

Information Overload Among Professionals in Thailand

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Abstract

Based on previous studies a theoretical model of the effects of personal factors (personality traits and socio-demographic variables) on an individual's perception of information overload is formulated. Using data collected by questionnaire from a sample of 594 individuals employed in organizations in Thailand the model is tested and a parsimonious model is developed using structural equation modeling techniques. The results are interpreted and theoretical and practical conclusions are drawn. Four personality traits (imagination, reserve, complexity, and emotionality) are found to have significant effects on perceptions of overload and based on their significant correlations with the other personal factors four profiles are developed for individuals at risk of experiencing perceptions of overload in their work environment.

Keywords: Perceived information overload, personality traits, socio-demographics.

Introduction

Information overload refers to a situation where there is a mismatch between the amount of information available to an individual and the individual's ability to process the information (Jacoby et al., 1974) and having more information than can be processed leads to dysfunctional consequences (Malhotra, 1984). For decades studies have investigated information overload and closely related constructs referring to: sensory overload (Lindsley, 1959; Bates et al., 1975; Malhotra, 1984); information input overload (Miller, 1960); information fatigue syndrome (McCune, 1998); cognitive overload (Herrod, 2000; Chen, 2003; Mulder, Poot, Verwijns, Janssen, & Bijlsma, 2006); content overload (Himma, 2007); and an overabundance of information (Mundell, 2008). From an objective viewpoint the degree of overload may be operationalized by comparing the amount of information available to an individual and the processing capacity of the individual which is limited by the storage capacity and processing limitations of the human brain (Heylighen, 2002).

A different viewpoint is that the effects of factors external to the individual (task complexity, time pressure, and work interruptions) lead to increases in the amount of information to be processed and symptoms of overload emerge such as stress, sub-optimal decision making, limited use of search and retrieval strategies, and arbitrary approaches to information organization and

analysis which may be used as de facto measures of information overload (Meier, 1963; Speier, Valacich, & Vessey, 1999; Carlson, 2003; Klausegger, Sinkovics, & Zou, 2007). From a subjective viewpoint the degree of information overload is an individual perception and is dependent on personal factors such as personality traits, emotions, feelings, skills, and knowledge rather than simply the amount of information received by the individual (Milford & Perry, 1977; Meyer, 1998; Chen, 2003). Intuitively, this view is supported by the observation that individuals with the same apparent processing capacity may express different perceptions of information overload when confronted with the same amount of information. For example, Bakker (2007) showed that novices experience overload more than experts and Kim et al. (2007) showed that emotional states of health significantly affect an individual's perception of information overload. This study investigates personal factors as causes for overload and adopts the view that the degree of information overload is an individual perception.

It is common to distinguish data (unstructured facts about events, objects, or people) from information (data processed to add specific meaning for users) and knowledge (accumulated information for particular purposes) (Avison & Fitzgerald, 2006). In this study work related information is used to refer to all of the data, information, and knowledge used by individuals in conducting their work duties and it includes numeric, alpha numeric, textual, or graphical types derived from internal or external sources verbally or in hard or soft copy forms which may be pulled by the individual or pushed to the individual. Information overload is believed to occur when the context of the information is unfamiliar to the reader especially if the information is irrelevant, ill-structured, unclear, novel, complex, ambiguous, or intensified (Wang & Lin, 2003; Bakker, 2007; Eppler & Mengis, 2004). From a survey ManageSmarter (2008) reported that 85 percent of respondents agreed that time is wasted on processing vast amounts of irrelevant information in a frustrated effort to be sure that all the relevant information has been found. The situation in the past where sufficient information was not available has changed to a situation where too much information is available for decision making and this change has been accelerated by the Internet and related technologies which have played two different roles in relation to information overload (Reuter Ltd., 1998; Klausegger et al., 2007; Netcraft.com, 2009). Technologies such as email and computer networks have increased the likelihood of overload but databases, data warehouses and marts, groupware, spam-mail filters, and intelligent agents have the potential to reduce overload (Edmunds & Morris, 2000; Baldacchino, Armistead, & Parker, 2002; Ferreira & Antunes, 2008; Gupta, 2008).

From an organizational perspective Burton and Obel (1998) found that highly centralized organizations are often associated with information overload. Bakker (2007) noted that an increased number of communication channels and stronger organizational networks lead to increases in overload and that new employees have a higher need for information than more established members and it is difficult for them to decide on the usefulness of information. The overload problem extends across the organization as information systems and business processes become integrated. Zeldes, Sward, and Louchheim (2007) estimated that workers at Intel Corporation spend up to eight hours a week to deal with information overload and Spira (2009) estimated that in the year 2009 organizations in the United States of America incurred costs of about 900 billion dollars related to information overload.

Against this background, this study aims to determine personal factors which cause individuals to perceive that they are overloaded with work related information. Based on previous studies 16 personality traits and four socio-demographic variables are identified as potential causes for the perception of overload. Data collected by questionnaire is analyzed and used to test the effects of these 20 personal factors on the perception of overload using structural equation modeling (SEM) techniques. The findings are interpreted and compared to those from previous studies and theoretical and practical conclusions are presented.

Research Design and Methodology

A cross-sectional field study design is used in this explanatory study to identify relatively strong effects on dependent variables and measure complex variables when independent variables cannot be manipulated (Boudreau, Gefen, & Straub, 2001; Cook & Campbell, 1979). The target population is individuals who work in organizations in Bangkok and the use of work related information is an important part of their duties. Data was collected using a self administered structured questionnaire based on existing measuring instruments. Data is analyzed using descriptive statistics and SEM techniques.

The questionnaire was developed in the English and Thai languages and both versions were reviewed by a focus group of five individuals from the target population. Minor corrections to language translation were incorporated and then the Thai language version was used in a pilot study with a sample of 10 individuals from the target population. No further modifications were necessary and the Thai language version was used in the full study. The final English language version of the questionnaire is included in the Appendix.

Thailand's Social Security Office and the Civil Service Commission estimate that there are 3.1 million employees in private organizations and 210,000 employees in public organizations in Bangkok. Using 3.3 million as the estimated size of the target population, a confidence level of 0.05, and a precision of 5 percent a minimum sample size of 400 was determined for the study (Tryfos, 1996). Questionnaires were distributed using the Thailand Company Information (2006-2007) directory and a list of Government Departments as sampling frames. A covering letter was included which ensured confidentiality, described the purpose of the study, the profile of suitable respondents, and contact details. The materials were delivered personally and the responses were collected at arranged appointments. In total 900 questionnaires were distributed and 834 were returned.

Review of Related Literature

It is ironical that a Google search using "information overload" returned 7.2 million items. Consequently, this review is focused on previous studies including literature reviews that have drawn attention to the role of personal factors in relation to information overload. This is followed by a discussion of studies related to the specific personal factors included in the theoretical model for this study.

Overview of Previous Studies

The literature review by Edmunds and Morris (2000) covers the period 1950-2000 and addresses the definition of information overload, factors associated with overload, business contexts where overload is likely, and possible solutions to the problems caused by overload. The review by Hall and Walton (2004) covers the period 1976-2004 but is limited to the health profession and overload in a clinical environment. It addresses the definition of information overload and causes and effects of information overload. In both of these reviews it is clear that personal factors are among the potential causes for overload. The most comprehensive review by Eppler and Mengis (2004) covers the period 1970-2003 as well as important earlier studies. Previous studies are identified in the areas of Accounting, Marketing, Organizational Behavior, Management Information System, Library Science, Medical Science, Education, and Business Management with discussion of the definition of overload, causal factors (personal factors, information characteristics, task/process parameters, organizational design, and information technologies), symptoms (limited search and retrieval strategies, arbitrary information organization/analysis, sub-optimal decisions, and signs of stress), and countermeasures which affect the causal factors. A framework of the relationships among these causes, symptoms, and countermeasures is developed and this is used to identify theoretical models for further research.

In addition to these literature reviews the site for the Information Overload Research Group (www.iorgforum.org) provides a comprehensive archive on studies of overload and practical countermeasures. In particular, many studies have focused on the role played by email and the manner in which distractions and interruptions to an individual's work contribute to information overload.

Table 1 identifies a selection of previous studies of information overload which have noted the importance of personal factors. The studies illustrate the range of experimental, field study, and case study designs that have been adopted and the use of quantitative and qualitative methods for data analysis. There are few cross-cultural studies and as noted by Eppler and Mengis (2004) many studies have been exploratory rather than explanatory and there has been more attention paid to the effects, symptoms, and countermeasures than the causes for overload.

Personal Factors

Eppler and Mengis (2004) propose that an individual's information processing capacity is influenced by personal factors such as motivation, attitude, satisfaction, skills, ideology, age, and level of social communication. Kim et al. (2007) found that personal factors related to an individual's mental health have direct effects on the perception of overload and that the perception is stronger for those who are not confident in finding information than for those who believe they can. Bakker (2007) found that the perception of overload tends to be high among individuals who have a low information processing capacity and that an individual's processing capacity varies on the basis of personal factors.

Table 1. An overview of studies of information overload

Study Focus	Unit of Analysis	Data Collection Techniques	References
Explanatory Experimental Designs			
Information input overload and psychopathology	Individuals	Experimental data	Miller (1960)
Effects of information overload on brand choice	Volunteer housewives	Experimental data	Jacoby et al. (1974)
Overload in organizations	Naval aviators	Experimental data	O'Reilly (1980)
Effects of overload on financial decision making	Auditors and accounting students	Experimental data	Chewning and Harrell (1990)
Effects of overload on financial decision making	Volunteers with administrative decision making experience	Experimental data	Iselin (1993)
Philosophical Analysis of the Concept of Information Overload			
Concept of information overload	Published literature on information overload	Analysis of atomic concept and philosophical analysis	Himma (2007)
Exploratory Field and Case Studies			
Effect of overload on consumer decision making	Respondents from cooperative social and religious institutions	Survey questionnaire, interview	Malhotra (1982)
Information overload in marketing management	Managers of marketing departments in German firms	Survey questionnaire	Meyer (1998)
Understanding information overload	Workers in knowledge intensive organization	Questionnaire, interview	Mulder et al. (2006)
Factors affecting information overload	Top level management of multi-cultural company	Interview	Janssen and Poot (2006)
Organizational effects of overload	East-West cross-cultural study of organizations	Survey questionnaire	Klausegger et al. (2007)

Personal factors such as level of education (Heylighen, 2002), age (Stevens, 2008), gender (Griffeth & Allen, 1977), and level of income (Janssen & Poot, 2006) are possible causes for perceptions of overload. Researchers who have proposed that personal factors are causes for information overload indicate that an individual's perception of the degree to which they are overloaded is an appropriate measure of overload (Milford & Perry, 1977).

The personal factors derived from previous studies which are examined in this study as causes for a perception of information overload are organized into two groups of 16 personality traits and four socio-demographic variables (level of education, age, gender, and income).

Personality Traits represent the dynamic and organized set of characteristics of an individual that uniquely influence cognition, motivations, and behaviors (Rychman, 2008). Pervin et al. (2005) noted that personality traits refer to the pattern of ways in which an individual behaves, feels, and

thinks and they reflect the differences between an individual's perceptions and their behavior. A trait describes an individual's typical behavior that is relatively stable over certain periods of time or in certain situations (Burger, 2008). Cattell is recognized as an important personality theorist who is well known for the 16PF (Personality Factors) instrument which was introduced in 1965 and is now in its fifth edition (Ryckman, 2008). The 16 PF model is more detailed than the Five Factors model which is much broader in its measurement of specific traits (Costa & McCrea, 1992). However, the 16PF instrument is a commercial instrument for enterprise, therapist, and psychological research use under the license of IPAT (IPAT.com, 2008) and it is not publicly available. In order to address this availability problem Goldberg et al. (2006) introduced the International Personality Item Pool (IPIP) which is freely available and is consistent with the 16 PF instrument. Consequently, in this study the IPIP instrument was used following the guidance provided at www.ipip.ori.org. Table 2 shows the definitions for the 16 IPIP traits used in this study and their correspondence with the 16PF traits.

Table 2: Personality traits

IPIP Trait	Symbol	Corresponding 16PF Trait	Operational Definition
Warmth	WM	Warmth	The degree to which the individual is attentive to the needs and problems of others.
Intellect	IL	Reasoning Ability	The individual's intellectual ability to analyze, synthesize, evaluate, and communicate.
Emotional Stability	ES	Emotional Stability	The ability of the individual to control their emotions
Assertiveness	AS	Dominance	The degree to which the individual is assertive in relation to others.
Gregariousness	GR	Liveliness	The degree to which the individual is fun loving, cheerful, and amusing.
Dutifulness	DU	Rule-Consciousness	The degree to which the individual respects authority, follows rules, and conforms.
Friendliness	FR	Social Boldness	The individual's ability to form congenial relationships with others.
Sensitivity	SE	Sensitivity	The degree to which the individual is aware of their emotional reactions.
Distrust	DI	Vigilance	The individual's level of distrust and suspicion of others.
Imagination	IM	Abstractedness	The individual's level of unexpected, unusual, imaginative, and absent minded behavior.
Reserve	RE	Privateness	The individual's emphasis on privacy and quietness.
Anxiety	AN	Apprehension	The extent of the individual's worry of guilt, insecurity, self-doubting, and self blaming.
Complexity	CO	Openness to Change	The individual's degree of liberal, analytical, critical and flexible thinking and behavior.
Introversion	IN	Self-Reliance	The degree to which the individual is self sufficient and self centered.
Orderliness	OP	Perfectionism	The degree to which the individual is a perfectionist and seeks order and exactness.
Emotionality	EM	Tension	The degree to which the individual is easily annoyed, aggravated, and made angry.

Socio-Demographic Variables (Level of Education, Age, Gender, and Income) Heylighen (2002) noted that individuals with higher levels of education are more likely to be in senior organizational positions where the nature of the work is more dependent on the use of information and perceptions of overload are more likely to occur. Research findings on the relationship between information overload and the age of an individual are contradictory. Stevens (2008) proposes that older people usually process too much unnecessary information compared to younger individuals and so information overload is more likely to occur among older people. However, Kim et al. (2007) concluded that there is no significant relationship between age and perceptions of information overload. Also, there have been different findings with respect to the role of gender. Griffeth and Allen (1997) found that females tend to be sent less information by their supervisors and thus they experience less information overload than their male counterparts.

However, Speier, Vessey and Valcich (2003) indicated that there is no significant relationship between information overload and gender among decision makers. It is commonly agreed among researchers that individuals with higher incomes are more likely to feel the effects of information overload (Janssen & Poot, 2006; Kim et al., 2007) and this is compatible with the finding that those with higher levels of education are more likely to experience overload.

Theoretical Model

The theoretical model in Figure 1 is derived from the studies discussed in the literature review.

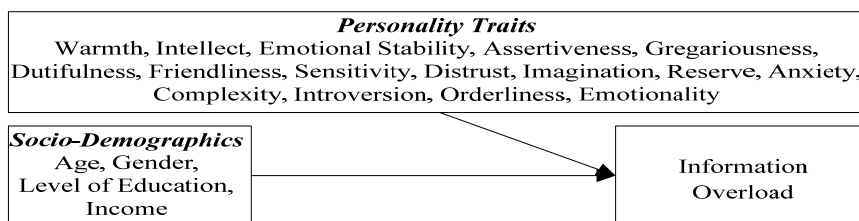


Figure 1. Theoretical model.

In Figure 1 each of the 20 exogenous independent variables is proposed to have a significant direct effect on the independent endogenous variable Information Overload. The details of the measurement of the variables are shown in Table 3 with references to existing measuring instruments that were useful in constructing the questionnaire items.

Table 3. Measurement of variables

Variable (Label)	Definition	Type of Variable	Reference
Personality Traits			
16 Variables (See Table 2)	See Table 2	Latent variables each with 5 indicators measured on 5 point Likert scales and treated as interval scale measures.	Goldberg et al. (2006)
Socio-Demographics			
Age (A)	Age in years.	Measured as ordinal categorical variables converted to single interval scale measures using the mid point of each category.	
Level of Education (E)	An individual's highest level of formal education.		
Income (I)	An individual's monthly income in Thai baht.		
Gender (G)	Male or female.	Nominal categorical variable	
Dependent Variable			
Information Overload (IO)	The extent to which an individual feels overloaded by work related information.	A single interval scale variable measured on a 7 point Likert scale.	Milford and Perry (1977), Meyer (1998), Carlson (2003)

In Table 3 the five indicators used for the 16 personality trait variables were selected from the pool of items developed by Goldberg et al. (2006). These items have been used extensively in previous studies and have been found to have satisfactory construct validity and reliability coefficients ranging from 0.73 to 0.86 (www.ipip.ori.org).

Data Preparation and Preliminary Analyses

Data Preparation

Data from the 834 returned questionnaires was entered into an SPSS worksheet. Ten percent (84) were checked for data entry errors and 4 errors were found and corrected. Table 4 summarizes the results of screening the responses.

Table 4. Summary of screening procedures

Number Distributed	Number Returned (Response Rate)	Number Removed		Total Number Removed	Final Sample Size
		Missing Values or Multiple Responses	Low Importance of Work Related Information		
900	834 (93 percent)	211	29	240	594

In response to “*How important is the use of work related information in your work?*”, 29 selected less than 3 on the 7-point scale which indicated that work related information was not at least reasonably important and so they were removed from the sample. No outliers (i.e. values 3 or more standard deviations from the mean) were found among the distributions of the model variables and the final sample size of 594 exceeds the minimum sample size of 400 determined for the study.

Principal Component factor analysis was used to determine the construct validity for the measures of the indicators for the 16 latent model variables. The output from the factor analysis is shown in Appendix Table A1. Each of the latent variables has satisfactory construct validity with indicators loading significantly (i.e. a loading factor of at least 0.4) onto only their associated latent variable with eigenvalues greater than 1 (Straub, Boudreau, & Gefen, 2004). The internal consistency reliability for the indicators was determined using Cronbach alpha coefficients which are shown in Appendix Table A2 and the reliabilities ranged from good to excellent. Consequently, there was no need to remove any of the indicators for the latent variables.

Appendix Table A3 shows descriptive statistics for the model variables. It is noted that the values of skewness and kurtosis are within the acceptable limits of 3 and 7, respectively, as recommended for the use of maximum likelihood estimation with SEM (Kline, 2005).

Characteristics of Respondents, Organizations, and Use of Work Related Information

From Appendix Table A4 it is seen that the 594 respondents represent 13 different organizational sectors with 68 percent employed across the four sectors Manufacturing/Engineering (22 percent), Banking and Finance (17 percent), Trader/Wholesale/Retailer (15 percent), and ICT (14 percent) with 2-7 percent in each of the other nine sectors. The majority of respondents (85 percent) are employed in the private sector and the public sector organizations include not only Government Ministries/ Departments but also organizations financed by government that operate in areas such as Banking and Finance, Education, Health, and Tourism and Transport. The largest proportion of respondents (47 percent) is from organizations with more than 350 employees and 93 percent of these are from the private sector. Organizations with less than 50, 51-150, and 151-250 employees each account for about 16 percent of all of the respondents Only 7 percent of all respondents are employed in organizations with 251-350 employees.

Respondents from the private sector are employed in larger sized organizations than those from the public sector. The largest proportion of public sector respondents (48 percent) is from organizations with 51-150 employees while for the private sector the largest proportion of respondents (50 percent) is from organizations with more than 350 employees. Furthermore, 72 percent of private sector respondents are from organizations with more than 150 employees compared to only 44 percent of respondents from the public sector.

From Appendix Table A5 it is seen that most of the respondents (78 percent) work in staff positions with 16 percent at the level of manager and above and among these 6 percent are at the levels of Director or Managing Director and Chairman or President. Most of the respondents (90 percent) hold either a bachelor degree (65 percent) or a master degree (25 percent). The average age of the respondents is 33 years and the majority (63 percent) is 25-34 years of age. The average monthly income is 31,000 baht but 66 percent earn less than the average and the majority of this group (65 percent) earns 20,000 baht or less per month. The respondents are mainly female (60 percent).

From Appendix Table A6 it is seen that for the majority of respondents (64 percent) their work duties are strongly dependent on the use of information and that there is extensive use made of each of the types of information (numerical, textual, alpha numerical, and graphical) although numerical and textual types are used to a greater extent than the other types of information. All of the different sources of information (internal and external in either hard/verbal or soft copy form) are used extensively but internal sources in hard/verbal and soft copy forms are used more often than information from external sources in any of these forms.

Preliminary Analyses

T-tests were used to identify statistically significant differences ($p < 0.05$) between males and females among the means of the distributions of the model variables. There are significant differences for only five of the model variables (Income, Intellect, Assertiveness, Imagination, and Introversion). On average the 239 males receive 35,000 baht per month which is 6,000 baht more than the average monthly income for the 355 females and for each of the four personality traits males present these traits more strongly than the females. In particular, there is no significant difference between males and females with respect to Information Overload and because it is not plausible to propose that Gender is a cause for any of the other independent variables in the model Gender may be removed from the theoretical model.

From the statistically significant correlations ($p < 0.05$) in Appendix Table A7 among the characteristics of respondents, organizations, and use of work related information it is seen that there are expected positive correlations among the importance of information, the perception of overload, and the use of all types and sources of information. Also, as expected there are significant positive correlations among age, employment position, income, level of education, and the number of employees in the organization. In organizations with a large (small) number of employees: work related information is more (less) important; the use of numerical and textual information sourced internally in soft copy is greater (smaller); and perceptions of overload are high (low). An individual with a high (low) income uses textual and graphical soft copy information from internal and external sources very often (seldom) while older (younger) individuals seldom (very often) use numerical and alpha numerical soft copy information from internal and external sources.

In Appendix Table A7 there are many statistically significant correlations ($p < 0.05$) among the model variables and these are used in section 7.1 to develop profiles of individuals who are at most or least risk of feeling overloaded. In particular, among the correlations with Information Overload the only statistically significant correlations involve five personality traits (Imagination,

Reserve, Anxiety, Complexity, and Emotionality) and, although correlations do not represent causal effects as proposed in the theoretical model, this does suggest that the other 14 independent variables may not have significant causal effects on Information Overload. However, this is simply noted here as the results of the SEM analysis of the model are presented next.

Model Analysis and Development

The theoretical model (Figure 1) was analyzed using SEM techniques implemented with AMOS 5 following the guidelines by Kline (2005). Figure 2 shows the direct effects from the SEM analysis. **Note:** The effects on Information Overload show: the unstandardized effect and its statistical significance where * and ** represent $p < 0.05$ and $p < 0.01$, respectively; in parentheses the standardized direct effect and its magnitude small (S) or medium (M) (Cohen, 1998).

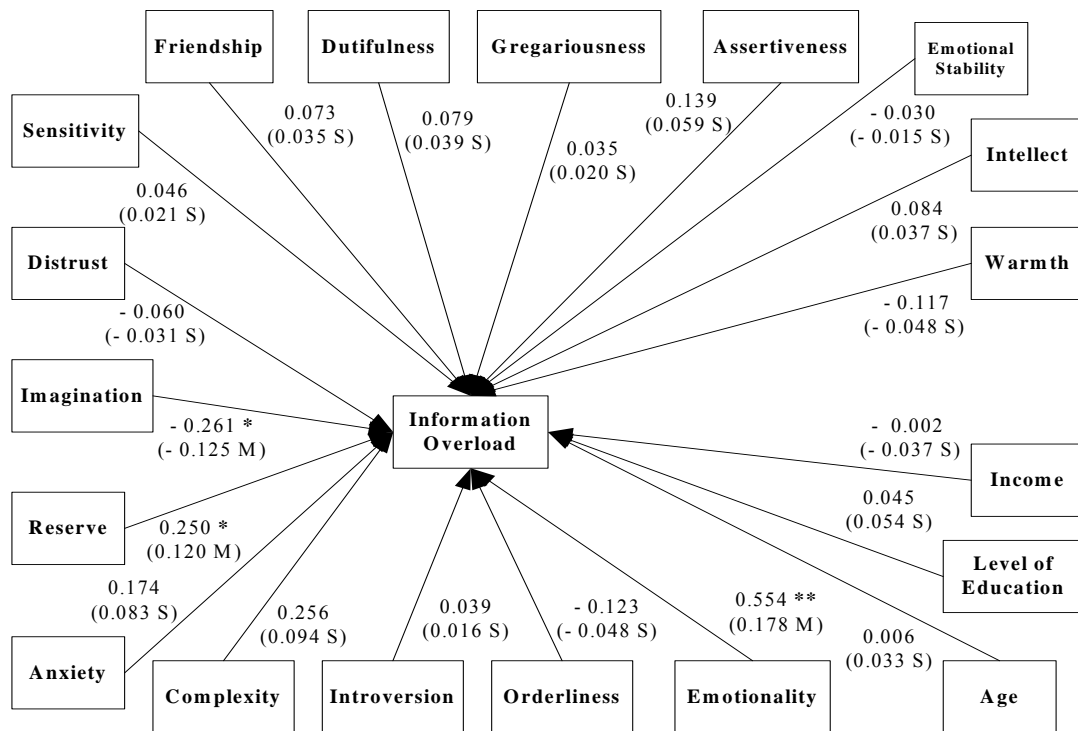


Figure 2: Direct effects in the theoretical model.

Because there is theoretical support for the structure of the model the measurement model was formulated as a latent structured regression model (Schumaker & Lomax, 1996). Table 5 shows the values of the fit statistics for the model recommended by Kline (2005).

Table 5. Theoretical model fit statistics

N	N _c	NC (χ^2/df)	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
594	434	4580.087/3216 = 1.424	0.097	0.844	0.827	0.862	0.954	0.954	0.027
		R ² : Information Overload (0.463)							

Note: R² is the proportion of the variance of Information Overload explained by the independent variables.

The fit statistics in Table 5 are at best only reasonable. Consequently, there is reason to seek a parsimonious model with improved fit statistics. In Figure 2 it is seen that there are 16 variables with small effects on Information Overload which are not statistically significant. Each of these effects was made optional producing a hierarchy of 2¹⁶ (65,536) possible models. Each model in this hierarchy was analyzed using the specification search facility in AMOS 5 and, as recommended by Kline (2005), the model with the smallest value for Normed Chi-square (NC) was selected as the final model. The direct effects in the final model are shown in Figure 3 using the same format as in Figure 2 and the fit statistics for the final model are shown in Table 6.

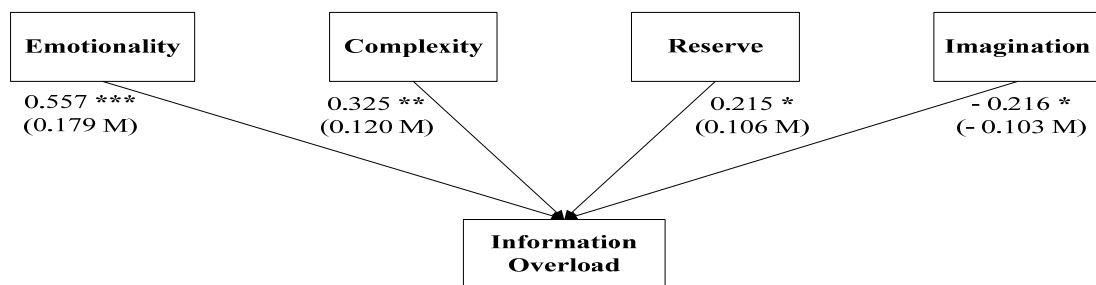


Figure 3. Direct effects in the final model.

Table 6. Final model fit statistics

N	N _c	NC (χ^2/df)	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
594	369	341.948/180 = 1.900	0.024	0.947	0.932	0.948	0.975	0.975	0.039
		R ² : Information Overload (0.457)							

Note: R² is the proportion of the variance of Information Overload explained by the independent variables.

From Figure 3 and Table 6 it is seen that compared to the model in Figure 2 the final model is much improved in terms of its simplicity, the statistical significance and magnitude of the effects, and the satisfactory values of the fit statistics. It is noted that the proportion of the variance of Information Overload that is explained by the four independent variables is an acceptable 45.7 percent.

Discussion

Interpretation of the Results

There is extensive use made of each of the types of work related information (numerical, textual, alpha numerical, and graphical) but numerical and textual types are used to a greater extent. All of the sources of work related information (internal and external in hard/verbal or soft copy) are used extensively but internal sources in either hard/verbal or soft copy are used most of all. This suggests that to a large extent overload originates from internal sources of information and this means that organizations have direct control of the main sources and types of work related information that are associated with perceptions of overload among employees.

Not surprisingly, the extent of use of all types and sources of information and the importance of information are positively correlated with perceptions of information overload. As expected, there are positive correlations among employment position, age, and income and an individual's level of education is positively correlated with income, employment position, and the importance and the extent of use of all types and sources of work related information.

The importance of information is positively correlated with income and those with higher incomes tend to make most use of soft copy textual and graphical information sourced internally and externally. Older employees make less use of numerical and alpha numerical information in soft copy from internal and external sources. Employees with higher levels of education tend to be employed in large organizations where perceptions of overload are high and work related information is very important especially internally sourced soft copy numerical and textual information while externally sourced information particularly in hard/verbal copy forms are used less often.

Comparing males with females it is seen that males: receive higher monthly incomes; have more ability to analyze, synthesize, evaluate, and communicate; are more self sufficient and self centered; are more assertive in their relationships with others; and are more likely to display unexpected, unusual, imaginative, and absent minded behavior. Notably, there were no significant differences between males and females with respect to their perceptions of information overload.

Twenty personal factors were proposed to be significant causes for perceptions of overload but only four personality traits (reserve, complexity, emotionality, and imagination) were found to have significant direct effects on perceptions of overload.

Reserve refers to the extent to which an individual emphasizes the importance of privacy and quietness. If an individual places strong emphases on privacy and quietness then the individual has strong perceptions of being overloaded. Such individuals are troubled by increasing amounts of information which are seen as threatening to their privacy and disturb their desire to be quiet and withdrawn. Table 7 describes other characteristics that were found to be significantly associated with reserve (see Appendix Table A7).

Table 7. Characteristics associated with reserve

<i>Distrust</i> : Highly distrustful and suspicious of others
<i>Anxiety</i> : Strong feelings of guilt, insecurity, self-doubting, and self blaming
<i>Emotionality</i> : Easily annoyed, aggravated, and made angry
<i>Level of Education</i> : Do not have higher levels of formal education
<i>Warmth</i> : Not very attentive to needs and problems of others
<i>Emotional Stability</i> : Less able to control their emotions
<i>Assertiveness</i> : Not assertive in relation to others
<i>Gregariousness</i> : Not fun loving, cheerful, and amusing
<i>Friendliness</i> : Less able to form congenial relationships with others
<i>Sensitivity</i> : Not very aware of their emotional reactions
<i>Complexity</i> : Do not display liberal, analytical, critical and flexible thinking and behavior

From Table 7 it is seen that reserved individuals do not display liberal, analytical, critical and flexible thinking skills and they may not have the ability to deal with increasing amounts of information. They are unlikely to seek or use information beyond the minimum level needed to perform their duties. It is likely that their strong perception of overload is due to their lack of skills in dealing with the content of information rather than the amount of information and compared to others they more likely to feel overloaded by relatively smaller amounts of information. In addition, they are unlikely to have productive relationships with other workers to assist with interpreting and understanding information which could lessen their feeling of being overloaded.

Complexity refers to the individual's ability for liberal, analytical, critical and flexible thinking and behavior. Individuals who display high levels of complexity have strong perceptions of being overloaded with work related information. This poses a significant problem for organizations since individuals with high levels of complexity are normally sought after by organizations because of their analytical and thinking skills. It is evident that such individuals are likely to actively use and seek information in order to be satisfied that they have fully exercised their skills. Table 8 describes other characteristics that were found to be significantly associated with complexity (see Appendix Table A7).

Table 8. Characteristics associated with complexity

<i>Level of Education</i> : Have a high level of formal education
<i>Income</i> : Receive a high income
<i>Warmth</i> : Inattentive to needs and problems of others
<i>Emotional Stability</i> : Have the ability to control their emotions
<i>Dutifulness</i> : Respect authority, rules, and conforming
<i>Sensitivity</i> : Aware of their emotional reactions
<i>Distrust</i> : Not distrustful and suspicious of others
<i>Imagination</i> : Display unexpected, unusual, imaginative, and absent minded behavior
<i>Reserve</i> : Do not emphasize privacy and quietness
<i>Introversion</i> : Self sufficient and self centered
<i>Orderliness</i> : Perfectionist who seek order and exactness
<i>Emotionality</i> : Not easily annoyed, aggravated, and made angry

From Table 8 it is seen that such individuals are likely to be recipients of information from many sources since they have good relationships with others who will readily share information with them. Also, they seek perfection, order, and exactness and this will lead them to seek information in order to satisfy these needs. It is likely that their strong perception of overload is due to large amounts of information rather than any inability to deal with the content of information.

Emotionality refers to the degree to which an individual is easily annoyed, aggravated, and made angry. Individuals who display high levels of emotionality experience strong perceptions of information overload. These negative emotional reactions are easily evoked when the individual has to deal with information that may not be easily or quickly understood. Table 9 describes other characteristics that were found to be significantly associated with emotionality (see Appendix Table A7).

Table 9. Characteristics associated with emotionality

<i>Age</i> : Younger individuals are more likely than older individuals to display high levels of emotionality
<i>Warmth</i> : Inattentive to the needs and problems of others
<i>Intellect</i> : Not skilled at analyzing, synthesizing, evaluating, and communicating
<i>Emotional Stability</i> : Less able to control their emotions
<i>Assertiveness</i> : Not assertive in relation to others
<i>Dutifulness</i> : Low level of respect for authority, rules, and conforming
<i>Friendliness</i> : Have difficulty in forming congenial relationships with others
<i>Sensitivity</i> : Unaware of their emotional reactions
<i>Distrust</i> : Distrustful and suspicious of others
<i>Reserve</i> : Emphasize privacy and quietness
<i>Anxiety</i> : Feel guilt, insecurity, self-doubt, and are self blaming
<i>Complexity</i> : Low ability with liberal, analytical, critical and flexible thinking and behavior
<i>Orderliness</i> : Not perfectionists and do not seek order and exactness

From Table 9 it is seen that individuals with high levels of emotionality have characteristics similar to those with high levels of reserve although they are more likely to be young individuals. Such individuals are unlikely to have control of their emotions and frustration with complex information will evoke negative reactions. They are not highly skilled in analyzing, evaluating, and communicating information. They do not seek perfection or exactness and they do not have productive relationships with other colleagues. It is unlikely that they will use or seek information beyond the minimum needed to conduct their duties and their perceptions of overload are mainly due to their lack of skills in dealing with the content of information rather than the amount of information.

Imagination refers to an individual's level of unexpected, unusual, imaginative, and absent minded behavior. Highly imaginative people have low levels of perception of information overload. They clearly use their inventiveness to implement procedures which lower their feelings of being overloaded and they may adopt approaches to overload that prevent the situation from bothering them such as being selective about the information they use. Table 10 describes other characteristics that were found to be significantly associated with imagination (see Appendix Table A7).

Table 10. Characteristics associated with imagination

<i>Age:</i> Tend to be younger individuals
<i>Gender:</i> Males have higher levels of emotionality than females
<i>Intellect:</i> Have the ability to analyze, synthesize, evaluate, and communicate
<i>Emotional Stability:</i> Less able to control their emotions
<i>Assertiveness:</i> Are assertive in relation to others
<i>Gregariousness:</i> Are fun loving, cheerful, and amusing
<i>Friendliness:</i> Form congenial relationships with others
<i>Complexity:</i> Display liberal, analytical, critical and flexible thinking and behavior

From Table 10 it is seen that highly imaginative individuals tend to be young males. Such individuals form friendly relationships with others and are likely to be willing to share information. They have the ability to analyze, synthesize, evaluate, and communicate information and to display liberal, analytical, critical and flexible thinking and behavior. It is expected that they will willingly seek and use information especially from others with whom they have established congenial relationships. It is likely that any perception of overload that they experience is associated with the amount of information rather than any lack of skills needed to deal with the content of the information.

Comparison of the Findings with those from Previous Studies

The significant direct effects on perceptions of information overload due to the four personality traits imagination, reserve, complexity, and emotionality support the findings in studies by Bakker (2007), Kim et al. (2007), Klauseggar et al. (2007), and Eppler and Mengis (2004). However, for the other 12 personality traits hypotheses of significant direct effects on overload were not supported and among these traits only anxiety was found to have a significant positive correlation with a perception of overload.

None of the three socio-demographic variables: Gender (suggested by Griffeth & Allen, 1977; Speir et al., 2003); Level of Education (suggested by Heylighen, 2002); and Income (suggested by Janssen & Poot, 2006; Kim et al., 2007) were found to have a significant direct effect on Information Overload and none were found to be significantly correlated with it. Stevens (2008) suggested that Age has a significant direct effect but the findings of this study do not support that claim and it is not significantly correlated with overload. However, Kim et al. (2007) claimed that age does not have a significant direct effect on Information Overload and this is supported by the findings.

Conclusion

From a theoretical perspective the study has identified four personality traits (reserve, complexity, emotionality, and imagination) which have important effects on an individual's perception of being overloaded with work related information. Those with strong reserve or emotionality traits are likely to experience overload mainly because of their lack of skills in dealing with the content of information rather than the amount of information. On the other hand, those who exhibit high

levels of complexity are likely to experience overload as a result of their strong desire to use information rather than any lack of ability in dealing with the content of information. Those who are highly imaginative are the least likely to experience overload and if they do then it is likely to be because of the amount of information they seek and use rather than any lack of skills in dealing with the content of the information. These four traits are significantly associated with other personality traits, and socio demographic factors (gender, age, level of income, and level of formal education) and this enabled the development of four profiles of individuals who are more or less likely to experience perceptions of information overload (see Tables 7-10). In addition, perceptions of overload are associated mainly with numerical and textual information in both soft and hard/verbal copy forms derived from sources that are internal to the organization.

From a practical perspective the advice to human resource managers is to screen existing and potential employees if the ability to deal with work related information is an important requirement. The screening should use established measuring instruments for personality traits (e.g. Cattell's 16PF, IPIP (Goldberg et al., 2006) with additional measures of gender, age, income, and level of education. The results may be compared to the four profiles in Tables 7-10 in order to identify individuals who are at risk of experiencing overload and this screening procedure may be used to place an employee in a work environment where their exposure to overload can be controlled, monitored, and minimized in order to improve their satisfaction and productivity. Understanding the phenomenon of information overload should be a part of employee training and education programs especially for those who are identified as being at risk of experiencing overload. Also, the results of this study may be used by therapists and counselors to further develop the profile of an individual who is experiencing overload. In particular, these individuals are likely to display symptoms such as: limited use of information search and retrieval strategies; seemingly arbitrary approaches to information analysis and organization; and sub-optimal decision making. Furthermore, information overload often causes other personal problems and in such cases it is important to identify and treat the basic causes and not just the symptoms which often present in the form of stress related problems.

Because this is the first study of this kind to be conducted in Thailand it is strongly recommended that the study be repeated in order to establish the external validity of the findings. Possible limitations on the results of the study include: (a) the sample only included individuals who work in the urban region of Bangkok; (b) no attempts were made to control age, level of education, gender, type of organization, or level of employment. Most of the subjects were employed in the private sector and most worked at staff levels in their organizations. Consequently, further related studies may include: (a) a comparison among individuals from different organizational sectors; (b) a focus on particular types or sources of information and individuals working at particular levels within an organization; (c) investigation of the relationship between information overload and constructs which are the basis for emotional quotients and emotional intelligence; (d) other personal factors (e.g. physical influence, mental influence, and personal interests); and (e) cross cultural studies which contrast cultural effects associated with perceptions of information overload.

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APPENDIX

Notated Questionnaire

The questionnaire has been abbreviated and notated to show the labels used for all variables and indicators as well as the measurement scales.

SECTION I: PERSONAL INFORMATION

1. **(nemp)** How many employees are in your organization? Less than 50 **(1)** 51-150 **(2)** 151-250 **(3)** 251-350 **(4)** 351 or above **(5)**
2. **(org)** Is your organization public or privately owned? Public **(1)** Private **(2)**
3. **(sector)** Which one of the following best describes your organization? Banking and Finance, Consultant, Education, Government Ministry/Department, Health, Information and Communication Technology, Manufacturing/Engineering, Non-Profit Organization, Publication and Media, Scientific, Service, Tourism and Transport, Trader/Wholesale/Retailer, Other.
4. **(pos)** What is your position in the organization? Staff **(1)** Senior Staff **(2)** Manager **(3)** Director or Managing Director **(4)** Chairman or President **(5)**
5. **(imp)** How important is the use of work related information in your work?

1	2	3	4	5	6	7
(Unimportant)						(Very Important)

6. **(e)** What is your level of education? High School **(12)** Bachelor Degree **(16)** Master Degree **(18)** Doctoral Degree **(22)** (*Measures are based on the time to complete the awards*)
7. **(A)** Please specify your age in years. 15 – 24 **(20)** 25 – 34 **(30)** 35 – 44 **(40)** 45 – 54 **(50)** More than 54 **(60)**
8. **(G)** Please specify your gender. Male **(1)** Female **(2)**
9. **(I)** Please specify your level of monthly income in Baht. 10000 – 20000 **(15)** 20001 – 30000 **(25)** 30001 – 40000 **(35)** 40001 – 50000 **(45)** 50001 – 60000 **(55)** 60001 – 70000 **(65)** 70001 – 80000 **(75)** 80001 – 90000 **(85)** 90001 – 100000 **(95)** More than 100000 **(105)**

SECTION 2: PERSONAL CHARACTERISTICS

All items use a 5-point scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5) and the indicators for reverse scored items are highlighted.

Personal Characteristics	Indicator	Personal Characteristics	Indicator
I know how to comfort others	wm1	I find it hard to forgive others	di1
I do not like to get involved in other people's problems	wm2	I believe that others have good intentions	di2
I enjoy bringing people together	wm3	I distrust people	di3
I make people feel at ease	wm4	I believe that people seldom tell you the whole truth	di4
I am not really interested in others	wm5	I believe that people are basically moral	di5
I know the answers to many questions	il1	I do things that others find strange	im1
I consider myself an average person	il2	I do things by the book	im2
I learn quickly	il3	I swim against the current	im3
I weigh the pros against the cons	il4	I take deviant positions	im4
I skip difficult words while reading	il5	I seldom daydream	im5
I feel comfortable with myself	es1	I reveal little about myself	re1
I have frequent mood swings	es2	I disclose my intimate thoughts	re2
I seldom feel blue	es3	I am hard to get to know	re3
I am not easily frustrated	es4	I do not talk a lot	re4
I dislike myself	es5	I am willing to talk about myself	re5
I want to be in charge	as1	I am afraid that I will do the wrong things	an1
I never challenge things	as2	I am not easily bothered by things	an2
I say what I think	as3	I spend time talking about past mistakes	an3
I am not afraid of providing criticism	as4	I feel guilty when I say "No"	an4
I let others make the decisions	as5	I do not let others discourage me	an5
I love large parties	gr1	I believe in the importance of arts	co1
I am the last to laugh at a joke	gr2	I avoid philosophical discussions	co2
I enjoy being part of a loud crowd	gr3	I enjoy hearing new ideas	co3
I amuse my friends	gr4	I carry the conversation to a higher level	co4
I dislike loud music	gr5	I am not interested in abstract ideas	co5
I believe laws should be strictly enforced	du1	I prefer to do things by myself	in1
I break rules	du2	I enjoy teamwork	in2
I believe in one true religion	du3	I do not mind eating alone	in3
I like to stand during the national anthem	du4	I enjoy silence	in4
I oppose authority	du5	I cannot do without the company of others	in5
I feel comfortable around people	fr1	I want everything to be "Just right"	or1
I find it difficult to approach others	fr2	I am not bothered by messy people	or2
I talk to a lot of different people at parties	fr3	I like order	or3
I do not mind being the center of attention	fr4	I continue until everything is perfect	or4
I am quiet around strangers	fr5	I put off unpleasant tasks	or5
I like to read	se1	I get angry easily	em1
I do not enjoy watching dance performances	se2	I try to forgive and forget	em2
I enjoy discussing movies and books with others	se3	I am annoyed by others' mistakes	em3
I do not like action movies	se4	I judge people by their appearance	em4
I rarely notice my emotional reactions	se5	I have a good word for everyone	em5

SECTION 3: WORK RELATED INFORMATION

Work related information refers to all of the information which you use as part of your work duties. Information overload is a feeling that you may have more work related information than you are able to process.

1. **(IO)** Please indicate on the scale below the extent to which you feel overloaded by work related information in your workplace.

1 (Not Overloaded)	2	3	4	5	6	7 (Extremely Overloaded)
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The measurement scale used for variables in Questions 2(a) and (b) is: Never Used (1) Hardly Ever Used (2) Used Sometimes (3) Used Frequently (4) Used A Lot (5)

2. Please indicate the extent to which you use **(a)** each of the following types of work related information in your workplace and **(b)** work related information from each of the following sources in your workplace.

(a) Type of Work Related Information	Variable	(b) Source of Work Related Information	Variable
Numerical data/information	it1	Internal sources in verbal or hard copy form	is1
Written textual data/information	it2	Internal sources in soft (electronic) copy form	is2
Alpha numerical data/information	it3	External sources in verbal or hard copy form	is3
Graphical data/information	it4	External sources in soft (electronic) copy form	is4

Table A1. Factor analysis

Indicators	Latent Variables															
	GR	DI	AN	ES	FR	RE	SE	IM	IL	IN	DU	WM	OR	CO	EM	AS
GR3	.886	.013	.015	.010	.071	-.063	.019	.062	.065	-.033	.029	.054	-.030	.018	-.001	.008
GR5	.865	-.004	-.009	.026	.087	-.022	.003	.055	.004	-.003	.072	.091	.030	.040	.016	.029
GR1	.861	.016	.015	.017	.137	-.090	.025	.110	.051	-.058	.025	.065	-.020	.050	.006	.081
GR2	.861	-.057	-.024	.054	.072	-.034	.058	.041	.061	.023	.027	.074	.016	.045	.001	.082
GR4	.829	-.002	.032	.017	.049	-.043	.060	.115	.075	-.008	.000	.172	-.031	.082	-.056	.037
DI4	-.012	.865	.033	-.022	-.076	.102	-.066	.022	.018	.020	.053	-.016	.001	-.008	.062	-.014
DI2	.000	.852	.025	-.012	-.077	.075	-.087	-.014	.020	.001	-.013	-.009	-.005	-.079	.139	-.012
DI1	-.016	.850	.069	-.055	-.072	.070	-.089	.028	.051	.028	-.053	-.039	-.042	-.073	.187	-.016
DI3	-.017	.843	.047	-.046	.006	.111	-.094	.004	.002	-.020	-.048	-.040	-.026	-.006	.096	-.005
DI5	.009	.838	.081	.022	-.093	.067	-.064	-.026	.039	.040	-.019	-.086	-.024	-.045	.130	-.042
AN3	-.029	.062	.855	-.144	-.019	-.031	.012	.029	-.001	.009	.026	.028	-.051	-.003	.110	-.046
AN4	.021	.081	.851	-.100	-.055	.043	.000	.032	.001	-.011	-.018	.031	.005	-.020	.071	-.139
AN1	.009	.063	.846	-.085	-.083	-.013	.046	-.007	.005	-.026	.004	-.015	.021	.002	.089	-.077
AN5	.032	.021	.822	-.124	-.039	.034	-.064	.006	-.064	.009	.012	.001	-.005	-.020	.055	-.138
AN2	-.008	.022	.797	-.074	-.100	-.021	-.011	-.005	-.081	-.090	-.002	-.047	-.006	-.025	.141	-.098
ES1	.026	-.029	-.090	.843	.120	-.065	.078	-.076	.093	.073	.028	.011	-.011	.065	-.096	.062
ES4	.034	-.001	-.100	.836	.061	-.083	.063	-.054	.069	.026	.056	.052	.000	.080	-.147	.061
ES5	.046	-.084	-.123	.833	.041	-.062	.058	-.084	.070	.023	.058	.052	.109	.051	-.110	.111
ES2	.011	.001	-.117	.806	.010	-.038	.011	-.082	.060	.043	.035	.058	.033	.080	-.139	.050
ES3	.017	-.007	-.128	.792	.065	-.102	.098	-.033	.074	.092	.027	.081	.038	.063	-.090	.075
FR5	.027	-.077	-.101	.015	.841	-.090	.033	.036	.064	-.043	.053	.122	.017	.053	-.084	.084
FR2	.071	-.092	-.073	.062	.812	-.084	.003	.039	.080	-.011	-.006	.112	.040	-.005	-.094	.113
FR4	.123	-.061	-.027	.076	.811	-.110	.033	.080	.088	-.037	.025	.101	.065	.082	-.039	.109
FR3	.142	-.055	-.040	.050	.807	-.107	-.026	.056	.069	-.049	-.011	.107	-.037	.090	-.098	.120
FR1	.089	-.044	-.080	.101	.790	-.105	-.019	.069	.153	.000	.069	.138	.040	.028	-.062	.125
RE2	-.026	.064	-.059	-.030	-.057	.846	-.045	-.055	-.019	.026	-.009	-.059	.002	-.051	.046	-.064
RE5	-.078	.061	-.058	-.010	-.074	.835	-.106	.035	-.071	.051	.033	-.023	.014	-.091	.086	-.075
RE1	-.057	.070	-.010	-.088	-.090	.835	-.062	.029	.065	.111	-.014	-.041	.040	-.090	-.027	-.048
RE4	-.074	.097	.100	-.071	-.170	.803	.002	-.016	-.021	.055	-.011	-.038	.020	-.064	.020	-.111
RE3	-.021	.146	.048	-.144	-.084	.785	-.006	.103	.004	.065	.026	-.030	-.086	-.015	-.046	-.072
SE4	.010	-.056	-.021	.050	.035	.016	.840	.004	.030	.060	.006	.030	.018	.103	.009	.036
SE1	.008	-.108	-.031	-.006	-.041	-.054	.817	.017	.123	.087	.032	.033	.029	.129	-.046	.049
SE3	.084	-.098	.058	.059	.003	-.094	.816	.026	.061	.045	.011	.037	.015	.114	-.049	.053
SE2	.065	-.095	-.005	.090	.019	-.047	.812	-.016	.034	.104	.060	.048	.037	.102	-.030	.030
SE5	-.005	-.038	-.015	.092	.007	-.038	.800	-.023	.060	.105	.019	.080	.120	.113	-.027	.060
IM1	.082	.059	.003	-.057	.037	.064	.033	.850	.103	-.006	-.070	.040	-.071	.057	.000	.036
IM3	.058	.026	.029	-.140	.038	.027	-.025	.840	.080	.036	-.041	.006	-.025	.098	.044	.049
IM5	.089	.031	.043	-.094	.016	-.017	-.013	.821	.070	.028	-.047	-.041	-.025	.034	.056	-.001
IM2	.025	-.035	-.022	.004	.089	-.003	-.044	.804	.056	-.016	.053	-.014	-.011	.085	.039	.040
IM4	.115	-.067	.000	-.023	.069	.018	.063	.788	.119	.047	-.044	.016	-.025	.089	-.030	.093
IL2	.064	.012	-.037	.064	.098	.036	.041	.133	.833	.047	.013	.033	.021	.078	-.016	.028

IL1	.038	.079	.025	.056	.123	.030	.077	.097	.822	.029	.008	.071	.010	.070	-.054	.094
IL5	.059	-.018	-.039	.074	.044	.016	.047	.092	.815	.048	-.046	.048	.110	.148	-.068	.093
IL4	.040	.009	-.032	.088	.063	-.048	.034	.045	.795	.062	-.034	.088	.155	.095	-.116	.151
IL3	.067	.053	-.071	.090	.114	-.092	.134	.094	.759	.111	-.035	.085	.051	.044	-.041	.164
IN3	.004	-.007	.000	.037	-.037	.041	.105	.021	.063	.850	.072	.022	.080	.019	.010	.010
IN2	-.020	.048	-.005	.029	-.008	.009	.062	-.006	.025	.840	.055	.019	.056	.056	-.003	.063
IN5	.035	-.014	-.079	.098	.008	.045	.073	-.015	.054	.803	.072	.025	.084	.097	-.003	.063
IN4	-.072	.051	.026	-.001	-.105	.115	.121	.051	.036	.803	.046	-.011	.053	.060	-.028	.008
IN1	-.027	-.017	-.056	.088	.016	.099	.036	.042	.102	.799	.095	.014	.149	.136	-.051	.148
DU1	.064	-.040	.010	.039	-.018	.009	.021	-.003	-.008	.105	.847	.013	.112	.041	-.019	.045
DU3	.045	.051	.018	.000	.018	-.019	-.036	-.021	-.014	.018	.820	-.001	.058	.058	-.048	.043
DU5	.061	-.046	-.051	.029	.041	-.004	.059	-.037	-.017	.053	.809	.009	.072	-.025	-.057	.013
DU4	.018	-.001	.070	.081	.044	.014	.053	.008	-.020	.075	.800	.058	.062	.051	-.076	.033
DU2	-.047	-.039	-.025	.034	.025	.022	.024	-.088	-.018	.070	.796	.069	.155	-.015	-.111	-.015
WM1	.099	-.033	.001	.064	.113	.020	.047	-.005	.073	.018	.010	.846	.037	.099	-.075	.029
WM2	.093	-.047	-.019	.021	.059	.013	.094	-.017	.012	.018	.044	.805	.029	-.004	-.009	.056
WM4	.037	-.070	.012	.043	.100	-.055	.028	-.004	.082	.057	.032	.792	.037	.106	-.076	.097
WM5	.063	-.040	.023	.070	.111	-.094	.046	.001	.043	-.010	.038	.791	.041	-.010	-.016	.036
WM3	.138	.011	-.019	.035	.133	-.064	.002	.028	.083	-.014	.023	.761	.003	.031	.003	.070
OR3	-.003	.004	.002	.052	.020	.050	.058	-.081	.049	.087	.132	.002	.809	.083	-.043	.024
OR2	.027	-.036	-.032	.090	-.049	-.008	.020	-.059	.053	.074	.131	.090	.795	.110	-.018	.048
OR4	.015	-.024	.054	.020	.112	-.023	.016	-.037	.075	.079	.054	.064	.792	.078	-.110	.074
OR5	-.058	-.042	-.070	-.021	.016	-.035	.055	.015	.067	.083	.067	.033	.783	.046	-.087	.080
OR1	-.010	.007	.017	.016	.015	.009	.060	.001	.062	.078	.087	-.036	.782	.105	-.028	.128
CO5	.034	-.084	-.062	.075	.044	-.046	.104	.059	.046	.067	.038	.037	.088	.815	-.032	.088
CO2	.039	-.041	-.017	.073	.044	-.072	.107	.053	.073	.087	.022	-.052	.076	.793	-.048	.102
CO3	.103	-.105	-.020	.073	.000	-.040	.137	.086	.124	.078	.004	.066	.115	.775	-.100	.151
CO1	.029	.002	.061	.060	.047	-.059	.143	.132	.081	.064	.063	.070	.080	.758	-.102	.040
CO4	.051	.005	-.035	.067	.120	-.119	.128	.077	.134	.090	-.006	.140	.117	.728	-.045	.157
EM1	-.018	.130	.125	-.208	-.069	-.020	-.008	.040	-.057	.001	-.061	-.021	-.036	-.061	.792	-.035
EM4	.007	.130	.133	-.095	-.060	.012	-.027	.008	-.047	-.017	-.142	-.040	-.114	.013	.790	-.051
EM3	.026	.117	.121	-.069	-.050	-.008	.011	.104	-.021	.076	-.033	.009	-.026	-.063	.779	-.045
EM2	-.061	.203	.052	-.095	-.078	.030	-.037	.023	-.076	-.088	-.162	-.023	-.028	-.127	.744	.008
EM5	.006	.074	.064	-.137	-.121	.076	-.096	-.061	-.095	-.059	.033	-.116	-.114	-.089	.726	-.005
AS3	.051	.006	-.052	.051	.123	-.087	.006	.032	.081	.047	-.001	.061	.005	.105	.001	.792
AS4	.077	.001	-.105	.061	.094	-.095	.041	.078	.138	.076	.057	.105	.014	.105	-.042	.773
AS1	.062	.009	-.122	.041	.145	-.134	.075	.041	.130	.081	.016	.003	.093	.110	.004	.747
AS5	.004	-.034	-.151	.121	.147	-.013	.053	.004	.045	.025	.030	.027	.162	.069	-.045	.740
AS2	.056	-.078	-.114	.087	.035	-.057	.075	.084	.128	.070	.040	.129	.133	.126	-.053	.687
Percentage of Variance	14.20	6.97	6.69	5.30	4.86	4.40	4.02	3.75	3.48	3.19	2.94	2.86	2.61	2.44	2.36	2.14
Eigenvalue	11.36	5.58	5.35	4.24	3.89	3.52	3.21	3.00	2.79	2.55	2.35	2.29	2.09	1.95	1.89	1.71

Notes: (a) Rotation method: Varimax with Kaiser normalization, (b) Highlighted loadings indicate satisfactory construct validity, (c) Total variance 72 percent, (d) Kaiser-Meyer-Olkin measure of sampling adequacy is 0.885, (e) Bartlett's test of sphericity: Chi-Square of 30870.533 (3160 degrees of freedom, statistical significance of 0.000).

Table A2. Cronbach alpha coefficients

Latent Variable	Alpha	Interpretation	Latent Variable	Alpha	Interpretation	Latent Variable	Alpha	Interpretation
Gregariousness	0.9271	Excellent	Sensitivity	0.8988	Good	Warmth	0.8796	Good
Distrust	0.9231	Excellent	Imagination	0.8951	Good	Orderliness	0.8768	Good
Anxiety	0.9101	Excellent	Intellect	0.8980	Good	Complexity	0.8837	Good
Emotional Stability	0.9143	Excellent	Introversion	0.8968	Good	Emotionality	0.8703	Good
Friendliness	0.9115	Excellent	Dutifulness	0.8851	Good	Assertiveness	0.8603	Good
Reserve	0.9006	Excellent	Note: $0.9 \leq \text{Excellent} \leq 1$ and $0.8 \leq \text{Good} < 0.9$ (George and Mallery, 2003).					

Table A6. Characteristics of work related information

Importance of Information		3 (Reasonably Important)					4	5	6	7 (Very Important)				
Frequency		21					95	97	127	254				
Percent		3.5					16.0	16.3	21.4	42.8				
Type of Information		Extent of Use					Source of Information		Extent of Use					
		Never	Hardly Ever	Sometimes	Frequently	A Lot			Never	Hardly Ever	Sometimes	Freq.	A Lot	
Numerical	Frequency	12	47	185	209	141	Internal Verbal /Hard	Frequency	5	45	169	249	126	
	Percent	2.0	7.9	31.1	35.2	23.7		Percent	0.8	7.6	28.5	41.9	21.2	
Textual	Frequency	12	31	166	243	142	Internal Soft	Frequency	17	39	158	206	174	
	Percent	2.0	5.2	27.9	40.9	23.9		Percent	2.9	6.6	26.6	34.7	29.3	
Alpha Numerical	Frequency	20	81	247	175	71	External Verbal /Hard	Frequency	14	79	229	196	76	
	Percent	3.4	13.6	41.6	29.5	12.0		Percent	2.4	13.3	38.6	33.0	12.8	
Graphical	Frequency	35	119	212	166	62	External Soft	Frequency	27	72	189	179	127	
	Percent	5.9	20.0	35.7	27.9	10.4		Percent	4.5	12.1	31.8	30.1	21.4	

Table A3. Descriptive statistics for model variables

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Variable	Mean	Std. Dev.	Skewness	Kurtosis
Level of Education	16.16	1.699	-.717	2.303	Sensitivity				
Age	33.03	7.893	1.100	1.707	SE1	3.45	.806	-.094	-.021
Income	31.31	23.361	1.917	3.065	SE2	3.40	.812	.066	-.118
Information Overload	4.49	1.432	-.308	-.081	SE3	3.40	.801	.012	.206
Warmth					SE4	3.23	.866	-.034	-.250
WM1	3.71	.690	-.161	.077	SE5	3.46	.796	.003	.058
WM2	3.12	.682	-.152	.280	Distrust				
WM3	3.26	.731	-.141	.097	DI1	2.54	.880	.289	-.078
WM4	3.56	.723	-.025	-.119	DI2	2.68	.875	.375	.010
WM5	3.51	.773	-.265	-.026	DI3	2.77	.837	.150	.120
Intellect					DI4	2.95	.918	.195	-.236
IL1	3.25	.781	.050	-.006	DI5	2.75	.851	.323	.258
IL2	3.09	.923	.387	-.396	Imagination				
IL3	3.57	.703	.179	.014	IM1	2.81	.809	.042	-.140
IL4	3.65	.770	-.104	-.361	IM2	3.08	.735	.057	.394
IL5	3.43	.872	.078	-.461	IM3	2.85	.841	.026	-.258
Emotional Stability					IM4	3.09	.822	-.188	-.198
ES1	3.70	.820	-.545	.606	IM5	2.96	.814	-.020	-.064
ES2	3.29	.815	-.128	-.051	Reserve				
ES3	3.44	.801	-.063	.103	RE1	3.04	.827	.119	.038
ES4	3.45	.849	-.234	-.115	RE2	3.10	.796	.093	.085
ES5	3.83	.872	-.406	-.117	RE3	2.91	.824	.258	-.090
Assertiveness					RE4	2.95	.896	.025	-.398
AS1	3.49	.795	-.098	.269	RE5	2.99	.819	.222	.271
AS2	3.60	.747	-.136	-.010	Anxiety				
AS3	3.59	.766	-.218	.073	AN1	3.14	.833	-.144	-.361
AS4	3.52	.744	-.119	-.032	AN2	3.00	.767	.070	.413
AS5	3.59	.756	-.064	.042	AN3	2.82	.893	.083	-.278
Gregariousness					AN4	3.11	.845	-.059	-.009
GR1	3.03	.939	-.043	-.191	AN5	2.91	.838	.127	.119
GR2	3.40	.893	-.415	-.057	Complexity				
GR3	2.97	.993	-.095	-.447	CO1	3.73	.710	-.042	.171
GR4	3.27	.842	-.162	.032	CO2	3.44	.738	.375	-.049
GR5	3.14	.900	-.049	.098	CO3	3.87	.728	-.194	-.138
Dutifulness					CO4	3.55	.720	.270	-.337
DU1	3.91	.836	-.515	-.118	CO5	3.46	.772	.472	-.175
DU2	3.71	.747	-.128	-.166	Introversion				
DU3	3.72	.839	-.174	-.320	IN1	3.84	.744	-.194	-.167
DU4	3.74	.779	-.140	-.194	IN2	3.47	.909	.089	-.664
DU5	3.56	.904	-.128	-.143	IN3	3.78	.861	-.337	-.124
Friendliness					IN4	3.55	.791	-.033	-.120
FR1	3.08	.843	-.066	-.030	IN5	3.78	.814	-.320	-.150
FR2	3.28	.826	-.224	-.238	Orderliness				
FR3	3.11	.824	.076	.298	OR1	3.80	.706	-.067	-.171
FR4	3.18	.818	-.117	.292	OR2	3.80	.775	-.333	.061
FR5	2.97	.918	.001	-.294	OR3	3.71	.747	.024	-.336
Emotionality					OR4	3.75	.735	-.116	-.027
EM1	2.68	.783	-.039	-.043	OR5	3.74	.755	-.074	-.292
EM2	2.45	.691	.133	.347					
EM3	2.77	.693	-.202	.128					
EM4	2.38	.751	.280	-.057					
EM5	2.47	.660	.040	.220					

Table A4. Characteristics of organizations

Organizational Sector	Frequency	Percent	Organizational Sector	Frequency	Percent	Organizational Sector	Freq.	Percent
Banking and Finance	100	16.8	Publication and Media	25	4.2	ICT	84	14.1
Consultant	11	1.9	Scientific	22	3.7	Manufacturing/Engineering	133	22.4
Education	21	3.5	Service	26	4.4	Trader/Wholesale/Retailer	88	14.8
Government Ministry/Department	42	7.1	Tourism and Transport	15	2.5	Non-Profit	12	2.0
Health	15	2.5						
Type of Organization	Number of Employees						Total (Percentage)	
	Less than 50	51-150	151-250	251-350	More than 350			
Public Sector	7	42	4	14	20	87 (14.6)		
Private Sector	82	58	82	29	256	507 (85.4)		
Total (Percentage)	89 (15)	100 (16.8)	86 (14.5)	43 (7.2)	276 (46.5)	594 (100)		

Table A5. Characteristics of respondents

Employment Position	Freq.	Percent	Age (Years)	Freq.	Percent	Income (Baht/Month)	Freq	%
Staff	462	77.8	15-24	51	8.6	50001-60000	18	3.0
Senior Staff	35	5.9	25-34	372	62.6	60001-70000	14	2.4
Manager	64	10.8	35-44	122	20.5	70001-80000	7	1.2
Director or Managing Director	13	2.2	45-54	38	6.4	80001-90000	8	1.3
Chairman or President	20	3.4	More than 54	11	1.9	90001-100000	8	1.3
Level of Education			Income (Baht/Month)			More than 100000	27	4.5
High School	58	9.8	10000-20000	254	42.8	Gender		
Bachelor Degree	384	64.6	20001-30000	137	23.1	Male	239	40.2
Master Degree	146	24.6	30001-40000	78	13.1	Female	355	59.8
Doctoral Degree	6	1.0	40001-50000	43	7.2			

Table A7. Correlations

Variable		Correlations among Characteristics of Respondents, Organizations, and Use of Work Related Information																
		Level of Education	Age	Income	Number of Employees	Employment Position	Importance of Information	Type of Information			Source of Information							
								Numerical	Textual	Graphical	Internal Verbal/Hard	Internal Verbal/Soft	Internal Hard	Internal Soft	External Verbal/Hard	External Soft		
Number of Employees	.165	-.006	.029	1														
Employment Position	.171	.343	.662	-.186	1													
Importance of Information	.226	-.010	.096	.261	-.044	1												
Type of Information	Numerical	.166	-.114	.042	.084	.286	1											
	Textual	.260	-.028	.107	.107	.367	.495	1										
Information	Alpha Numerical	.127	-.083	.025	.031	.276	.326	.526	1									
	Graphical	.207	.017	.146	-.024	.221	.220	.368	.588	1								
Source of Information	Internal Verbal/Hard	.114	-.031	.012	.014	.210	.416	.486	.316	.265	1							
	Internal Soft	.350	-.089	.268	.137	.359	.390	.541	.398	.440	.343	1						
Information	External Verbal/Hard	.141	-.005	.045	-.094	.152	.301	.360	.327	.352	.616	.279	1					
	External Soft	.331	-.102	.249	.052	.288	.266	.439	.440	.526	.285	.669	.476	1				
Information Overload	.053	.013	.003	.115	-.061	.218	.121	.150	.222	.166	.112	.130	.124	.144				

Variable		Correlations among Model Variables (Socio-Demographics and Personality Traits)																	
		Socio-Demographics							Personality Traits										
		Level of Education	Age	Income	WM	IL	ES	AS	GR	DU	FR	SE	DI	IM	RE	AN	CO	IN	OR
Age	.026	1																	
Income	.312	.351	1																
Warmth (WM)	.121	.099	.191	1															
Intellect (IL)	.194	.063	.266	.216	1														
Emotional Stability (ES)	.044	.081	.112	.175	.235	1													
Assertiveness (AS)	.124	-.002	.183	.227	.360	.267	1												
Gregariousness (AS)	.021	-.092	.039	.247	.174	.093	.182	1											
Dutifulness (DU)	-.019	.195	.071	.099	-.004	.134	.107	.081	1										
Friendliness (FR)	.011	-.019	.064	.328	.282	.218	.366	.259	.080	1									
Sensitivity (SE)	.162	.018	.085	.159	.209	.197	.193	.106	.096	.071	1								
Distrust (DI)	-.125	-.020	-.116	-.127	.018	-.119	-.096	-.041	-.067	-.201	-.220	1							
Imagination (IM)	.035	-.161	.041	.030	.244	-.150	.143	.200	-.084	.143	.024	.024	1						
Reserve (RE)	-.099	-.004	-.046	-.135	-.066	-.203	-.246	-.161	-.002	-.288	-.147	.236	.034	1					
Anxiety (AN)	-.071	-.108	-.096	-.034	-.110	-.304	-.302	-.005	-.013	-.192	-.038	.156	.033	.043	1				
Complexity (CO)	.178	-.005	.145	.203	.322	.243	.380	.173	.105	.211	.364	-.167	.207	-.209	-.087	1			
Introversion (IN)	.145	.072	.122	.066	.190	.156	.201	-.024	.201	-.033	.234	.017	.052	-.136	-.072	.245	1		
Orderliness (OR)	.046	.130	.079	.123	.213	.147	.249	.009	.280	.102	.161	-.077	-.076	-.021	-.051	.291	.260	1	
Emotionality (EM)	.003	-.090	-.005	-.157	-.200	-.370	-.165	-.048	-.213	-.254	-.136	.358	.065	.096	.298	-.236	-.084	-.210	1
Information Overload	.053	.013	.003	-.041	.005	-.051	.008	-.003	.019	-.036	.030	.042	-.084	.081	.083	.085	.045	-.013	.142

Notes: (a) For highlighted coefficients $p < 0.05$, (b) Coefficients in italics are negative.