



# An Empirical Evaluation Of Key Factors Contributing To Internet Abuse In The Workplace

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## Abstract

**Purpose** – This study seeks to synthesize theories from communication, psychology and criminology to examine the factors that influence the two most popular topics in industry – internet abuse and addiction at the workplace. **Design/methodology/approach** – The survey results of 351 responses were analyzed to test the proposed hypotheses and research model using structural equation modeling. Data were collected in Southern Science Park in Taiwan.

**Findings** – It was found that personality factors such as locus of control and self-esteem significantly influence employees' internet addictions; and internet addiction significantly impacts employees' internet abuse at the workplace. **Practical implications** – Employers should pay special attention to employees' personalities because they play important roles in internet addiction and internet abuse. Also a good internet policy will be useful especially to a panoptic working environment, which is becoming popular. **Originality/value**. his study provides a comprehensive theoretical foundation to better understand the two controversial issues in industry. The empirical study validates the important theories of locus of control, self-esteem, use and gratification, control, and containment in workplace surveillance and deviant behavior research

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## Introduction

The use of internet technology has become a common practice in the workplace. To stay competitive, companies leverage the ease, availability and accessibility of internet technology to support and enhance the internal and external communications among employees. Internet-enabled communication media, such as e-mail, instant messaging

and IP phones, are enabling companies to conduct business anytime from anywhere. Virtual teams are a natural product of the ubiquity of internet technology to smooth the communication process of dispersed teams.

However, implicit in the use of internet technology to improve work-related productivity in the workplace is a concern for the abuse of internet technology for non-work-related activities. A Center for Internet Addiction Report shows that about 5 to 10 percent of adults are having internet addiction problems (Trask, 2006). A study on the internet abuse in the workplace reveals that employees are more likely to visit shopping web sites, followed by entertainment, financial and adult web sites (Surfcontrol, 2000). A little control of internet abuse activities can entail an unproductive and uncompetitive organization (e.g. the number of work hours wasted, inefficient use of network resources, or productivity loss). These activities can further victimize an organization with overpaid wages, legal liabilities, lawsuits (Stewart, 2000), loss of goodwill, or unintentional release of confidential information (Phillips, 1999).

Today's major management challenge with internet abuse in the workplace is to reduce the occurrences of internet abuse by taking necessary precautions. Prior research in the field of internet abuse is primarily incident reports or case discussion. These studies are lack of theoretical backgrounds and rigors of research methodology. In order to resolve these issues, this study integrates theories applicable to understanding key factors contributing to the misuse of internet technologies in the workplace for non-work-related activities. Five antecedents of internet abuse are identified: internet addiction, personality, uses and gratification, internet use policy and the perceptions of electronic monitoring systems. An effective solution to combat these identified factors conducive to the widespread internet abuse activities are proposed as the findings of this study.

### Theory development and hypotheses

Internet abuse in the workplace is to conduct non-work-related activities or public communications online on company time (Young, 1996). Internet abuse in the workplace is also the misuse of organizational information technology to achieve personal gains, instead of organizational goals. Guthrie and Gray (1996) christen the misalignment between the use of organizational information technology and organizational goals as "junk computing." The deviant use of internet technology in the workplace can pose various risks to a corporation. The wrongdoers may be distracted from tasks on hand and engaged into unproductive or unethical activities. Unproductive activities range from online shopping, news, music, chatting, games, to cybersex. Too many unproductive activities in the workplace can lead to productivity loss, slowed network speed and liability risks (Lichtash, 2004). Unethical internet abuse can sometimes grow to become e-crimes, including intellectual property theft, distributing offensive materials, and online piracy of copyright materials. The e-crime can seriously tarnish the goodwill of a corporation. The impacts of internet abuse can be devastating. For instance, about 25 employees of the Automobile Club of South California delayed their response to the request of roadside assistance because they were engaged in the posting of sexual harassing messages at the blog web site myspace.com in the workplace (Ashmore and Herman, 2006).

Although many companies have corporate policies to deter the internet abuse, many users are addicted to internet activities and have little control of not using internet

activities in the workplace. Internet abuse behaviors in the workplace are the natural extension of internet addiction behaviors (Stanton, 2002). A user who is accustomed to use online chatting services at home will instantly respond to any request of online chatters even in the workplace. Other usage behaviors may include reading internet news, booking travel packages, buying movie tickets, etc. This study adopts a multidimensional approach to examine key factors contributing to the relationship between internet addiction and internet abuse from the individual perspective.

### Internet addiction

Internet is a widely adopted medium to meet the social needs of new generations. Online users seek gratification via online activities and gradually lose impulse and control. The conscious or unconscious control of the desire or impulse to use the internet, such as online chat rooms, shopping, gambling, online auctioning and online dating, is difficult for some people. As a result, a long time of intensive exposure to the medium can induce anxiety, intolerance, insomnia, depression, conflict and other disordered behaviors (Griffiths, 1998). The youth is particularly susceptible to the adverse effect of pathological addictions, including gambling and internet addiction. A study shows that the number of college students who are addicted to gambling is four to eight times higher than the number of adults (Lesieur *et al.*, 1991). College students who are exposed to the internet longer than their peers clearly show lower reading skills, and higher temptation to plagiarize and social isolation (Trask, 2006). Many researchers labeled the inordinate use of internet as the internet addiction disorder (IAD) (Goldberg, 1996; Greenfield, 1999; Young, 1998a, b).

Internet addiction resembles to the addiction to drug and alcohol because both of them are destructive to the normal life of an individual (Kershaw, 2005). Excessive use of internet or internet addiction disorder can lead to pathological and psychological symptoms, which cause the physical illness and isolation from the society (Brenner, 1997). Internet addicts usually have troubles socializing in the school or workplace when they are not with the computer. Some addicts even display physical illnesses, including carpal tunnel syndrome, migraine headaches, irregularities of life patterns (e.g. insomnia or skipping meals), and back aches. The American Psychiatric Association prescribes seven criteria to diagnose and determine if an individual becomes an internet addictive (Ferris, 2006). The individual needs to show the persistent presence of at least three out of seven criteria over a 12 month period in order to be qualified as an internet addictive. These seven criteria are:

- (1) tolerance;
- (2) two or more withdrawal symptoms after reduction of internet use;
- (3) use of the internet to relieve or avoid withdrawal symptoms;
- (4) longer and more frequent use of the internet than the average;
- (5) excessive use of internet activities;
- (6) trade the use of internet for physical social activities; and
- (7) trade the use of internet for relationship.

All these behavioral and impulse-control symptoms have the “compulsiveness” feature in common. This feature has resulted in the emergence of cybersexual addiction,

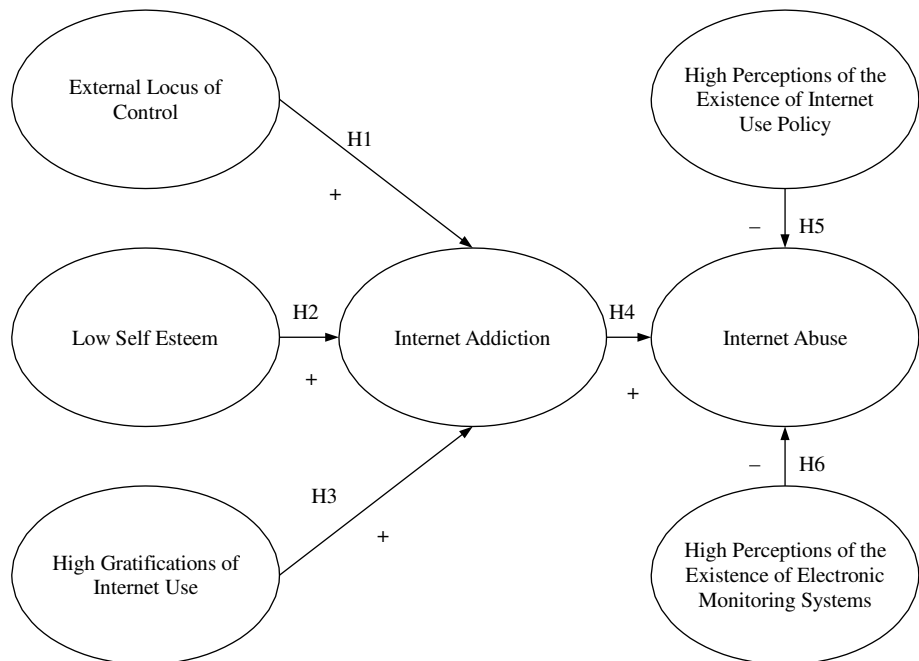
cyberrelationship addiction, net compulsion, information overload and computer addiction problems (Soule *et al.*, 2003).

With the ubiquitous connectivity of the internet and the fast adoption of the internet as the major medium for communication by the younger generation, the importance of internet addiction cannot be underestimated. Many socio-technical factors can contribute to the internet addiction behaviors. Among those factors, the uses and gratification, the *locus* of control and self esteem are most pertinent to the effects of internet addiction behaviors at an individual basis.

This study integrates the *locus* of control theory, control theory, containment theory, and uses and gratification theory. Seven constructs are incorporated in the proposed theoretical framework (Figure 1). Six hypotheses are used to validate the relationship among these seven constructs. The external *locus* of control, low self-esteem (LSE), and gratifications of internet use are three predictors for internet addiction. A high degree of internet addiction may lead to internet abuse behaviors, which can be predicted with two perceptual antecedents: perceptions of the existence of internet use policy and of electronic monitoring systems.

### *Locus of control and internet addiction*

A person has the belief that his/her future success can be largely attributed to either the internal or external causes (Rotter, 1966). The group of people who believe in the control of their own actions and efforts to succeed in their future fall into the category of internal *locus* of control. The other group of people who believe in fate or luck that is outside their own controls are in the category of external *locus* of control. The degree of internal and external *locus* of control may contribute to the degree of internet addiction behaviors.



Prior research shows that the internal *locus* of control is positively correlated with the attitudes of an individual towards the use of personal computers (Coovert and Goldstein, 1980; Woodrow, 1990). Individuals with a higher degree of internally controlled orientation show more eagerness, and curiosity, but less anxiety at the use of world processing equipment (Arndt *et al.*, 1983). These individuals can also have a higher discipline to restraint their internet use without displaying feelings of restlessness, moodiness and depression (Chak and Leung, 2004). In the same logic, an individual with a higher degree of internal local of control is more likely to control the use of internet activities without experiencing psychological and pathological disorders of internet addiction:

*H1.* Online users with a higher degree of external *locus* control are more likely addicted to the use of internet activities.

### *Self-esteem and internet addiction*

Self-esteem is another important enduring personality to consider when investigating the internet addiction behavior. Most of us have a subjective appraisal of our basic worth and personal competence as intrinsically positive or negative (Bosma and Jackson, 1990). When it comes to the internet use, online users with a high or LSE may behave fairly different. Many studies discovered that LSE online users have a higher tendency of showing the internet addiction behaviors than high self-esteem (HSE) users (Armstrong *et al.*, 2000; Young, 1998a, b; Young and Rogers, 1998). LSE online users, particularly, are more likely to capitalize on the unique features of anonymity, convenience and escape available on the internet to achieve personal comforts and gratifications. This virtual context feature can help LSE cultivate a subjective escape from social and emotional difficulties. For instance, LSE users have a higher preference for e-mail than for face-to-face interactions when the communication involves deceptions, intimacy or personal risks (Joinson, 1998). A cybersex study corroborates with the argument that the rise of cybersex addicts is primarily due to the anonymity, convenience and escape of internet features:

*H2.* Low self-esteem online users are easier addicted to the internet than high self-esteem online users.

### *Uses and gratification, and internet addiction*

The active use of a particular medium is a personal choice. The uses and gratifications theory asserts that media users are rationale and goal oriented in their media use when more than one alternative medium is available to them (Blumler and Katz, 1974). An individual usually aware their personal needs and choose a particular medium to satisfy their needs (Katz *et al.*, 1974). Online users with different goals in mind choose to engage into one internet activity over the others (Lin and Tsai, 2002; Rubin, 1994). The degree of gratification with prior internet use can lead to the habitual use of internet activities (Charney and Greenberg, 2002). Uses and gratification theory examines the use of mass communication at the user level and is a useful reference to examine the divergent goals of internet addicts to fulfill their needs.

An individual actively adopts the internet over other mass communication media (e.g. TV and radio) to achieve process, content and social gratifications (Stafford *et al.*, 2004). The web surfing and navigation experience is a process gratification, while the

attractiveness of content is a content gratification. These two gratifications serve the basic needs of being an internet addict, but can hardly get an online user seriously addicted to any internet activities. In order to gain and retain users, the social gratification feature is more important than the other two gratification types. A survey with internet addicts show that “social communications with online parties” is a strong predictor for the internet addiction behavior (Chou and Hsiao, 2000). Most internet addiction disorders are commonly found in the online social activities, including online gaming, cybersex, online chatting, and online auction. All these online social activities take more than one party. Internet addicts feel obligated or compelled to respond to online parties. Along with the convenience and anonymity features, this compulsiveness feature of the internet creates a vicious cycle to have online users constantly hooked to the use of internet. Consequently, without being able to access to the internet all the time, some online users begin having the disorders of depression, obsessive thoughts, intolerance, inability to create and withdrawal (Song *et al.*, 2004):

*H3.* The degree of gratifications can lead to the internet addiction.

#### *Internet addiction and internet abuse*

Internet abuse is the extension of the form of internet addiction. Built upon Young's (1999) typology on internet addiction, Griffiths (2003) classifies internet abuse in the workplace into six types: cybersexual internet abuse, online relationship abuse, internet activity abuse, online information abuse, criminal internet abuse and miscellaneous internet abuse. Many factors can encourage online users to become an abuser of online activities: short-term comfort, excitement, distraction (Griffiths, 2000), opportunity and access, affordability, anonymity, convenience, escape, disinhibition, social acceptability, and longer working hours (Griffiths, 2003). College students commonly have a lower social responsibilities and more opportunity to use free online services on campus. These factors have made college students an easy target to get involved into internet abuse activities. Internet abuse is also growing to become a serious occupational issue in the workplace. This issue has drawn the attention of the management to take many corrective actions. Therefore, it is imperative to examine if internet abuse is the result of serious internet addiction problems from an individual perspective:

*H4.* A higher degree of internet addiction can lead to a higher degree of internet abuse.

#### *Internet use policy and internet abuse*

As the proliferation of many internet use policies and e-monitoring systems, many managers have a high perception of the usefulness of these artifacts to deter the internet addiction of employees in the workplace. However, the deployment of internet use policies and e-monitoring systems do not guarantee the improved perception of their existence in the minds of employees. Failure to improve the awareness of internet use policy and e-monitoring system can lead to many internet abuse vulnerabilities, such as the continuous occurrences of internet misuse, ignorance of their appearances, as well as legislative and regulatory entrenching incidents (Sipior and Ward, 2002).

Many internet abuse behaviors are a felony. They are emerging as new social phenomena. Biological, psychological and social factors predispose someone to commit

criminal behaviors (Lombroso, 1918). Two schools of criminology can be adopted to mitigate the occurrence of and lessen the effect of internet abuse behavior in the workplace. The first school presumes that the human being is a “rational calculator” to commit a crime after weighing up its costs and benefits. Concrete measures, such as punishment or deterrence policy, fall into this school of criminology. The second school stresses the importance of identifying internal and external factors that can prevent people from committing crimes.

The control theory presumes that people who did not commit crimes have some commonality in their traits. Four important traits are “attachment to others” , “belief in moral validity of rules” , “commitment to achievement” , and “involvement in conventional activities” (Hirshi, 1969). To insulate an individual from committing crimes, both internal and external containments need to be enforced (Reckless, 1940). Internal containments are the internal *locus* of control, including egos, self-esteem, and frustration tolerance. External containments refer to social norms, goals, peer pressure, adverse living environment, values and disciplines.

A growing number of companies are drafting the internet use policy to deter, dissuade or prevent the internet abuse in the workplace. Internet use policy is a written agreement for employees to comply with the rule of not engaging into the internet abuse activities (Young and Case, 2004). Companies have used the policy as an external containment or deterrent to combat with internet abuse in the workplace. Embodying the internet use policy can help cultivate the appropriate use of internet activities in the workplace:

*H5.* A higher perception of the existence of internet use policy at work, the less likely an online user will commit the internet abuse behavior.

#### *Perception of the existence of e-monitoring systems*

Monitoring systems are particularly prevalent in security-sensitive organizations. These organizations adopt the system to:

- evaluate the work performance of employees;
- improve the productivity of workers;
- prevent illegal activities; and
- mitigate the consequence of illegal activities.

Electronic monitoring (e-monitoring) systems used in this study refer to the monitoring systems used to combat internet abuses behaviors of employees in the workplace. Major functions of this system can monitor employee network activity, track visited web sites, and record many internet navigation history (e.g. the duration, content of the visited web sites, key strokes, the tile of web sites and the name of programs used for internet abuse activities). The primary purpose of e-monitoring system is to discourage the engagement of employees into the internet abuse activities in the workplace. In the situation that employee continuously commit the internet abuse activities at work, e-monitoring systems can record the incident and use it for legal purpose to take more stringent actions to correct this situation. A study of The Center for Online Addiction shows that 58 percent of employers adopt the e-monitoring system to control recreational use of employees in the workplace. About 47 percent of the surveyed employers adopt the e-monitoring system to reduce the unproductive use of consumable corporate bandwidth for nonwork-related activities.



E-monitoring systems are potentially an effective tool for individuals with certain personality traits. Individuals with a high-internal *locus* of control appear to be more stressful than individuals with a low-internal *locus* of control (Kolb and Aiello, 1996). When being monitored, LSE users are more willingly to modify their usage behaviors to meet the organizational expectation than HSE users (Brockner and Kramer, 1988).

The utilization of e-monitoring systems creates many privacy concerns. A survey with employees and privacy groups discovers that employers need to put a limit on the use of e-monitoring systems in the workplace. Although the surveyed subjects agree with the monitoring of excessive use of internet activities, they disagree with the detailed monitoring, such as where employees navigate to (Siau *et al.*, 2002). This provokes the importance of many personal and privacy issues associated with the use of e-monitoring systems. An ethical and responsible employer needs to frankly communicate with employees about the use of e-monitoring systems to deter and dissuade internet abuse activities in the workplace. The system is an effective artifact to reinforce the business use behaviors and responsibility of employees to utilize corporate resource in a more responsible manner:

*H6.* A higher perception of the existence of e-monitoring systems at work, the less likely an online user will commit the internet abuse behavior.

## Research methodology

### *Data collection*

This study adopts the web-based field survey to collect empirical data. The targeted subjects of this study are online users who have a full-time job and internet access in the workplace. We first conducted a pilot test with 30 subjects who meet the criteria. The collected data are used to measure the reliability of seven constructs of the questionnaire. The test of reliability showed that six constructs have the Cronbach's  $\alpha$  value higher than the minimum requirement of 0.7 (Table I). This indicates that the indicator items used to measure these six constructs have a fairly good model-wise reliability. Self-esteem construct met the minimum requirement of Cronbach  $\alpha \geq 0.5$  (Guelford, 1965). Therefore, all indicator items designed to measure these seven constructs are retained for the full-scale study.

Company employees who are currently working in the South Taiwan Science Park (STSP) are targeted subjects participating in the full-scale survey. STSP has played a major role for the continuous growth of the industry sectors of integrated circuits (IC), TFT-LCD, and biotechnology in Taiwan since... An online questionnaire had been posted at: <http://140.116.54.177/sal>, a direct link from the homepage of STSP Administration for three weeks, beginning on March 28, 2006. A total of 351 subjects filled out the survey. A total of 277 valid questionnaires were derived after excluding

Internal <i>locus</i> of control	0.7499
Self-esteem	0.6477
Uses and gratifications	0.8967
Internet addiction	0.8088
Internet abuse	0.9394
Internet use policy	0.7857
Electronic monitoring systems	0.8779

Table I.  
Reliability of pre-test  
questionnaire

74 repetitive and invalid ones. The response rate is 79 percent, a fairly large rate to represent the population of STSP.

Table II compares the distribution of the demographics in our study sample to the distribution of all companies as reported in the 2003 Annual Report of the STSP Administration. We did not find a major discrepancy between these two sets of data, with respect to age, the highest degree obtained, age, positions, company size and the average monthly salary of employees. This may be due to the high-participation rate and the concentration of the science park within three industry sectors. The minor demographical difference between our sample and the population indicates that the primary data collected in this study is fairly representative of the entire population and can help generalize our findings to the entire population of the STSP.

### *Operationalization of constructs*

Seven variables are used to measure the proposed theoretical framework. They are:

- (1) internet abuse;
- (2) internet addiction;
- (3) *locus* of control;
- (4) self-esteem;
- (5) uses and gratifications;
- (6) perception of the existence of internet use policy; and
- (7) perception of the existence of electronic monitoring systems.

	Number of responses	Percentage	Accumulated percentage
<i>Gender</i>			
Male	286	67.1	67.1
Female	91	32.9	100.0
<i>Educational background</i>			
Junior high and below	1	0.4	0.4
High school	9	3.2	3.6
Two year college	20	7.2	10.8
Four year university	136	49.1	59.9
Master	109	39.4	99.3
PhD	2	0.7	100
<i>Age (years old)</i>			
20-30	227	81.9	81.9
31-40	44	15.9	97.8
41-50	5	1.8	99.6
51-60	1	0.4	100.0
<i>Position</i>			
General manager/vice GM	1	0.4	0.4
Manager and assistants	4	1.4	1.8
	33	11.9	13.7
Department manager and assistants	7	2.5	16.2
Engineer	165	59.6	75.8
Technicians	32	11.6	87.4
Others	35	12.6	100.0

Table II.  
Descriptive statistics of  
the sample

The five-point Likert scale is adopted to measure all these variables. Respondents need to answer questions used to measure the first five variables from “strongly disagree” to “strongly agree” . Answers for questions used to measure the other two variables range from “never” to “always” [1].

Built upon the DSM-IV instrument of the American Psychiatric Association (1994), Young (1996) developed an eight-item diagnostic questionnaire (DQ) to measure the extent of internet addiction of online users with respect to its psychological and pathological symptoms. At least six symptoms were reported in the internet addiction behavior:

- (1) withdrawal;
- (2) tolerance;
- (3) cannot stop;
- (4) conflict;
- (5) longer time; and
- (6) relapse.

These symptoms resemble to pathological symptoms found in addicted gamblers. These gamblers can experience persistent and recurrent compulsive gambling behavior, according to the American Psychiatric Association (1994, p. 615). We adopted Rotter’ s (1966) nine-item scale to measure the *locus* of control variable. Rosenberg’ s (1962) ten-item instrument was used to measure the self-esteem variable. Song *et al.*’ s (2004) 18-item instrument was used to measure the uses and gratification variable. The internet abuse variable was measured using a condensed version of an 11-item scale developed by Mahatanankoon *et al.* (2004). We combined and modified the questionnaires of Straub (1990) and Foltz *et al.* (2005) to develop instruments to measure the variables of perceptions about the existence of internet use policy and of electronic monitoring systems.

## Analysis results

### *Measurement models and validation*

We initially conducted the tests of Cronbach  $\alpha$  and item-to-total correlation for all indicator items used to measure each individual first order construct. This internal consistency test allows us to screen out indicator items that have low correlations with the total scale of their measured construct. This initial test can help ensure a high reliability of the indicator items. The baseline to determine if an original item is included or excluded is that the values of Cronbach  $\alpha$  and item-total correlation need to exceed the recommended values of 0.35 and 0.5, respectively, (Henryson, 1971). In Table III, indicator items (italicized items) that do not meet the threshold are dropped for further consideration.

Confirmatory factor analysis (CFA) was conducted for the remaining indicator items to ensure the adequacy of the measurement model, as well as the composite reliability and discriminant validity (Lichtenstein *et al.*, 1993) (Table IV). The goodness of fit index (GFI) and the adjusted goodness of fit index (AGFI) of the measurement model are 0.871 and 0.844, respectively. These indices implied the adequacy of the measurement model fit (Chatterjee *et al.*, 2002).

Construct	Concept	Indicator	Item-total-correlation	Cronbach $\alpha$
<i>Personality</i>	Locus of control	Per1	0.510	0.803
		<i>Per2</i>	<i>0.433</i>	
		Per3	0.568	
		<i>Per4</i>	<i>0.453</i>	
		Per5	0.481	
		Per6	0.533	
		<i>Per7</i>	<i>0.467</i>	
		Per8	0.567	
		<i>Per9</i>	<i>0.447</i>	
	Self esteem	Per10	0.657	0.850
		Per11	0.650	
		Per12	0.626	
		Per13	0.728	
		Per14	0.637	
<i>Internet uses and gratifications</i>	Virtual community	<i>Ug1</i>	<i>0.452</i>	0.853
		Ug2	0.616	
		Ug3	0.617	
		Ug4	0.535	
		Ug5	0.669	
		Ug6	0.647	
		Ug7	0.656	
		Ug8	0.567	
	Beauty experience	Ug9	0.598	0.855
		Ug10	0.674	
		Ug11	0.685	
		Ug12	0.714	
		Ug13	0.666	
	Entertainment	Ug14	0.636	0.847
		Ug15	0.673	
		Ug16	0.785	
		Ug17	0.644	
	Maintaining relations	Ug18	0.538	0.7
		Ug19	0.538	
<i>Internet addiction</i>	Internet addiction	Add1	0.526	0.829
		<i>Add2</i>	<i>0.455</i>	
		Add3	0.554	
		Add4	0.688	
		<i>Add5</i>	<i>0.391</i>	
		Add6	0.628	
		Add7	0.609	
		Add8	0.587	
		<i>Internet abuse</i>	Shopping and other personal matters	
Abs2	0.644			
Abs3	0.720			
Abs4	0.743			
Searching information	Abs5		0.713	0.918
	Abs6		0.867	
	Abs7		0.880	
	Abs8		0.792	
Interpersonal relationship	<i>Abs9</i>		<i>0.475</i>	0.625

(continued)

Table III.  
Initial item total  
correlations and  
Cronbach  $\alpha$  reliability  
estimates

Construct	Concept	Indicator	Item-total-correlation	Cronbach $\alpha$
<i>Perceptions</i>	Internet use policy	<i>Abs10</i>	0.411	0.821
		<i>Abs11</i>	0.399	
		<i>Pol1</i>	–	
		<i>Pol2</i>	0.345	
		<i>Pol3</i>	0.213	
		<i>Pol4</i>	0.612	
		<i>Pol5</i>	0.635	
		<i>Pol6</i>	0.674	
		<i>Pol7</i>	0.699	
		<i>Pol8</i>	0.589	
	Electronic monitoring systems	<i>Pol9</i>	0.631	
		<i>Pol10</i>	0.181	
		<i>Emo1</i>	–	
		<i>Emo2</i>	0.213	
		<i>Emo3</i>	0.263	
		<i>Emo4</i>	0.680	
		<i>Emo5</i>	0.702	
		<i>Emo6</i>	0.784	
		<i>Emo7</i>	0.774	
		<i>Emo8</i>	0.717	
	<i>Emo9</i>	0.743		
	<i>Emo10</i>	0.210		
			0.856	

Table III.

The composite reliability and discriminant validity are adequate because the root mean square residual values of all remaining items are below the threshold value of 0.05. This indicates that the remaining indicator items can measure most of the variance in the latent constructs with insignificant errors (Gefen *et al.*, 2000).

### *Hypotheses testing*

The initial structure equation model was derived from the CFA (Figure 2) for further structural modeling analysis. This analysis method permits simultaneous examinations of a network of constructs, including direct and mediating constructs. In order to apply this method correctly, it needs to meet the minimum sample size of 15 cases per measured variable (Bentler and Chou, 1987). Our proposed theoretical model includes seven variables. Sample size needs to have at least 105 subjects in order to meet the assumption of SEM. We have 277 subjects used in the analysis. Meeting the assumption permits us to proceed to SEM testing.

The test results indicate a strong positive relationship between the constructs of external *locus* of control and internet addiction (0.331;  $p \leq 0.000 < 0.01$ ) (Figure 2). This statistical evidence provides strong support for *H1*. Self-esteem also has a strong negative relationship between the constructs of self-esteem and internet addiction (0.20161;  $p \leq 0.044 < 0.05$ ). *H2* is also supported. The constructs of uses and gratifications and internet addiction do not have strong positive or negative relationship (0.013;  $p \leq 0.864$ ). *H3* is not supported. The statistical results confirm the existence of the hypothesized positive relationship between internet addiction and internet abuse (0.202;  $p \leq 0.007 < 0.01$ ). This provides strong support for *H5*.

CFA	Deleted item	CMIN	Degrees of freedom	P-value	CMIN/df	RMR	GFI	AGFI
Initial		3,366.849	1,359	0.000	2.477	0.06	0.648	0.616
Rev.1	Ug5	3,158.628	1,307	0.000	2.417	0.059	0.666	0.634
Rev.2	Ug6	2,941.652	1,256	0.000	2.342	0.056	0.687	0.656
Rev.3	Ug7	2,752.566	1,206	0.000	2.282	0.054	0.704	0.674
Rev.4	Ug18	2,578.860	1,157	0.000	2.229	0.053	0.713	0.684
Rev.5	Ug3	2,408.232	1,108	0.000	2.145	0.052	0.727	0.698
Rev.6	Ug2	2,276.036	1,061	0.000	2.145	0.052	0.735	0.706
Rev.7	Po14	2,099.061	1,015	0.000	2.068	0.049	0.746	0.718
Rev.8	Ug8	2,016.437	970	0.000	2.0079	0.046	0.750	0.721
Rev.9	Ug16	1,772.304	926	0.000	1.914	0.046	0.777	0.751
Rev.10	Ug15	1,649.703	883	0.000	1.873	0.0443	0.788	0.762
Rev.11	Ug19	1,574.838	841	0.000	1.873	0.044	0.790	0.764
Rev.12	Ug17	1,473.890	800	0.000	1.842	0.043	0.797	0.771
Rev.13	Per1	1,412.569	760	0.000	1.859	0.044	0.799	0.773
Rev.14	Emo5	1,274.830	721	0.000	1.768	0.043	0.814	0.788
Rev.15	Abs3	1,170.315	683	0.000	1.713	0.042	0.823	0.798
Rev.16	Per3	1,119.635	646	0.000	1.733	0.042	0.825	0.719
Rev.17	Per10	1,027.992	610	0.000	1.685	0.042	0.835	0.810
Rev.18	Emo4	965.619	574	0.000	1.682	0.049	0.840	0.815
Rev.19	Abs1	892.622	540	0.000	1.653	0.039	0.845	0.819
Rev.20	Per8	832.976	507	0.000	1.643	0.039	0.849	0.823
Rev.21	Abs2	774.129	475	0.000	1.630	0.037	0.856	0.830
Rev.22	Abs6	727.567	444	0.000	1.639	0.037	0.860	0.834
Rev.23	Ug9	667.316	414	0.000	1.612	0.036	0.867	0.841
Final	Ug11	625.799	385	0.000	1.625	0.036	0.871	0.844

Table IV.  
CFA results for the remaining indicator items

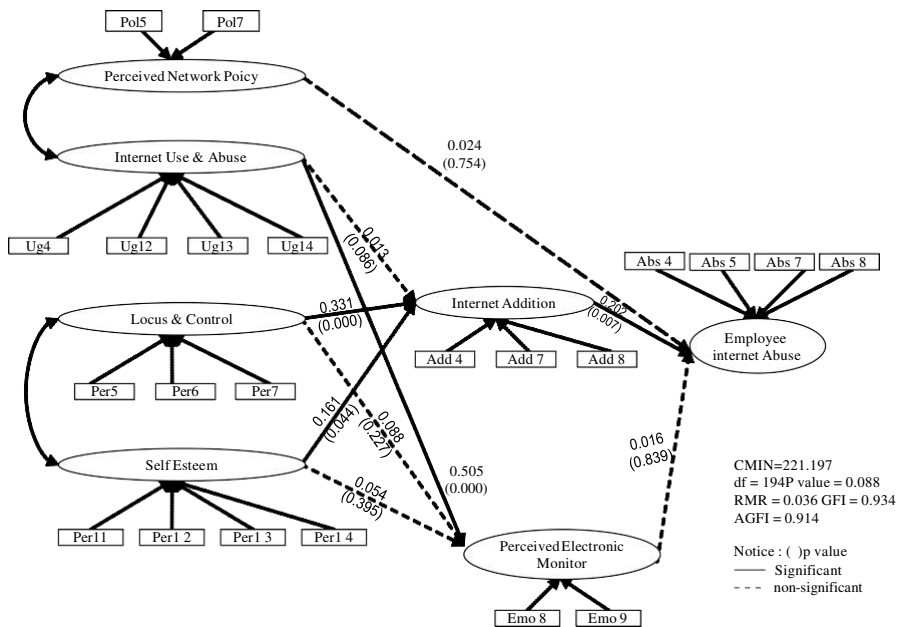


Figure 2.  
Test results of structural modeling analysis

The positive relationships between the perception of the existence of internet use policy and internet abuse (0.024;  $p \leq 0.754$ ), and between the perception of the existence of electronic monitoring systems and internet abuse (0.013;  $p \leq 0.864$ ) are not confirmed statistically. This results in the rejection of *H6* and *H7*. Testing results of all hypotheses are summarized in Tables V and VI.

### Discussions and conclusion

Internet addiction can lead to internet abuse, which not only can devastate an individual's life but also destroy an organization's goodwill. An increasingly number of reports is released to aware the management of the negative effects of internet addiction and internet abuse on the normal operation of an organization. Some organizations are even proactively formulating internet use policy and adopting electronic monitoring systems to dissuade and prevent the occurrences of internet abuse from happening. Many studies have supported this argument that artifacts, such as internet use policy and electronic monitoring systems, can effectively mitigate, prevent or deter internet addiction problems (Straub *et al.*, 1993; Greenfield and Davis, 2002; Fitzpatrick and Burke, 2003). However, the widely adopted practice does not guarantee the effectiveness of these artifacts. Lichtash (2004) examines an array of arbitration and court decisions and discovers most disordered behaviors of using the e-mail in the workplace are the

Table V.  
The statistics of overall model fit

Fit statistics	Threshold	Testing results	Fit (yes/no)
<i>P</i> -value	≤ 0.05	0.088	Yes
CMIN/DF	≤ 2	1.140 (221.197/194)	Yes
RMR	≤ 0.05	0.036	Yes
GFI	≥ 0.9	0.934	Yes
AGFI	≥ 0.9	0.914	Yes
NFI	≥ 0.9	0.909	Yes
CFI	≥ 0.9	0.988	Yes
RMSEA	≤ 0.05	0.023	Yes

Table VI.  
Summary results of hypotheses testing

Hypothesis	Testing results
<i>H1</i> . Online users with a higher degree of external <i>locus</i> control are more likely addicted to the use of internet activities	Supported
<i>H2</i> . Low self-esteem online users are easier addicted to the internet than high self-esteem online users	Supported
<i>H3</i> . The degree of gratifications can lead to the internet addiction	Rejected
<i>H4</i> . A higher degree of internet addiction can lead to a higher degree of internet abuse	Supported
<i>H5</i> . A higher perception of the existence of internet use policy at work, the less likely an online user will commit the internet abuse behavior	Rejected
<i>H6</i> . A higher perception of the existence of e-monitoring systems at work, the less likely an online user will commit the internet abuse behavior	Rejected

result of unclear internet use policy or lack of communication about the existence of electronic monitoring systems. Humans are the weakest link in the control of internet use. Employees with a higher degree of awareness of the existence of internet use policy are least likely to have internet abuse problems (Foltz *et al.*, 2005). One effective preventive measure is to create a security-aware culture by educating staff about risks and symptoms of internet abuse and their responsibilities. An effective training program to improve the awareness of internet use in the workplace can pre-install employees with adequate knowledge to evaluate adverse consequences of internet abuse problems. The management can take appropriate actions to correct errors, should internet misuse problems surface. The management needs to understand that these artifacts cannot become effective tools unless they are adequately managed and translated into the improvement of awareness or perception of their values.

The internet is becoming an important source for online users to seek process, content or social gratifications. Process and content gratifications are not strong predictors for internet addiction and abuse of online users based on the findings of this study. Although not used as an independent variable, social gratifications could be a better indicator for the tendency of addicting and abusing the internet. Social gratifications differ from the other two kinds of gratifications in their “interactivity” with other parties on the internet. The interactivity is about the degree to which online users depend on each other or can exchange roles in the communication process (Williams *et al.*, 1988). The communication media with a high degree of interactivity is more likely to satisfy and retain users (Rayburn *et al.*, 1996). Therefore, it is reasonable to presume that social gratification is a more pertinent element than process and content gratifications to get an online users addicted. The future study may want to explore the relationship between social gratification and internet addiction.

External *locus* of control and self-esteem are two personality traits that are strong predictors for the internet addiction tendency of an employee in the workplace. Employees who have a high-external *locus* of control are most likely to be influenced by the external environment, such as the internet environment. As a result, employees are more likely to get addicted to the internet in the workplace (Chak and Leung, 2004). Employees with LSE often resort to the internet for their psychological and pathological needs. As a result, these employees are more likely to spend more money, or more time on the internet than those employees with HSE. This finding is consistent with other studies (Young, 1998a, b; Young and Rogers, 1998; Armstrong *et al.*, 2000). Companies aiming to lower internet addiction behavior should not only address policies and technical aspects of the work environment, but also should see if it is possible to hire employees with the personality traits of internal *locus* control and HSE. These preventive measures are often more effective than reactive measures after internet addiction behaviors are spotted in the workplace.

Without proper control, employees with internet addiction problems can display disturbed patterns of internet use. Employees with serious internet abuse problems can show many disorders, including depression, sexual disorders, or loneliness. These problems can carry over to the workplace and result in a lowered productivity of employees in the workplace. In the worse case scenarios, some internet abuse problems, including pornography, gambling, online auctions, chat rooms and blogging, can create corporate liability with illegal activities and potential lawsuits. For example, a Delta Airline flight attendant posed her own sexual pictures in



company uniform in a blogging site (Ashmore and Herman, 2006). Officers in the Camden County distributed sexually explicit e-mails during work time and received an allegation (Colimore, 2006). Our findings corroborate with Stanton's (2002) study that employees who have trouble with internet addiction are more likely to become the victims of internet abuse problems. Internet addiction and abuse problems can cost tangible (e.g. lowered bandwidth, unproductive hours) and intangible loss (e.g. lost productivity, virus and spyware infection, and poor service quality) to a company. It is imperative to prevent employees with internet addiction problems from becoming the ones with internet abuse problems.

### Limitations and future research

There are several limitations to be acknowledged. First of all, this is a cross section survey study which is hard to know how much the real effects are reflected to employees' perspective answers. It would be interesting to find employees' reactions through some field experiment method. Secondly, this study does not take the differences of industries into account. It uses the subjects from a science park where hi-tech industry is the only dominant force. Different industries may have different characteristics which result in different internet usage time among employees. Thirdly, this research does not consider the impacts from different roles that employees play. It is possible that employees' perceptions of internet abuse may be different because of their jobs or titles. For example, employees with higher titles may look at this issue more from managerial considerations which could be opposite to those of the operational employees. Fourth, this study discusses the perceived electronic monitoring facility not privacy concerns. It is, however, privacy concerns that grab attentions from industry and academia. Lastly, because of the controversial issue of this research, respondents were reluctant to participate in this study which might have impacted to the representative ness of collected data.

Future research may be conducted to further extend this study through improving the above limitations. Following studies using field experiment may well-provide solutions to the first three limitations given that employee/employer's concerns can be addressed. The second limitation mentioned above can be improved by taking small and medium enterprises (SME) into account. It is particularly important to those countries that are known for their SME industry. A future study base on this validated model may provide another insight to employers of SME caring about IT implementation in their work environment (Wong and Lu, 1995; Subrahmanya, 2005; Wickramansinghe and Sharma, 2005).

As the fourth limitation stated it is privacy concerns not perceived electronic monitoring that people care, another research line is the exploration of privacy concerns in electronic monitoring workplace together with the consideration of internet abuse and addiction. Researchers have studied the privacy issues (Choi *et al.*, 2005) or related issue - trust (Ross *et al.*, 2007), but not much in the realistic mixture of the internet abuse and addiction issues together with privacy concerns of nowadays panoptic work environment.

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#### Note

1. As the long questionnaire would take too much space, questions are not provided in this paper. However, the corresponding author would be more than happy to provide it upon request.

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