant differences in growth needs, advanced technology strengths and change acceptance. Developers are interested in the latest tools to help them satisfy new and challenging requirements. Maintenance personnel rarely have the opportunity to do the *glory* work and spend considerable time struggling to keep up. Maintenance personnel might view new technologies as an obstacle that they will eventually need to conquer.

The hypothetical model was developed as part of an earlier pilot study done through exploratory focus group discussions with IS professionals. The constructs as presented were augmented with literacy reviews (Kaluzinacky, 2000). This model is based on the work of Sockel (2000) and Mak & Sockel (2001). The model of this study, as shown in figure 1, explores the concept of “diffusion of technology innovation” from the perspective of the IS&T knowledge worker. In this instance, the knowledge worker is defined as someone who is involved in the creation and maintenance of information or knowledge based systems. This definition includes programmers, analysts, database, network, project leaders, quality control specialists, and middle management. It does not include documentation or operation specialists, clerks, data entry personnel or others that do not directly impact the mechanics of software production or maintenance.

This model proposes that the dependent variable of employee burnout is directly impacted by the employees’ perception of management of the organization, their sense of job security and their overall level of satisfaction. These intermediate variables are impacted by both issues of communication and by diffusion of technology innovation

Figure 1



## II.1 Diffusion of Technology Innovation

Leonard-Barton & Sinha (1993) indicates that there exists little theory to explain internally developed technology diffusion. Gallivan (1995) indicates most research on diffusion assumes that there is a voluntary adoption. Issues based on coercion of the perspective employee adopter, concerning career or job security have not adequately been investigated.

According to Rogers (1983) diffusion is defined as the process by which innovation is communicated through information channels to members of a social system. As such, there are four key elements: the actual innovation, the channel of communication, time, and the social system. The construct of communication is viewed both from an internal and external aspect of the organization. Thus, it is unimportant which media the IS&T personnel get the information on new technology or issues related to their management and job security. It is anticipated that an indirect relationship exist between diffusion of technology innovation and employee burnout heavily mitigated via communication. A body of research already exists that establishes a strong link between communication, innovation, and a person’s level of contentment (Mak & Sockel, 2001; Steers & Porter, 1979; Rogers, 1983; Sullivan-Trainor, 1994; and Wilde, 1994).

The mere presence of change within the IS&T industry is often enough to disrupt an individual. A person's natural sense of curiosity causes them to take notice. IS&T employee often does some preliminary investigation into the new technology: unless the new technology is being evaluated at work, the employees are not typically concerned about it. As new technologies rise to the forefront and organizations take notice, the pressure on the individual increases. They may have an aspect of the innovation become part of their job, to investigate, install, use or maintain. As more and more organizations adopt the technologies, pressures mount on the developers to become knowledgeable of it in addition to doing their normal work.

Sometimes, the new technology can be interpreted as a threat to the employee's IS&T skills. From the employees' perspective their existing skills are hard to acquire, oftentimes taking years to become proficient, lucrative, and often a source of great pride. These skills can appear to be under attack. Thus, they may regard any change in the industry's view of what is appropriate technology to be a threat to their personal job security. Consequently, the method that organizations use to introduce and adopt or not adopt innovations can have a profound impact on the IS&T employees. If the organization is open and communicates its intentions and the rationale behind the change, the IS&T employees are likely to be more tolerant of the change. This leads us to hypothesize that

**H01:** The IS&T employees' perception of how innovation is adopted into the organization will have a direct and significant impact on their perception of management

**H02:** The IS&T employees' perception of how innovation is adopted into the organization will have a direct and significant impact on organizational communication

**H03:** The IS&T employees' perception of how innovation is adopted into the organization will have a direct and significant impact on their level of job satisfaction

## II.2 Communication Role:

Rogers (1983) indicates that communication channels are the means by which information is transmitted to or within the social system. It is the channel by which IS&T employees will be influenced by innovation. Researchers indicate that an effective way to mitigate stress is through communication. However, the effect of communication on diffusion of technology innovation can only be helpful up to a limit. Too much of a good thing is still too much.

Orlikowski's (1993) studies demonstrated the affects of communication and diffusion. She noticed that the results of adoption of technology varied by type of employee and how the intent of the innovation was communicated. She studied two large firms, which implemented Computer Aided Software Engineering (CASE) tools. Contradictory results were found. The business units for the most part, did not support change. Porter and Millar (1985) found that most developers welcomed the CASE tools and believed that the tools would enhance the company's competitive advantage. Other researchers found that communication was an important aspect in building better relationships with the employee, increasing job satisfaction and enhancing job security (Levinson, 1996; Pavett, 1986; and Rosen, 1994). Effective communications with users is perhaps one of the most important aspects of any development toward the ultimate success of any system (Agarwal, De, Sinha, & Tannru, 2000; Whitten, Bentley, & Ditman, 2000). Since our focus is on IS&T employee we hypothesize the following:

**H04:** The IS&T employees' perception of organizational communication will have a direct and significant impact on their perception of management

**H05:** The IS&T employees' perception of organizational communication will have a direct and significant impact on their level of job satisfaction

## II.3 Employee's Perception of Management:

Organizational issues are concerned with the attitudes and perceptions of employees on the following issues:

- What management is doing to enhance the corporation via the acquisition of personnel and technology?
- Is the organization able to attract, retain and develop high quality personnel?
- Is the organization committed to trying to improve itself?

Byrd and Ikerd (1992) found that IS staff need more than just technical skills, they need to know and understand the goals and objectives of their organization. In order for management to retain quality personnel, they must indicate to their employees that the firm is committed to the future. To this end, it is important that management explore new ideas and methodologies. However, as management makes adjustments they must always be concerned about unforeseen outcomes. Experimentation may help in the long run, but only if the staff stays committed to the organization and its goals. "Management needs to focus on developing positive perceptions about the new technology to ensure its successful adoption into the IS organization..." (Agarwal, Prasad, Tannru, & Lynch 2000, pp.183).

If management is able to adopt innovation in an appropriate manner, where the employees are in agreement with the need for change and the pace of adoption, then employee stress should be reduced and ultimately so should their level of burnout. As such, it is anticipated that the IS&T professional's perception of management will have a direct impact on employee burnout. We hypothesize:

**H06:** The IS&T employees' perception of management will have a direct and significant impact on their level of burnout

## II.4 Employee Satisfaction

**To cope with the continual change, employees may choose to educate themselves in the areas that they feel offer the most opportunity for their benefit. The direct benefit may be monetary (the ability to earn future income) or academic (knowledge for the sake of self-actualization). However, the introduction of new technology can increase employee's internal stress from the aspect of dealing with the unknown. Proper communication and education can relieve some of this stress by converting the unknown into the known. If done appropriately, the introduction of technology can be considered a concern for the employee, something to help them with their work. The opportunity to acquire new technology could improve the satisfaction of the employees, their perception of management and the organization in general.**

Computerworld (magazine) in their eighth annual job satisfaction survey noted that job satisfaction has declined at all levels of the IS organization (Wilde 1994). They noted that employees and managers are feeling "left out". Respondents to their survey indicated the problems were correctable through increased communication and exposure to new technologies. Garner (1996) indicates that about 45 percent of the IS professionals described their job satisfaction as "somewhat" satisfied while 20 percent were dissatisfied. About 39 percent of the IS staff indicated that their level of job satisfaction was declining. G. Raphaelian VP of management strategies and directions at Gartner Groups, Inc.'s Bay Area Research Center states that the "top source of gratification for all IS professionals is working on advanced technologies ... of which probably 20 to 25 percent of an IT organization get exposed to those new technologies, and the remaining 75 percent have to maintain the in-place legacy systems to run the business" (Garner, p. 91).

The introduction of innovation can help prevent detrimental influences. Cherlin (1981) indicates that within the IS&T industry that it is not uncommon for personnel to spend years working on the same routines. Employees can be stuck in the same positions because there is not enough in the budget to train new people, to relieve them, or to rewrite the system that they are working on. The surveys on IS&T indicate that suitable technological innovation can lead to higher job satisfaction and lower level of stress and burnout. Therefore we hypothesize:

**H07:** The IS&T employees' level of satisfaction will have a direct and significant impact on their level of burnout

## II.5 Job Security

With the advent of Business Process Reengineering, Electronic Commerce, Customer Relationship Management, Enterprise Resources Planning, Data Warehousing and the like, businesses are in the process of reinventing themselves. Many firms went through dramatic and drastic changes over the last decade. These reorganizations shook the traditional employee / employer relationships. Some changes in the organization created an atmosphere where employees are concerned for their jobs and prompting an attitude of “What’s in it for me?” Rosen (1994) indicates that the best way an employee can protect their job security is to ensure that their work experience is as up-to-date as possible. Some employees are demanding assurance upfront. They are signing contracts, agreeing to stay with their organization for a minimum fixed period of time, in return for additional training. As Sullivan-Trainor (1994) states, training has become more important than ever, organizations are looking for people who have experience with new technology.

Earlier it was argued that employees might feel threatened if they are unable to acquire new skills or if the technology is changing at a rate faster than they can assimilate. To this end, management should be communicating to the employees why the innovations that the firm is adopting are beneficial for both the organization and the employee. Solid honest communication will help relieve employee anxiety and job insecurity. Management must communicate to the employee that the adoption of innovation is being done at the right time, at the right speed and with the right motives (Orlikowski, 1993). Thus, the introduction of technologies if well communicated can act as an agent to increase job security and lower burnout. It is hypothesized:

**H08:** How the organization responds to and communicates innovation will have a direct and significant impact on the individuals’ level of job security

**H09:** The IS&T employees’ sense of job security will have an inverse and significant impact on their level of burnout.

## II.6 Burnout

An organizational culture that becomes too stressful, abusive, non-challenging, or inconsistent with its employees’ needs and desires may lead to employee burnout. The increased incidence of burnout can lead to reduced productivity, feelings of frustration, low morale and incidence of being tired and lonely (Rose, 1986). Winnubs (1993) indicates that continuous struggle with other people creates a high risk of burnout.

Stress is not just a phenomenon of the developers, all of IS&T is affected by its changing status. The IS&T department is also subject to technology stress. Its roles have been expanded, its focus changed, its responsibilities increased; information has become the blood of the organization. Management is forcing and challenging the IS&T group to perform at higher levels of both effectiveness and efficiency, while employees are constantly being asked to do more. The work falls on the shoulders of the IS&T employees. Garner indicates that common concerns amongst IS&T employees are as follows:

too much is expected from too few,  
there is not enough time to do a good job,  
deadlines are unrealistic, and that the  
process is loaded with politics that takes time and energy from the real job.

**While it may not be possible for an organization to increase its staff, new technologies can make its staff more productive. In the last quarter of 2001, productivity increased even though there were significant employee layoffs. This was attributed to recently implemented technologies such as inventory control and comprehensive Enterprise Resource Planning systems – fewer, yet more productive employees (Kaiec, 2001). In general, IS&T developers are receptive to learning new technologies. If the technologies are introduced and managed well, it might lead to lower levels of burnout.**

### ■ III. METHODOLOGY

To analyze the relationships between diffusion of technology innovation and burnout via the intermediate variables, we conducted a survey among IS&T employees. An anonymous survey was conducted because the study explored the employees' attitudes towards the organization, management, and new technologies. To circumvent the management perception problem, yet still incorporate a large degree of randomness into the survey, a variant "snowball" distribution approach was used. The survey was distributed to known trustworthy individuals for further distribution amongst their friends and colleagues. A problem with this approach is that it is not possible to accurately determine non-respondent information.

Originally, 300 questionnaires were distributed to IS associates of the authors for further distribution. In total, 115 usable questionnaires were returned. Factor analysis and reliability tests were used to validate the constructs of the model. The relationships among the constructs within the model were explored using path analysis. The analysis was conducted using SPSS.

#### III.1 Instrument

An instrument was developed to research the attitudes of the IS&T employees concerning diffusion of technology innovation, communication, perception of management, satisfaction and burnout. The instrument used a six-point Likert scale. The questionnaire was patterned after existing instruments, specifically Mowday, Steers and Porter's (1979) Organizational Commitment Questionnaire, Ives and Olson's User Information Satisfaction Measure (Ives & Olson, 1984), Maslach and Jackson's Maslach Burnout Index (1982), and Larson's (1996) job stress and turnover intentions. Additional topics were suggested by literature reviews and focus group discussions. Preliminary versions of this paper were reviewed and discussed by practitioners within the IS&T community who offered further suggestions.

#### III.2 Validity

A three-step process was employed to validate the items. As suggested by Doll and Torkzadeh (1989), the validity of the questionnaire items was assessed using the following: factor analysis, correlation between the items, reliability as indicated by Cronbach's alpha and corrected item total correlation. All six variables had satisfactory construct validity and reliability. Table 1 presents the data on construct and criterion related validity for the items used in the questionnaire. Table 2 explains the items used in the questionnaire.

Table 1 shows the reliability coefficient (Cronbach's alpha) for the items ranged from 0.75 to 0.93. The correlation of the items with the criteria was generally high, ranging from 0.44 to 0.78. The factor loading was high (range from 0.67 to 0.91) showing that the items represented one construct. The corrected item total correlation was also high. Therefore we conclude that the construct and criterion validity was good. In addition, the Kolmogorov-Smirnov test of normality showed all the constructs followed normal distribution (significant at 0.005 level).

Table 1 Validity of the items in the model

Construct	Items	Correlation with Criterion	Corrected Item Total Correlation	Factor Loading
Diffusion of Technology Technology Innovation Innovation	Key question	1.00	0.74	0.86
	dif01	0.54	0.61	0.75
	dif02	0.53	0.61	0.75
	dif03	0.60	0.58	0.78
	dif04	0.61	0.64	0.74
				Alpha = 0.84
Satisfaction	Key question	1.00	0.76	0.91
	sat01	0.81	0.76	0.91
	sat02	0.53	0.56	0.77
				Alpha = 0.83
Employee's Perception of Management	Key question	1.00	0.61	0.73
	man01	0.49	0.52	0.86
	man02	0.53	0.70	0.74
	man03	0.46	0.53	0.79
				Alpha = 0.78
Job Security	Key question	1.00	0.56	0.81
	sec01	0.55	0.64	0.85
	sec02	0.44	0.55	0.79
				Alpha = 0.75
Communication	Key question	1.00	0.74	0.87
	pla01	0.76	0.71	0.84
	pla02	0.53	0.56	0.72
	pla03	0.50	0.56	0.72
	pla04	0.44	0.51	0.67
				Alpha = 0.82
Burnout	Key question	1.00	0.83	0.87
	Bur01	0.56	0.71	0.77
	Bur02	0.51	0.63	0.70
	Bur03	0.57	0.65	0.71
	Bur04	0.65	0.76	0.82
	Bur05	0.69	0.70	0.77
	Bur06	0.73	0.78	0.83
	Bur07	0.63	0.70	0.76
	Bur08	0.68	0.68	0.75
	Bur09	0.78	0.80	0.85
				Alpha = 0.93

Table 2 Items within the Questionnaire

Construct	Items	Questions
Diffusion of Technology Innovation	Key question	My company is innovative and encourages people to try new Methodologies
	dif01	My company encourages me to learn new skills
	dif02	My company is quick to adopt/try new ideas
	dif03	My company encourages new ideas
	dif04	My company is fast to implement new methods
Satisfaction	Key question	All in all, I am satisfied with my job
	sat01	In general, I like working here
	sat02	I seldom think about quitting
Employee's Perceptions of Management	Key question	IS&T is an effective department to work for
	man01	My IS&T department has high quality talented personnel
	man02	IS&T meets the company's information needs
	man03	IS&T is respected within the company by senior management
Job Security	Key question	My skills are outdated
	sec01	The wave of the future is in the areas of IS&T that I do not understand
	sec02	My peers are more current in technology
Communication	Key question	There is good communication within my IS&T
	pla01	Generally everyone works well together
	pla02	Not much internal conflict exists within the IS&T department
	pla03	Management actively supports exchange of ideas and opinions
	pla04	IS&T is a good place to work
Burnout	Key question	Feeling hopeless
	Bur01	Feeling depressed
	Bur02	Being physically exhausted
	Bur03	Being emotionally exhausted
	Bur04	Can't take it anymore
	Bur05	Feeling trapped
	Bur06	Feeling worthless
	Bur07	Feeling weary
	Bur08	Being troubled
	Bur09	Feeling rejected

### III.3 Respondents

The sample consisted of a diverse group of developers from different sizes of IS&T departments evenly distributed over five categories (from under 5 people to over 99 people), indicating that the sample was representative. More than 82 percent of the respondents were between 25 to 45 years old. Over 61 percent had two to ten years of employment with their current organization. More than half (61 percent) of the respondents identified their functional responsibility as system analyst, programmer, or project leader. About a fifth (22 percent) of the respondents had less than two years IS&T experience while over 26 percent had more than 10 years experience. The respondents were distributed across a variety of different development platforms. Most of (65 percent) of the respondents had been college trained. The respondents indicated that their normal work activity was concentrated on new development and enhancements (30 percent), maintenance activities (18 percent) and general support (42 percent).

■ IV. RESULTS OF ANALYSIS

Path analysis was conducted to analyze the hypothesized relationships in the model. A factor of .05 was used for determining significance. The variables in the final model consist of diffusion of technology innovation, communication, employee’s perception of management, satisfaction, job security and burnout.

We adopted the method of analysis used by Iberia et al. (1994) to determine direct and indirect effect of the factors. The TOTAL effect of the independent variable on the dependent variable is represented by the initial beta weight of the variable when only that independent variable is entered into the analysis. The DIRECT effect of that variable is the final beta weight when all the independent variables are used in the regression. The INDIRECT effect is the difference between the two effects.

Table 3 Predictors of Burnout

Predictors	Direct	Indirect	Total
Satisfaction	-0.20*	-0.13	-0.33**
Perception of management	-0.28**	-0.09	-0.37***
Job Security	0.24**	0.06	0.30**
Communication	insignificant		insignificant
Diffusion	insignificant		insignificant

\*p≤ 0.05; \*\*p≤ 0.01; \*\*\*p≤ 0.001

As shown in Table 3, Burnout ( $R^2= 0.25$ ,  $F=11.48$ ,  $p<0.001$ ) analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology*, Vol. 81, pp. 123-133.

Table 4 Predictors of middle layer variables

Predictors	Perception of management			Job Security			Satisfaction		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Communication	0.36***	0.06	0.41***	-0.22*	0.00	-0.22*	0.40***	0.09	0.49***
Diffusion	0.20*	0.09	0.29***	insignificant			0.34***	0.11	0.45***

\*p≤ 0.05; \*\*p≤ 0.01; \*\*\*p≤ 0.001

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