

Explaining Non-Work-Related Computing in the Workplace: A Comparison of Alternative Models

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Abstract

Our study was initiated to provide a better understanding of the factors influencing employees' non-work-related computing (NWRC) behavior by comparing two models, one based on Triandis' Theory of Interpersonal Behavior (TIB) and the other derived from the Theory of Planned Behavior (TPB). Results of the study showed that the TIB-based model had higher explanatory power than the TPB-based model. Specifically, affect, social factors, and perceived consequences significantly influenced employees' intention to engage in NWRC, while intention to engage in it, habit, and facilitating conditions determined employees' NWRC behavior. Implications of these findings are discussed.

Keywords: Non-Work-Related Computing; Theory of Interpersonal Behavior; Theory of Planned Behavior

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1. Introduction

Organizations are increasingly using the Internet as a means of meeting their business needs. Consequently, access for employees has become commonplace. But despite its myriad uses, a pervasive problem is associated with its use: non-work-related computing (NWRC) of employees [12]. It has been defined as employees' use of the Internet in their workplace for personal purposes [7]. NWRC increases an organizations' exposure to security risk and legal liability. For example, a survey has shown that misuse of e-mail and web browsing facilities constitute a significant cause of IS security incidents in organizations [17]. Use of an organization's Internet facilities to download inappropriate materials (e.g., pirated software, pornographic content, etc.) not only expose the organization to security risks but may also result in adverse legal action. NWRC may also clog enterprise networks, resulting in slower access and lower productivity for legitimate business users. Considering the negative impacts of NWRC on IS security and organizational performance, it is important to identify and understand the factors related to such employee behavior. This can also help in crafting effective measures for coping with NWRC behavior.

Past studies suggest that setting up appropriate Internet use policies (IUP) [18] and monitoring employees' adherence to them through technical means [15] are effective in deterring NWRC. However, monitoring employees' computer usage can adversely affect their privacy perception and job satisfaction and consequently reduce productivity and result in union activity [22]. This suggests a need to find less intrusive measures for preventing and deterring NWRC. To this end, we proposed a research model based on Triandis' Theory of Interpersonal Behavior (TIB) [21], which identified social, psychological, and organizational factors affecting employees' NWRC intention and behavior. Investigating the phenomenon from these angles allowed us to formulate a way to help employees manage their NWRC intentions before they take any action, in addition to curbing their NWRC behavior.

Several studies have applied the Theory of Planned Behavior (TPB) [1] to explain individuals' NWRC in the workplace. TPB is similar to TIB: both are cognitive models attempting to explain how individuals' attitude and social norms influence their intentions to act in particular ways and they have successfully predicted different human behaviors in a variety of situations. However, TIB theorizes that, in addition to the constructs in TPB, habit and affect (emotions) are also significant aspects that need to be considered in modeling human intention formation and behavior. In the context of NWRC, habit and affect are likely to be relevant also. By virtue of the Internet's characteristics as a worldwide, publicly accessible, and interconnected network of computers, individuals who use it in their personal life for activities such as reading news, trading stocks, and viewing videos will naturally find it convenient to use it in their workplace for similar personal purposes. Repetition of such behavior may eventually lead to formation of NWRC habit. Indeed, habit has been found to be significantly related to Internet usage in general [10] and it is thus reasonable to expect that habit will also influence NWRC behavior. The concept of affect is also likely to be relevant in the context of NWRC, as the Internet provides a wide variety of information and experiences, including those related to leisure and entertainment that are intended to trigger emotions in viewers. Therefore, TIB seems to have value over TPB in improving understanding of NWRC. To assess this empirically and investigate the antecedents of employees' NWRC intentions and behaviors, we studied both models and validated them with data collected in a survey of employees provided with Internet access in their workplace. The explanatory power of both models was then assessed and compared.

2. Conceptual Background

Theory of Planned Behavior (TPB)

TPB provides explanations of informational and motivational influences on behavior. It is

a deliberative processing model that implies that individuals make behavioral decisions based on careful consideration of available information. TPB posits that human behavior is preceded by intention formation and that intention is determined by individuals' attitude (general feeling of favorableness) towards a behavior, subjective norm (perception that most people who are important to him/her think that he/she should perform the behavior), and perceived behavioral control (perception of his/her control over performing the behavior) (see Figure 1).

<Insert Figure 1 here>

Following an expectancy-value conceptualization [16], *attitude* is the result of an individual's perceived likelihood that performance of the focal behavior will lead to a particular outcome and his/her evaluation of that outcome. The expectancy-value products are then summed over various consequences to represent an overall attitude. *Subjective norm* is the result of an individual's subjective likelihood that specific group or individual thinks he/she should perform the behavior, and the individual's motivation to comply; the products are summed to form an overall subjective norm. *Perceived behavioral control* is the result of an individual's perceived likelihood of access to necessary resources or opportunity to successfully perform the behavior and the perceived importance of each facilitating (or inhibiting) factor; the products are then summed across all factors to represent the overall perceived behavior control.

Theory of Interpersonal Behavior (TIB)

According to TIB, individuals' behavior is a function of the strength of habit in performing the behavior, intention to engage in it, and relevant facilitating conditions. Intention, in turn, depends on affect towards performing the behavior, social factors (i.e., perceived appropriateness of the behavior by significant referents), and perceived

consequences of performing the behavior along with their desirability (see Figure 2).

<Insert Figure 2 here>

Comparison of TPB and TIB

TPB and TIB are similar, both include expectancy-value constructs (e.g., *attitude* of TPB and *perceived consequences* of TIB) and normative belief constructs (i.e., *subjective norm* in TPB and *social factors* in TIB), and both recognize that behavior may be subjected to the influence of environmental factors and is not always voluntary. Nevertheless, there are three major differences (see Table 1).

<Insert Table 1 here>

First, TIB posits that, habit will have significant influence on individuals' actual behavior. TIB even argues that for many behaviors, habit may be more important than intention in determining individuals' action.

Second, TPB only considers the cognitive aspect of attitude under the *attitude* construct, while TIB considers both affective and cognitive aspects: the affective aspect is assessed through an *affect* construct, while the cognitive aspect is assessed through *perceived consequences*. TIB suggests that affective and cognitive aspects of attitude often yield independent information and therefore both should be considered. Also, the *attitude* construct of TPB is defined similarly to the *perceived consequences* construct of TIB -- both are concerned with expected outcome.

Third, while *perceived behavioral control* of TPB and *facilitating conditions* of TIB are almost equivalent in definition, TPB posits that perceived behavioral control predicts individuals' intention and can be used to predict behavior only to the extent that it reflects actual behavioral control accurately, and TIB posits that facilitating conditions influence behavior directly rather than through intention, because even when one has developed intention to perform an act, it may not be executed unless the environment supports it. Thus

in conceptualizing environmental influence, TPB focuses on individuals' subjective perception while TIB focuses on actual controls that exist. However, both conceptualizations are likely to be closely related because individuals' perception of behavioral controls will be strongly influenced by what actually exists.

In sum, TIB includes all constructs proposed in TPB and suggests that two additional constructs (habit and affect) are important in understanding social behavior. Although TPB has been applied widely in understanding various illegal and unethical behaviors [11] and several meta analyses have supported its strong predictive power [19], TIB may be able to provide better understanding in contexts where habit and affect come into play. Therefore, we expected TIB to perform at least as well as TPB in explaining and predicting employees' NWRC behavior.

3. Research Models and Hypotheses

In our study, the behavior of interest was NWRC: employees' use of the Internet in their workplace for personal purposes. Figure 3 presents the research model based on TIB. It consisted of seven constructs (affect, social factors, perceived consequences, habit, facilitating conditions, intention, and behavior). Figure 4 shows the research model based on TPB, with corresponding TIB constructs shown in parentheses. For ease of interpretation, all constructs in the proposed models were considered to relate positively (e.g., perceived consequences referred to desirable consequences of NWRC).

<Insert Figure 3 here>

<Insert Figure 4 here>

Affect

In TIB, affect refers to individuals' emotion of joy, elation, pleasure, depression, distaste, discontentment, or hatred experienced from or of a behavior. When individuals felt that using the Internet for non-work-related purposes was enjoyable, they would naturally want to do so

to experience pleasure. In the context of Internet usage, past studies (e.g., [2]) found that affect was significant in predicting usage intention. Hence, we hypothesized:

T1: There is a positive relationship between employees' affect towards NWRC and their intention to use the Internet for NWRC.

Social Factors

Social factors involve individuals' internalization of the reference groups' subjective beliefs with respect to NWRC. When individuals' key social referents seem to approve of NWRC (e.g., by engaging in NWRC themselves), people may feel justified in doing similarly. The relationship between social factors and intention to use the Internet has been found to be significant. In the context of NWRC, studies have shown that supportive peer culture and evaluation towards the behavior increased NWRC in organizations. Therefore, we hypothesized that:

T2: There is a positive relationship between social factors and employees' intention to use the Internet for NWRC.

Since the social factors construct is conceptually similar to *subjective norm* of TPB, we also hypothesized:

A2: There is a positive relationship between subjective norm and employees' intention to use the Internet for NWRC.

Perceived Consequences

According to TIB, an act is perceived as having potential outcomes that have either positive or negative value, together with the probability of occurrence of each outcome. The concept of perceived consequences is consistent with the expectancy theory of motivation [24]. When NWRC is perceived as having positive outcomes (e.g., saving time and money) individuals will be motivated to perform the act to reap the benefits. In contrast, when NWRC is seen as having negative consequences such as lower work productivity, individuals

are less likely to want to engage in the behavior. Therefore, we hypothesized:

T3: There is a positive relationship between (desirable) perceived consequences of NWRC and employees' intention to use the Internet for NWRC.

As the construct of perceived consequences in TIB is defined similarly to that construct of attitude in TPB, we also tested the hypothesis in TPB terms:

A1: There is a positive relationship between employees' (positive) attitude towards NWRC and their intention to use the Internet for NWRC.

Habit

In TIB, habit refers to situation-behavior sequences that are or have become automatic in response to specific cues in the environment. When individuals have formed the habit of using the Internet for NWRC, its performance requires minimal deliberation effort and individuals can enjoy the pleasure derived from the activity itself. Hence, we hypothesized:

T4a: There is a positive relationship between employees' habit of using the Internet for NWRC and their level of affect towards NWRC.

Past studies have found that habit is a predictor of future behavior (e.g., [4]), including Internet usage and individuals feel a natural urge to perform the act when opportunities arise. Hence, we expect habit to influence NWRC behavior directly and we postulated:

T4b: There is a positive relationship between employees' habit of using the Internet for NWRC and their NWRC behavior.

Intention

TIB defined intention to be a conscious plan to carry out a behavior. It includes a subjective probability dimension linking individuals to a behavior and indicates how much effort individuals are willing to invest to engage in it. Since the intention and behavior constructs in TIB and TPB are named and defined similarly, the hypothesis relating intention and behavior in both models was hypothesized as:

T5 and A4: There is a positive relationship between employees' intention to use the Internet for NWRC and their NWRC behavior.

Facilitating Conditions

TIB defined facilitating conditions as factors in individuals' environment that make a behavior easy to perform. Thus individuals who have the intention of carrying out NWRC may not be able to do so if their environment prevents it. Facilitating conditions may be considered as having two dimensions [9]: situational (helpful external conditions, right settings, or access to resources) and internal (self-efficacy) which are harder to manipulate. An individual's self-efficacy involves both an individual's skills and the judgment of what he/she can do with them. We hypothesize that:

T6: There is a positive relationship between facilitating conditions and employees' NWRC behavior.

The facilitating conditions construct in TIB is similar to the perceived behavioral control construct in TPB. Hence, we also hypothesized:

A3: There is a positive relationship between perceived behavioral control and employees' intention to use the Internet for NWRC.

A5: There is a positive relationship between perceived behavioral control and employees' NWRC behavior.

4. Methodology

The research models were assessed empirically with data collected from a survey. The step-by-step procedure recommended by Churchill [3] was used to develop the instrument for our study. The survey instrument is given in the Appendix. Most items were measured using seven-point Likert scales with suitable labels for the middle and end points of the scales.

Construct Operationalization

Specifying the domain of each construct was achieved through a review of the literature. We gathered items from past studies that have developed measures for similar constructs. For example, to measure NWRC behavior, we adapted the items from Thompson et al.'s [20] scale of personal computer utilization. For constructs with fixed content (e.g., affect, intention), the primary question was not *what* to measure, but *how* to measure it in our context and population. In contrast, for items measuring constructs with variable content (e.g., social factors, perceived consequences, facilitating conditions), the content depended on the type of behavior and population being examined and it was thus necessary to consult a sample of experts.

Pretest Interview

To refine the instrument, we conducted interviews with 3 experienced observers of NWRC to assess the face and content validities of the proposed instrument. During the interviews, participants' were invited to comment on the content, relevance, and wording of items measuring each of the constructs. The belief elicitation process was also used to identify additional items for constructs with variable content [6]. For example, in the context of NWRC, situational facilitating conditions included the existence of IUP (Appendix, item FC4), which served as a written recommendation of appropriate behavior where compliance was voluntary/volitional and did not involve physical blocking of websites. In contrast, access to physical resources such as computer hardware (Appendix, item FC8) was a physical limitation that could directly impede employees' NWRC activity, even when intention was high. An example of internal facilitating conditions was employees' ability to use the Internet (Appendix, item FC7), which was also a physical limitation that could directly impede NWRC behavior. Open-ended questions (see Table 2) about these constructs in the context of NWRC were posed. The instrument was then refined to incorporate the comments and suggestions.

<Insert Table 2 here>

Assessment of Conceptual Validity

As an initial assessment of the conceptual validity of the instrument, two rounds of sorting routine proposed by Moore and Benbasat [14] were carried out. In each round, four judges were invited to sort the items into categories and the placement was compared with the proposed constructs and corresponding items. In the final round, the inter-judge raw agreement scores averaged 0.95, Kappa scores averaged 0.93, and average overall placement ratio of items within the target constructs was 0.95. These values indicate that the instrument possesses satisfactory conceptual validity, with high potential for good reliability.

Data Collection

We collected data from employees who were taking part-time post-graduate computing courses in a large tertiary institution as well as employees from various organizations in the IT and logistics industries. We chose the sample so that it consisted of professionals who used the Internet for their work yet the work was well defined and thus NWRC could be distinguished. Responses from the post-graduates were gathered in various survey sessions at the institution. Other respondents self administered the survey in their respective workplaces. The survey package contained a cover letter that explained the purpose of the study and ensured the confidentiality and anonymity of all responses. Out of the total of 288 surveys distributed, 239 were returned, with an overall response rate of 83%. Out of the 239 responses collected, 25 incomplete responses were eliminated, leaving 214 responses for data analysis. We tested to see if there was any difference between those who attended a survey session and those who self administered the survey by comparing the means of responses of the two samples using T-tests. No significant difference was found (at 0.05 level) between the two groups and the data was thus pooled for further analyses. The demographic profile of respondents is shown in Table 3.

<Insert Table 3 here>

5. Data Analysis and Results

Analysis using Partial Least Squares (PLS), a structural equation modeling (SEM) tool, was conducted to assess the research models and hypotheses. PLS analysis concurrently tested the psychometric properties of each scale used to measure the constructs in the models and analyzed the strength and direction of the relationships among the constructs [5]. Of course, PLS handles both formative and reflective manifest variables that jointly occur in a single structural model. In our study, the constructs *affect*, *habit*, *intention*, and *behavior* were reflective because these constructs were uni-dimensional and exclusion of an item did not alter the meaning of construct. The constructs *social factors*, *perceived consequences*, and *facilitating conditions* were considered formative because each item jointly determined the meaning of a construct and exclusion of an item could alter its meaning. PLS also has less stringent distribution assumptions in that it is a nonparametric calculus. Specifically, PLS-Graph version 3.0 and bootstrap resampling method (100 resamples) were used in our data analysis to assess the measurement and structural models. Bootstrap was selected over Jackknife resampling. While Jackknife requires less computation, it does not perform as well as bootstrap in most cases. For items whose scales are binary (HAB1 and BEH3), the total number of positive responses of the sub-parts was computed to represent individual respondents' score for these items. Subsequently the data was standardized before model testing as per PLS requirements.

Test of Measurement Model

Assessment of the measurement model included evaluation of internal consistency, convergent validity, and discriminant validity of the instrument items. Reflective and formative constructs needed to be treated differently during validation because, unlike reflective constructs, different dimensions of formative constructs are not expected to

demonstrate internal consistency and correlations. To assess the relevance and level of contribution of each item to the formative constructs, we examined the items weights instead.

For reflective constructs, internal consistency was measured using Cronbach's alpha reliability coefficient. All reflective constructs in our models had scores above 0.70. Convergent validity was assessed through item reliability, composite reliability of each scale, and average variance extracted (AVE) for each construct. All reliabilities, item and composite, were well above the recommended level of 0.70 and all AVEs were well above 0.5.

Discriminant validity was assessed using factor analysis and item correlations. Four factors were extracted and Kaiser-Meyer-Olkin measured 0.8 (which is well above the recommended value of 0.5) in factor analysis. All item loadings on stipulated constructs were greater than 0.5 and all eigenvalues were greater than one. The item correlation matrix showed that all the non-diagonal entries (item correlation) did not exceed the diagonal entries (square root of AVE) for all constructs, indicating that measures of each construct correlated more highly with their own items than with items measuring other constructs. Thus, we concluded that the discriminant validity of all scales was adequate.

For formative constructs, absolute value of item weights were examined to determine the relative contribution of items constituting each construct (see Table 4). Results indicated that: friends and IT department were significant social factors in NWRC behavior, and warnings/reprimands, convenience, and decrease in work productivity were the most important consequences of NWRC, as perceived by employees. Also, lack of monitoring and recording of Internet use, lack of productivity measurement, and ability to use the Internet were the main facilitating conditions of employees' NWRC behavior.

<Insert Table 4 here>

Test of Structural Model

Results of structural model analysis for the TIB-based model are presented in Figure 5.

As shown in the diagram, all paths were significant at either 0.01 or 0.001 levels. *Habit* explained 23% of variance in *affect*. *Affect*, *social factors*, and *perceived consequences* explained 57% of the variance in intention. *Intention*, combined with *habit* and *facilitating conditions*, explained 46% of the variance in employees' NWRC behavior.

<Insert Figure 5 here>

Results of structural model analysis for the TPB-based model are presented in Figure 6. Here too, all paths were significant at either 0.01 or 0.001 levels. *Attitude*, *subjective norm*, and *perceived behavioral control* explained 53% of the variance in intention. *Intention*, in turn, combined with *perceived behavioral control* to explain 37% of the variance in NWRC behavior.

<Insert Figure 6 here>

In both models, all relationships were found to be significant in the stipulated direction. Hence, all hypotheses were supported. For a more accurate comparison of TIB and TPB, we also tested a modified TIB-based model that included the link between *facilitating conditions* and *intention*. Results for the modified TIB-based model are shown in Figure 7. The additional relationship (A3) was also significant and the explanatory power for affect and intention improved while it dipped slightly for behavior. This indicated that this relationship (A3) should be considered when studying NWRC behavior. Results of structural model test for all three models are compared in Table 5.

<Insert Figure 7 here>

<Insert Table 5 here>

6. Discussion and Conclusion

We examined the sociological and psychological aspects of employees' use of Internet for NWRC using two attitude-behavior models - TIB and TPB. Results indicated that the TIB-based model (57%) and modified TIB-based model (59%) explained more variance in

intention than the TPB-based model (53%). Similarly, the TIB-based model (46%) and modified TIB-based model (45%) explained more variance in NWRC behavior than the TPB-based model (37%). Also, all paths related to the two additional constructs of *affect* and *habit* in TIB are significant, and the additional relationship between *facilitating conditions* and *intention* in the modified TIB-based model was also significant.

We found *social factors* to be a significant antecedent of employees' NWRC intention (T2). Among various referents, we found that employees' friends and their organizations' IT department were the most important (see Table 4). This suggested that the coverage of security awareness campaigns and communication of IUP should be expanded to employees' friends when possible. IT departments should be clear in communicating their stand with regard to what is acceptable and what is not in Internet usage. Interestingly, immediate supervisors and top management are found to have less influence on employees' NWRC intention than the IT department. This finding can be explained by Weber's theory of Bureaucracy [25], which suggested that legitimate domination in organizations rested on rational grounds and beliefs in the legality of enacted rules which dictate who has rights to issue commands. As NWRC is an IT-related behavior, employees are likely to perceive the IT department as having the rational and legal authority to manage their Internet usage. This indicated that despite common practice, top management and supervisors were not always the most influential advocates of proper Internet usage.

Results also revealed that the *perceived consequences* of NWRC significantly influenced employees' intention to engage in NWRC (T3). Among various consequences, convenience was the most significant benefit of NWRC while warnings/reprimands and decrease in work productivity were the most significant negative outcomes. This finding suggested that, in practice, implementing productivity measurement, where relevant, may be effective in limiting employees' NWRC behavior. Indeed, our findings about *facilitating conditions* also

indicated that existence of productivity measurement had significant negative impact on employees' NWRC behavior. Our findings also showed that warnings or reprimands were significant deterrents against NWRC. This suggested that managers should not hesitate to warn employees found to be engaging in NWRC behavior (especially security-threatening activities). It is also important to enforce these disciplinary actions in a consistent manner.

Facilitating conditions were found to be significantly related to NWRC behavior (T6). In addition to productivity measurement, conditions such as the ability to use the Internet and existence of monitoring and recording of Internet usage have real effect on NWRC behavior. Our results suggested that it is important to make it known to employees that they are being monitored; this also can alleviate negative emotions associated with a feeling of invasion of employee privacy.

As significant relationships exist between *habit* and *behavior*, *habit* and *affect*, *affect* and *intention*, and *intention* to *behavior* (T1, T4a, T4b, T5), it is important to prevent NWRC behavior from becoming habitual by reducing the opportunity of employees abusing their Internet access. A clear message notifying new employees of the organizational policy on use of the Internet could reduce intention to use it for NWRC from the start.

When interpreting our results, it is necessary to consider some of its limitations. One is that some respondents were self selected (thus non-random) and all data was self reported. Due to the largely illicit nature of this behavior, respondents may be unwilling to report the true extent of their NWRC, thus introducing social desirability bias or self-presentation bias.

It is also important to consider the limitations in our analysis due to the use of PLS. In this study, PLS was chosen over LISREL. However, being a variance-based approach that aims to minimize errors to maximize predictive power, loadings in PLS tend to be overestimated and structural paths to be underestimated compared to covariance-based approaches. To minimize the potential bias, a sample of size 214 was used.

Our contributions to theory and practice are three-fold. First, we highlighted the importance of *affect* and *habit* in explaining employees' NWRC behavior. Second, by developing and testing three alternative behavioral models for NWRC intention and behavior, we provided evidence that the TIB-based models had greater explanatory power than the TPB-based model. Third, our results provided practitioners with insight into ways that the problem of NWRC can be adequately managed vis-à-vis employees' privacy. This could help managers to channel their time, effort, and other resources into more effective mechanisms for alleviation of NWRC.

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Appendix

Construct	Item (scale italicized in parenthesis)	Source
Affect (AFF)	I feel that using Internet provided by the organization for non-work related purposes is ... ■ AFF1: (<i>pleasant - unpleasant</i>) ■ AFF2: (<i>boring -interesting</i>) (reversed)	All items adapted from [2]
Social Factors (SF)	■ SF1: My family's ■ SF2: My friends' ■ SF3: My co-workers' ■ SF4: My immediate supervisor's ■ SF5: My IT department's ■ SF6: My top management's ... approval of me using Internet provided by the organization for non-work-related purposes is (<i>Very low - Moderate - Very high</i>).	All items developed from belief elicitation process
Perceived Consequences (PC) Product of perceived likelihood of occurrence (LPC) and perceived severity (SPC)	LPC scale Using Internet provided by the organization for non-work-related purposes will result in ... (<i>Very unlikely - 50% chance - Very likely</i>) ■ LPC1: warnings/reprimands (reversed) ■ LPC2: probation (reversed) ■ LPC3: suspension (reversed) ■ LPC4: expulsion/termination (reversed) ■ LPC5: legal prosecution (reversed) ■ LPC6: my Internet access privileges being restricted by the organization (reversed) ■ LPC7: saving my personal time using private Internet access ■ LPC8: saving my personal expense for using private Internet access ■ LPC9: better quality of access with high-speed connection available ■ LPC10: convenience ■ LPC11: more interesting work life ■ LPC12: decrease in my work productivity (reversed) SPC scale ■ SPC1: Warnings/reprimands (reversed) ■ SPC2: Probation (reversed) ■ SPC3: Suspension (reversed) ■ SPC4: Expulsion/termination (reversed) ■ SPC5: Legal prosecution (reversed) ■ SPC6: Restriction of my Internet access privileges by the organization (reversed) ... as a penalty for using Internet provided by the organization for non-work purposes is (<i>Very lenient - Just right - Very harsh</i>) ■ SPC7: The amount of personal time I can save ■ SPC8: The amount of personal expense I can save ■ SPC9: The increase in quality of Internet access with high-speed connection ■ SPC10: The increase in convenience ■ SPC11: The extent to which my work life become more interesting ■ SPC12: The decrease in work productivity (reversed) ... as a result of using Internet provided by the organization for non-work purposes is (<i>Very little - Moderate - Very much</i>)	All items developed from belief elicitation process
Habit (HAB) Script-based, scores summed to represent habit Habit (HAB) Self-reported	When I need to... ■ HAB1a: send/receive non-work-related email, ■ HAB1b: browse non-work-related websites, ■ HAB1c: download/upload non-work-related file/material, ■ HAB1d: use Internet for personal entertainment, ... [Choose one] ...I will habitually (<i>Use Internet provided by the organization/Use private or other Internet access</i>) ■ HAB2: I had used Internet provided by the organization for non-work-related purposes in the past (<i>Never - Sometimes - Always</i>). ■ HAB3: I think twice before using Internet provided by the organization for non-work-related purposes (<i>Strongly disagree - Neutral - Strongly agree</i>) (reversed). ■ HAB4: I am addicted to using Internet provided by the organization for non-work-related purposes (<i>Strongly disagree - Neutral - Strongly agree</i>).	HAB1 developed based on [23] HAB2-4 adapted from [13]

Construct	Item (scale italicized in parenthesis)	Source
Facilitating Conditions (FC)	<ul style="list-style-type: none"> ▪ FC1: There are security awareness campaigns with regard to Internet use (reversed) ▪ FC2: There are monitoring and recording of Internet usage (reversed) ▪ FC3: There are disciplinary measures with regard to Internet (reversed) ▪ FC4: There is Internet use policy (reversed) ▪ FC5: There is productivity measurement (reversed) ▪ FC6: There is workplace privacy ... in my organization (<i>Never - Sometimes - Very often</i>). ▪ FC7: My ability to use Internet is ▪ FC8: My access to the resources (e.g., computer, modem, etc.) that I would need to use Internet provided by the organization is ... (<i>Very low - Average - Very high</i>) 	<ul style="list-style-type: none"> ▪ FC1-3 adapted from [13] ▪ FC4-5 self-developed ▪ Adapted from [7] ▪ FC7-8 adapted from [8]
Intention (INT)	<ul style="list-style-type: none"> ▪ INT1: I intend to use Internet provided by the organization for non-work-related purposes in the future (<i>Strongly disagree - Neutral - Strongly agree</i>) ▪ INT2: I will use Internet provided by the organization for non-work-related purposes in the future (<i>Very unlikely - 50% chance - Very likely</i>) ▪ INT3: I expect to use Internet provided by the organization for non-work-related purposes in the future (<i>Strongly disagree - Neutral - Strongly agree</i>) 	All items adapted from [13]
<p data-bbox="177 831 384 965">Behavior (BEH) Self-reported</p> <p data-bbox="177 965 384 1534">Behavior (BEH) Variety of use, score summed to represent item BEH3</p>	<p data-bbox="384 831 1238 965">I use Internet provided by the organization for non-work-related purposes for about ...</p> <ul style="list-style-type: none"> ▪ BEH1: _____ hours a day. ▪ BEH2: _____ times per week. <p data-bbox="384 965 1238 1534">I use Internet provided by the organization for ... (Yes/No)</p> <ul style="list-style-type: none"> ▪ BEH3a: personal communication, including personal email, chat rooms, employment search etc. ▪ BEH3b: personal shopping (not travel related), including purchasing products, browsing classified ads, bidding on auctions etc. ▪ BEH3c: personal entrepreneurship, including selling products on-line or selling items on auction sites etc. ▪ BEH3d: personal finance, including making investments, trading stocks, obtaining quotes, investigating stocks, on-line banking, paying bills, income tax preparation etc. ▪ BEH3e: personal news, including headlines, weather, and sports etc. ▪ BEH3f: personal travel, including obtaining information or making reservations for airlines, cars, hotels etc. ▪ BEH3g: non-essential computer maintenance, including non-essential software updates, tinkering with configuration etc. ▪ BEH3h: personal hobbies, including collecting information about personal interests, working for non-business sanctioned clubs or associations, maintaining of content of personal web site etc. ▪ BEH3i: other personal entertainment, including movies, music, computer games, hacking, aimless browsing etc. 	All items adapted from [20]

Figures and Tables

Figure 1. Theory of Planned Behavior

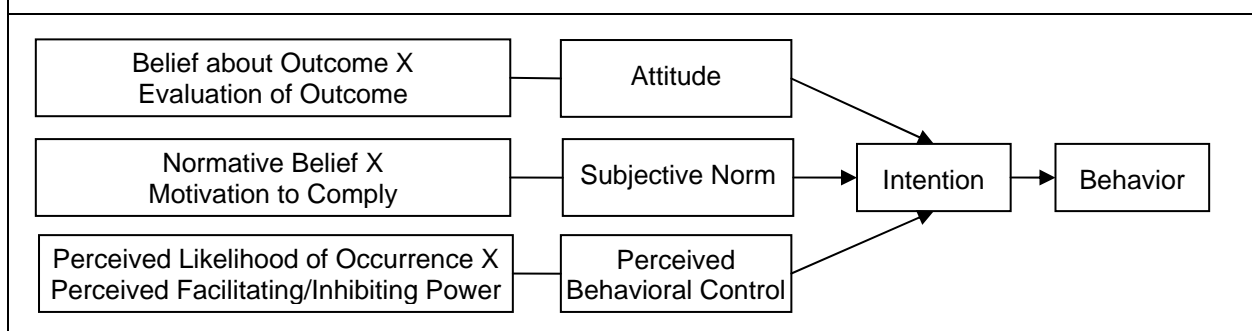


Figure 2. Theory of Interpersonal Behavior

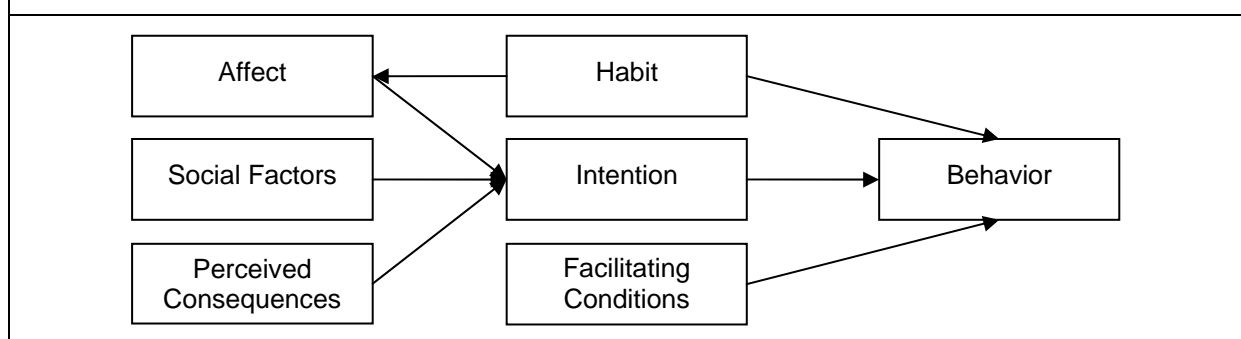


Figure 3. TIB-based Model of Employees' NWRC Behavior

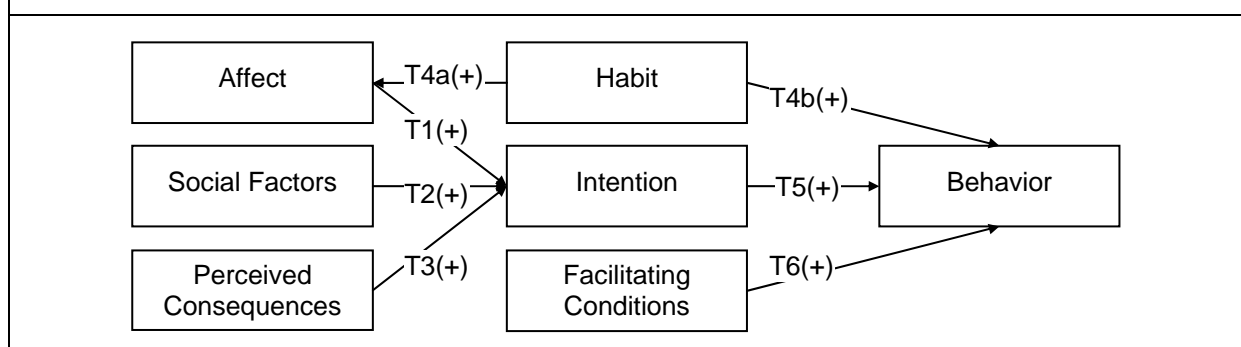


Figure 4. TPB-based Model of Employees' NWRC Behavior (Corresponding TIB construct in parentheses)

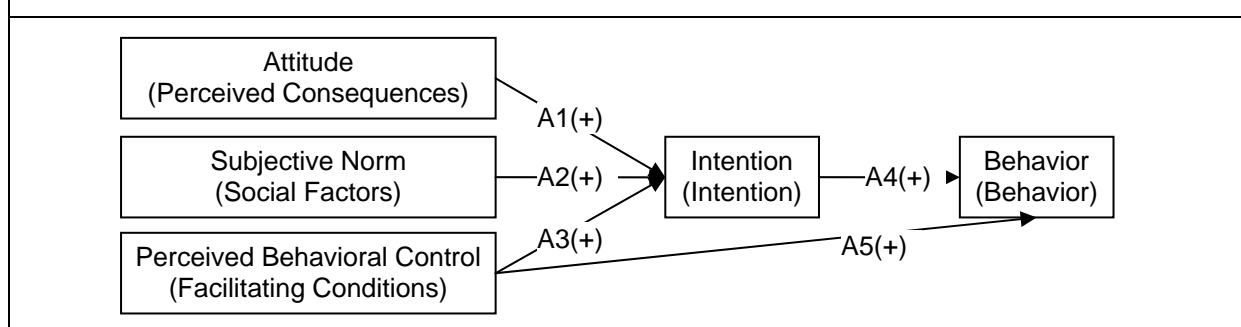
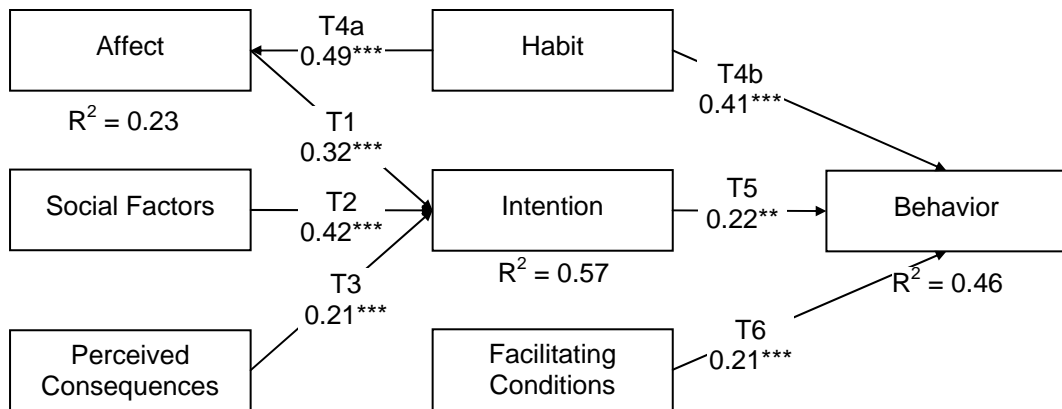
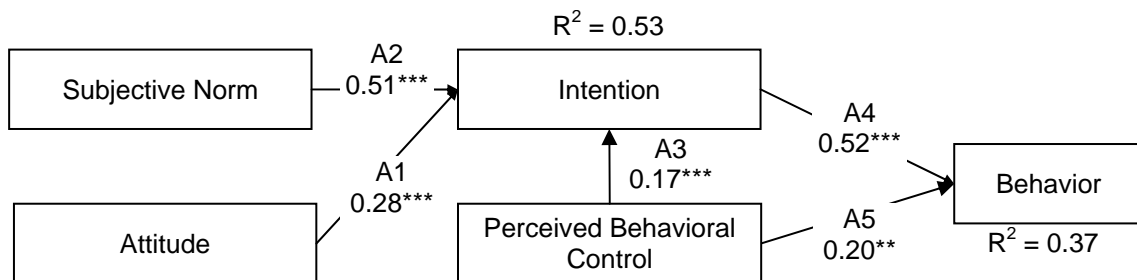


Figure 5. Results of Structural Model Analysis for TIB-based Model



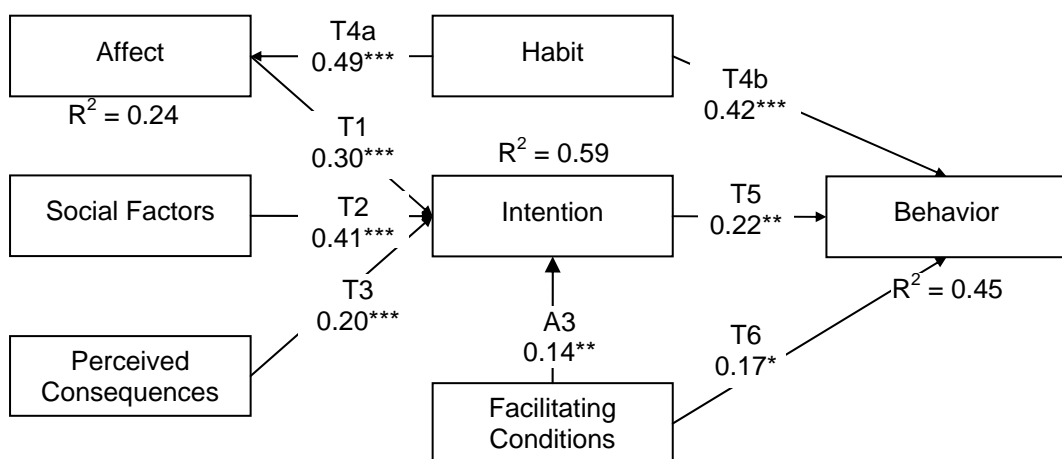
*Significant at $p < 0.05$ (One-tailed T-value: 1.65, df: 208); **Significant at $p < 0.01$ (One-tailed T-value: 2.34); ***Significant at $p < 0.001$ (One-tailed T-value: 3.13)

Figure 6. Results of Structural Model Analysis for TPB-based Model



*Significant at $p < 0.05$ (One-tailed T-value: 1.65, df: 208); **Significant at $p < 0.01$ (One-tailed T-value: 2.34); ***Significant at $p < 0.001$ (One-tailed T-value: 3.13)

Figure 7. Results of Structural Model Analysis for Modified TIB-based Model



*Significant at $p < 0.05$ (One-tailed T-value: 1.65, df: 208); **Significant at $p < 0.01$ (One-tailed T-value: 2.34); ***Significant at $p < 0.001$ (One-tailed T-value: 3.13)

Table 1. Comparison of TPB and TIB	
Construct in TPB	Corresponding Construct in TIB
N.A.	Habit
N.A.	Affect
Attitude	Perceived Consequences
Subjective Norm	Social Factors
Perceived Behavioral Control	Facilitating Conditions
Intention	Intention
Behavior	Behavior

Table 2. Belief Elicitation Questions	
Construct with Variable Content	Belief Elicitation Question
Social Factors (Subjective Norm)	<ul style="list-style-type: none"> - Which other individual or group will support/approve or oppose/disapprove the use of Internet provided in the workplace for non-work-related purposes? - Which other individual or group comes to your mind when you think about using Internet provided in the workplace for non-work-related purposes?
Perceived Consequences (Attitude)	<ul style="list-style-type: none"> - What do you see as the advantages/disadvantages of using Internet provided in the workplace for non-work-related purposes? - What other consequence comes to your mind when you think about using Internet provided in the workplace for non-work-related purposes?
Facilitating Conditions (Perceived Behavioral Control)	<ul style="list-style-type: none"> - What makes it difficult or impossible to use Internet provided in the workplace for non-work-related purposes? - What helps or makes it easier to use Internet provided in the workplace for non-work-related purposes?

Table 3. Demographic Profile					
	Frequency	Percentage		Frequency	Percentage
Age			Organizational Size		
20-24	48	22.4	1 - 9 employees	10	4.7
25-29	96	44.9	10 - 49 employees	37	17.3
30-39	58	27.1	50 - 199 employees	31	14.5
>39	12	5.6	200 - 599 employees	23	10.7
Gender			600 - 1999 employees	37	17.3
Male	147	68.7	2000+ employees	76	35.5
Female	67	31.3	Job Position		
Experience with Computer			Executive/Manager	31	14.4
1 - 9 years	78	36.4	Professional/Technical	175	81.8
10 - 15 years	111	51.9	Sales	4	1.9
16 - 20 years	20	9.3	Clerical	4	1.9
>20 years	5	2.3	Hours of NWRC Per Day		
Experience with Internet			1	105	49.1
1 - 5 years	33	15.4	2	54	25.2
6 - 10 years	169	79.0	3	18	8.4
>10 years	12	5.6	4	12	5.6
Type of Internet Connection			5	2	0.9
Always connected	209	97.7	6	4	1.9
Dial-up	5	2.3	>6	19	8.9

Construct and items	Item weight [#]	Construct and items	Item weight [#]
Social Factors		PC8	0.17
SF1	0.25	PC9	0.04
SF2	0.34*	PC10	0.40*
SF3	0.23	PC11	0.16
SF4	0.12	PC12	-0.38*
SF5	0.30*	Facilitating Conditions	
SF6	0.07	FC1	-0.09
Perceived Consequences		FC2	-0.37*
PC1	-0.56*	FC3	-0.25
PC2	-0.24	FC4	-0.10
PC3	-0.30	FC5	-0.36*
PC4	-0.44	FC6	0.16
PC5	-0.13	FC7	0.90***
PC6	-0.32	FC8	0.09
PC7	0.03		

indicates that the item is significant at *p<0.05 level (one-tailed T-value: 1.65);
p < 0.01 level (one-tailed T-value: 2.34); *p < 0.001 level (one-tailed T-value: 3.13)

TIB	TPB	Hypothesis	TIB		TPB		Modified TIB	
			Path Coefficient	T value	Path Coefficient	T value	Path Coefficient	T value
T1	N.A.	AFF → INT	0.32***	5.50	N.A.	N.A.	0.30***	5.23
T2	A2	SF/SN → INT	0.42***	7.92	0.51***	10.48	0.41***	7.84
T3	A1	PC/ATT → INT	0.21***	3.64	0.28***	4.56	0.20***	3.76
T4a	N.A.	HAB → AFF	0.49***	6.94	N.A.	N.A.	0.49***	6.93
T4b	N.A.	HAB → BEH	0.41***	4.93	N.A.	N.A.	0.42***	4.85
T5	A4	INT → BEH	0.22**	2.82	0.52***	10.15	0.22**	2.66
T6	A5	FC/PBC → BEH	0.21***	3.37	0.20**	2.37	0.17*	2.20
N.A.	A3	FC/PBC → INT	N.A.	N.A.	0.17***	3.54	0.14**	2.66

Path is significant at * p<0.05 level (one-tailed T-value: 1.65); **p < 0.01 level (one-tailed T-value: 2.34); ***p < 0.001 level (one-tailed T-value: 3.13)

Brief Vita

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