

How Personality Moderates the Effect of Techno-Stress on Actual Use of Technology

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Abstract

Implementing new technologies may bring about some positive as well as negative changes. Some negative side-effects of these changes may cause high turnover or burnout in companies. Meanwhile, as individuals may experience the stress and discomfort of dealing with challenging environment, recruiting process and human resources (HR) managers will be affected as well. Several factors will affect recruiting in various aspects. Among such factors, however, personality of the interviewee is one of the top reasons which could have some sort of significant impact on the rest of criteria. Many studies show the stress that comes from technology, called techno-stress, will affect the perception of users, and several studies demonstrate that the level of techno-stress will vary with personality of the people. However due to lack of studies we need to understand the impact of different aspects of personality on the relationship between techno-stress and adoption of technology. Therefore, this study examined the moderating role of personality on relationship between techno-stress and Technology acceptance and usage. This paper reports on the literature we reviewed to better understand the moderating role of personality on the relationship between techno-stress and perceived ease of use of the technology.

Keywords: Human Resource, Technology Adoption, Techno-stress, Personality, Perceived Ease of Use

Introduction

Personality is known as one of the most critical variables which could affect organizational performance at all levels. Organizations keep updating and bringing new technologies to their firm in order to improve both efficiency and effectiveness. However, this continuous process makes employees feel more stress in their work, which is known as Techno-stress. As techno-stress is affecting the whole performance including intention to use and actual using of new technologies, the role of personality could be crucial since it affects the whole relationship between techno-stress and technology adoption and use.

Earlier studies focused on techno-stress mentioned that there is a negative relationship between techno-stress and technology adoption and use. In order to study the moderating role of personality, based on available body of research a new framework was designed with five different variables, namely Techno-stress, Personality, Intention to Use, Actual Use of Technology, and Self-Efficacy. The moderating role of personality on various level is hypothesized and we use this framework to test our hypothesis. The schematic relationship of these variables is shown in Figure 1.

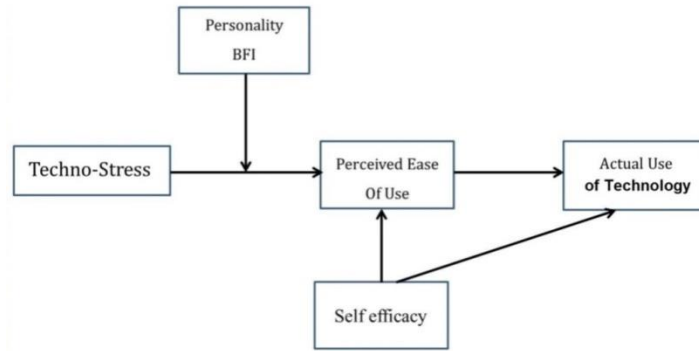


Figure 1. Schematic relationship of 5 variables

This report focuses on one essential part of the whole framework on which the major part of the study is founded, i.e. the moderating role of personality on the relationship between techno-stress and perceived ease of use of the technology. This part is especially important because the initial contribution of techno-stress to the final outcome we need to investigate in this context, i.e. Actual Use of Technology, does happen in this segment. Therefore, this paper reports on the literature we gathered to form our basic understanding of what is demonstrated in Figure 2.

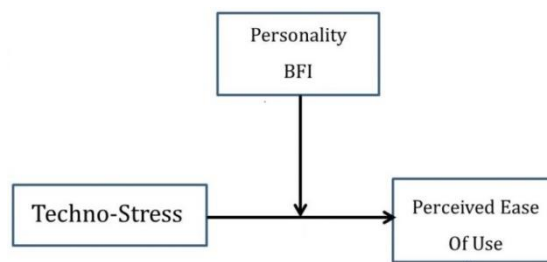


Figure 2. Proposed Conceptual Framework

It should be mentioned that for the original research, Enterprise Resource Planning (ERP) was selected as the test technology since it is one of the latest technologies to be adopted in accounting industry. ERP systems are well-known for being complicated with high risk of failure but with high efficiency if they are implemented successfully. Target participants are employees of local accounting firms which implemented ERP systems.

Background

As already mentioned, we hypothesized a moderating role for personality on the relationship between techno-stress and actual use of technology. This moderating role occurs on three levels, and this paper draws on previous literature to explain that one crucial level of that role, i.e. the relationship between techno-stress and perceived ease of use of the technology. In this part, what might be gathered from the available literature on that role is offered.

Techno-Stress

The previous research reports reviewed have identified techno-stress as one of the major problems causing errors of judgment, absenteeism, loss of valuable man-hours at work, low

productivity and poor service delivery among employees of information and communication technology (ICT) mediated work environments (Mustaffa, Yusof, and Saad, 2007). Clinical psychologist, Craig Brod (1984) has described the term Techno-stress as "a condition resulting from the inability of an individual or organization to adapt to the introduction and operation of new technology" or "a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner." Bolger and Zuckerman (1995) divided the stress process to two fundamental stages, stressor exposure and stressor reactivity. They discussed that reactivity to conflicts is more important than exposure to conflicts. According to them different personalities might lead to different choices of coping strategies and different level of coping effectiveness. Personality variables predict the choice of coping strategies (Bolger & Zuckerman, 1995).

Several researchers have investigated techno-stress and its effect on organizational performance. Many authors have argued that stress is extremely prevalent in the workplace and that it might cause serious challenges for both employers and employees (Atkinson, 2004; Bridson, 1995; Cilliers & Kossuth, 2002; De Beer & Korf, 2004; Dhaniram, 2003; Dua, 1994; Lowe, 2004; Le Feure, Matteny & Kolt, 2003; Recupero, 2003; Sadri, 1997; Spangenberg & Orpen-Lyall, 2000; Van Zyl and Bester, 2002; Wissing & Van Eeden, 2002).

There are a number of work related stressors which have been linked to an increased likelihood of individual experiencing negative stress outcomes. Cooper and Marshall's (1976) original model of work related stress included five sources of stress at work, each of which are represented in the revised model of stress on which ASSET is based (Robertson Cooper, 2002b).

Ethel Roskies suggests that "stress has become the fashionable disease of our time, and the treatment of stress is a popular and profitable activity." (Roskies, 1991; p. 411) There are several types of stress management used today. They may be placed in the following broad categories (adapted from Monat & Lazarus, 1991):

1. Environment/Lifestyle: time management, proper nutrition, exercise, finding alternatives to frustrated goals, stopping bad habit (smoking, drinking, excessive eating, etc.)
2. Personality/Perception: assertiveness training thought stopping, refuting irrational ideas, stress inoculation, modifying type "A" behavior
3. Biological responses: progressive relaxation, relaxation response, meditation, breathing exercises, biofeedback, autogenic (Hudiburg, 1996)

According to some scholars, despite the fact that human society has greatly benefited from the availability of information and communication technologies (ICT), both the use and ubiquity of ICT may also have a "dark side." Direct human interaction with ICT, as well as perceptions, emotions, and thoughts regarding the implementation of ICT in organizations and its pervasiveness in society in general, may lead to notable stress perceptions--a type of stress referred to as techno-stress (Rene Riedl, 2013).

From another point, technology started to lead all factors that bring stress to the work from long time ago. Lally (1997) mentioned that "job burn-out is at an all-time high. Information Systems managers and operators head the list of burnout candidates". He also highlighted computer slowdowns and breakdowns are leading contributions to employee stress, and information overload led to increased tension with colleagues and diminished job satisfaction (Lally, 1997).

In his inspiring work, Brod (1984) elaborates the symptoms of Techno-stress as such: "The primary symptom of those who are ambivalent, reluctant, or fearful of computers is anxiety. This anxiety is expressed in many ways: irritability, headaches, nightmares, resistance to learning about the computer or outright rejection of the technology. Techno-anxiety most commonly afflicts those who feel pressured--by employers, peers, or the general culture--to accept and use computers".

Lazarus and Folkman (1984) described the specific terms that show how one's perceptions of objective events determine their health valence. Cognitive appraisal is described by Lazarus as an intra-psycho process which translates objective events into stressful experiences. The importance of this formulation lies in its recognition that subjective factors can play a much larger role in the experience of stress than objective conditions. Indeed, any given objective event can at once be perceived positively by one person and negatively by another.

Bunge (1987) studied stress in the work place and identified almost 15 categories of stress, one of which was technology and equipment. Based on Bunge's study, Ostler and Oon (1989) had a study

on stress in the library at Brigham Young University. They found out that technology and equipment was a high source of stress among both faculty librarians and support staff.

For techno-stress when it deals with stress due to information and communication technologies, one might briefly state that techno-stress is driven by a range of psycho-social factors: Psychological Capital, Work Overload, Interpersonal Conflict, Role Ambiguity, Work-Family conflict, Role Anxiety and Insecurity, Cognitive Processing, Role Conflict, Role-overload and Invasion of Privacy (Sinha, 2012). It is suggested that some of the well-known stressors may be more pronounced with the use of information and communication technologies at work (Frese 1987).

Khosrowpour and Culpan (1989) have published a stress-related study applied to individuals working in computer-related fields. In it, they remark: "Information processing professionals see change in technology as a pre-requisite for their existence, yet the speed of this change can have profound psychological and physiological effects". In their survey with 231 responses, "a large majority agreed with the statements that change in computer technology creates pressure". The authors conclude that "the men and women who plan, design, and monitor these systems have experienced greater Techno-stress in their jobs and environments".

Ayyagari (2007) extended the definitions of Techno-stress to the Techno-stress specifically caused by ICTs, namely work overload, role ambiguity, job insecurity, work-home conflict and invasion of privacy. Researcher presumes that professors in Colleges of Business Administration are more adept and comfortable using technology than those in other colleges within universities. On the other hand, other disciplines such as liberal arts have had less need to adapt as quickly, and perhaps have been more reluctant to change (Miller & Rojewski, 1992).

Ayyagari et al. (2011) used 13 dimensions techno-stress model to study the effect of techno-stress. They adapted their model from different studies (13 in overall) and combined them all together. According to their study techno-stress comes in 13 different dimensions named:

- i) Work Overload (Moore 2000)
- ii) Work Home Conflict (Kreiner 2006; Netemeyer et al. 1996)
- iii) Invasion of Privacy (Alge 2001; Eddy et al. 1999)
- iv) Role Ambiguity (Moore 2000)
- v) Strain (Moore 2000)
- vi) Usefulness (Moore and Benbasat 1991)
- vii) Complexity (Moore and Benbasat 1991)
- viii) Reliability (DeLone and McLean 1992, 2003; Jiang et al. 2002)
- ix) Presenteeism
- x) Anonymity (Pinsonneault and Hippel 1997)
- xi) Pace of Change (Heide and Weiss 1995; Weiss and Heide 1993)
- xii) Job Insecurity (Ashford 1989)
- xiii) Negative Affectivity (Agho et al. 1992)

Their results indicate that as individuals become more dependent on technologies (increasing technology usage) they experience higher levels of stressors. This study recommends general subject of ICT usage but in the case of ERP implementation the consequences of implementation might be a little different. Among these 13 criteria four of them seem are not applicable to ERP namely; work home conflict, invasion of privacy, anonymity and pace of change due to the nature of software itself. Therefore, the questionnaire used for this study contains nine (9) criteria out of thirteen (13) and not more.

Technology Acceptance

The term 'acceptance' is used by authors from many different background and approaches. In fact, in the literature acceptance does not have a unique definition. TAM (Davis, 1989) describes acceptance as 'user's decision about how and when they will use technology'. Martinez (Martinez-Torres et al., 2008) notice that initial use (acceptance) is the first critical step toward e-learning, while sustainable success depends on its continued use (continuance). There is large variety of studies focus on ICT acceptance (Ngai, Poon & Chan, 2005; Abdul-Gader, 1996; Adams, Nelson & Todd, 1992; Igbaria, Guimaraes & Davis, 1995). The Theory of reasoned action (TRA) proposed by Fishbein and Ajzen (1975) to explain and predict the people's behavior in a specific situation. TRA is a well-known

model in the social psychology domain. According to TRA a person's actual behavior is driven by the intention to perform the behavior. Individual's attitude toward the behavior and subjective norms are the 'loading factors' toward behavioral intention. Attitude is a person's positive or negative feeling, and tendency towards an idea, behavior. Subjective norm is defined as an individual's perception of whether people important to the individual think the behavior should be performed.

Given our test setting, one might argue that although implementation of an ERP system can be extremely difficult, the benefits are well worth the effort. Like every other new projects in organizations, one of the most important success factor in ERP implementation is the commitment of all people involved in the project. If employees do not embrace it, the ERP system will ultimately fail (Korunka et al., 1997; Barki and Pinsonneault, 2005; Kwahk and Ahn, 2010; Adbul-Gader and Kozar, 1995; Fisher and Wesolkowski, 1999).

Despite all benefits that may entail, implementation of ERP systems don't show a high success rate in different industries. M.Keil and D. Robey (2001) say that the estimate is about 74% of IT projects cannot deliver the promised functionality on time and on budget. Cooke et al (2001) did a survey on success rate of ERP projects. According to a survey of 117 organizations conducted by the Conference Board, 40% of ERP projects failed to meet the business case. In another study done by information technology (IT) management consultancy Robbins-Gioia LLC, they found 51% of companies across a wide range of industries stated that their ERP implementations were unsuccessful. With these results, it's clear that despite the popularity of ERP, the failure rate of ERP implementation remains high.

Technology acceptance model (TAM) shows employees resist any new technology in organizations while the ease of use is not there. In ERP system implementation, complicated and integrated information process will make it even more difficult to accept and use the system. Besides not using the new technology, the side effect of any new technology could be the stress and anxiety they bring to the work environment. These feelings and emotions could affect organizational effectiveness and productivity. Because of these emotions, an employee may become apprehensive about using technology. The application of new software or hardware can create resentment and can have an ill-effect on an employee's productivity (Hudiburg and Necessary, 1996; Marcoulides, 1989). "ERP implementations usually require people to create new work relationships, share information that was once closely guarded, and make business decisions they never were required to make" (Appleton, 1997, p. 2).

The goal of TAM is "to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified". (Fishbein and Ajzen, 1975) TAM has 5 variables namely, Perceived usefulness (PU), Perceived ease of use (PEOU), Attitude toward using (A), Behavioral Intention (BI) and Actual Use (Act). The theory, assumes that an individual's information systems acceptance is determined by two major variables: Perceived usefulness (PU) and Perceived ease-of-use (PEOU).

Perceived usefulness (PU) defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). Perceived ease-of-use (PEOU) defined by Davis as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). A and PU influence the individual's BI to use the system. Actual use of the system is predicted by BI.

Adapting to technology is not simple. Some people tend to embrace change while others resist change (Wolski & Jackson, 1999). Before making a decision on whether to embrace technology or not, people may look at the practical and social consequences of accepting change. Therefore, the technology acceptance model, the accepting or resisting of technology is considered to be a form of reasoned behavior (Wolski & Jackson, 1999).

Given that perceived ease of use is defined in terms of effort, individuals generally perceive a technology to require less effort to use as they gain more knowledge and confidence through direct experience with technology. Once skills are improved with experience, the task becomes less dependent on cognitive resources (known as learning curve), thus leading individuals to perceive the task and technology to be easier than when they first started.

Research shows nearly 40% to 60% of ERP projects fail to implement in companies (Thomas L. Legare, 2002). Markus et al. (2000) found that there are three main factors that may cause ERP

failure namely; poor planning or poor management, change in business goals during implementation and lack of business management support. These reasons are all human related issues. Jafari et al. (2006) studied top ten critical factors in implementing ERP which 6 out of ten factors are human related factors. One of these factors is user's participants in implementation ERP with degree of importance of 4.22 out of 5. Therefore, the critical role of users leads researchers to more studies in recent years to find solutions to make the implementation process a success.

Among all human related factors, stress or specifically what in technology related situations called Techno-stress is one of the main reasons of user's avoidance (vocal passive avoidance) of using new technology (Mahalakshmi, 2011). The relationship between techno-stress and intention to use ERP is one of the areas that can bring a new insight to the whole process of implementation ERP. However this relationship is affected by list of other factors. Past studies point out that although a pressure-laden work environment creates a negative perception of the organization but at the same time some type of different personalities may experience less difficulty adjusting to a high-pressured working environment (Crant, 2000, Fugate et al., 2004, Savichas and Porfeli, 2012, Hung et al., 2015).

Personality

According to Siommons and Nelson (2007) personality is one of the factors that may contribute to how individuals react to stress. Hotard et al. (1989) showed that introverted individuals with poor social relationships experienced low subjective well-being. Elovainio et al. (2003) showed that neuroticism strengthened the relationship between stress and sickness increase in men which are caused by techno-stress. These studies thus point to the potentially important role of personality on techno-stress. Therefore, the researcher argues that, in the specific situation of technology as a job stressor, personality may moderate the relationship between techno-stress and intention to use technology.

Researchers found that humans reaction and decision making styles are affected by different personality of users so much. Therefore, the role of personality in adapting and using the ERP systems is vital and managers must have special plan for their recruitment and team arrangement. Although there are lots of studies on ERP implementation in recent years, the focus of the relevant literature has been on ERP systems in general and there is limited published scientific evidence on the ERP implementation processes and their effects on accounting in particular (Granlund and Malmi, 2002; Sutton, 2006).

Personality is an important determinant of health and psychological outcomes (Contrada, Et al, 1990; Friedman, 1990). It's clear that stressful experiences and how people cope with them play an important explanatory role (Bolger & Schilling, 1991). An extreme or advanced form of stress that is studied within occupations that have been termed as in the "human service" arena is burnout (Maslach and Jackson, 1981; Cordes and Dougherty, 1993). Burnout has been described as comprising three elements, emotional exhaustion – characterized by a lack of energy and a feeling that one's emotional resources are used up, depersonalization – marked by the treatment of clients as objects rather than people, and personal accomplishment – characterized by a tendency to evaluate oneself negatively. The specific role and influence of emotions in the workplace have been subject to further (and ongoing) research and emotion work has been described as possessing the following characteristics; it is a significant component of jobs that require either face to face or voice to voice interaction with clients; the emotions displayed in these jobs are intended to influence other people's attitudes and behaviors; and the display of emotions has to follow certain rules (Zapf et al., 1999).

In recent years, measurement of work-related personality characteristics has become an increasingly important function of human resources and other organization units tasked with the responsibility for employee selection. The domain of personnel assessment has expanded from an emphasis on job-related knowledge, skill, and abilities (KSA's) to include KSAO's where "O" refers to other personal characteristics, especially personality traits. It is now recognized by researchers and practitioners alike that personality plays a key role in job performance.

Stress research suggests that dispositional (e.g., personality variables, self-efficacy) and contextual variables (e.g., social support) increase the individual's coping ability and thereby act as

buffer mechanisms against stressful situations (Cooper et al., 2001). Resource Associates' Personal Style Inventory (PSI; Lounsbury & Gibson, 2000) is a normal personality inventory that differs from many of the widely used personality instruments (e.g., 16 PF, NEO-PI-R, or Myers-Briggs Type Indicator) in that most of the items were contextualized to work settings. This approach is consistent with research that demonstrates the work-related validity of personality measures can be increased by framing items in terms of work (Schmit, Ryan, Stierwalt, & Powell, 1995). Although the PSI measures many different work-related facets of personality, it also assesses what are termed the "Big Five" personality traits. The Big Five reflects a paradigm shift in the field of psychology, especially personality and individual differences, contending that there is a core set of five broad personality traits that infuse all areas of behavior, including work behavior (DeRaad, 2000; McCrae & Costa, 1987). The Big Five personality traits—Neuroticism, Extraversion, Agreeableness, Openness, and Conscientiousness—have been extensively studied and are supported by an extensive body of empirical research. For example, three meta-analyses (Barrick & Mount, 1991; Salgado, 1997; Tett, Jackson, & Rothstein, 1991) have found that Conscientiousness is a near-universal predictor of job performance, regardless of type of job or industry. In addition, the PSI focuses on elements of the Big Five that are more applicable to work settings. Specifically, the Big Five scales on the PSI are operationally defined as:

- Agreeableness/Teamwork: an adaptation of Agreeableness, reflecting a propensity for working as part of a team; inclined to be cooperative and participative in group projects; values team cohesion and solidarity.
- Conscientiousness: dependability, reliability, trustworthiness, and inclination to adhere to company norms, rules, and values.
- Emotional Stability: the inverse of what others term Neuroticism; it reflects overall level of adjustment, resilience, and emotional stability; indicative of ability to function effectively under conditions or job pressure and stress.
- Extraversion: tendency to be sociable, outgoing, gregarious, expressive, warm-hearted, and talkative.
- Openness: receptivity/openness to change, innovation, novel experience, and new learning.

There are quite few researches focused on the role of personality in the process of being affected by techno-stress. In most researches findings show the effect of personality on organizational performance and the effect of techno-stress on organizational performance. While all researches found the negative relationship between techno-stress and organizational performance, the question arise is which type of personality will be less affected by techno-stress? By there, the answer of the question could lead human resource departments in companies to ensure if the selected candidate for specific job is suitable to work under stress and pressure or not and may have an indicator to measure or at least to predict the future performance of the employees.

There are researches that found different characters show different reaction to stress and the same level of stress could affect employees in different levels. One of the researches which divided employees to two groups of promotion oriented and prevention oriented found that these two groups have different attitude and values in their work that may lead to different approaches to stress in their work. Holland (1996) discussed that people tend to flourish in occupations in which there is an optimal fit between personality and environment; poor fit leads to occupational dissatisfaction and instability. Personality is one of the factors that may contribute to how individuals perceive stress (Simmons & Nelson, 2007). In the last 30 to 40 years, the Big Five Factor Model of personality (FFM; Costa & McCrae, 1992) has received a dominant status in personality related research. The model includes five central personality traits: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. These traits are assumed to be relatively consistent over time and across situations and may be related to how individuals perceive stress. Holand (1966) stated that individuals' personality might affect what types of job demands and Stressors they will perceive as positive and negative.

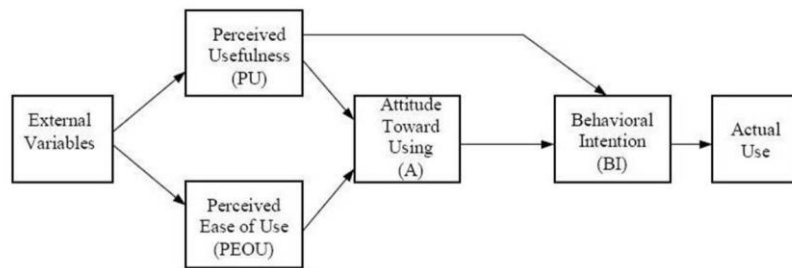


Figure 3. A schematic diagram of tam variables

Hyphotesis

Drawing on available literature, we argue that personality type moderates the relationship between techno-stress and technology acceptance, as schematically demonstrated in Fig 2.

Based on above discussions, we hypothesize that:

1. The more extraverted are the users, the lesser would be the effect of techno-stress on intention to use the technology;
2. The more agreeable are the users, the lesser would be the effect of techno-stress on intention to use the technology;
3. The more conscientious are the users, lesser would be the effect of techno-stress on intention to use the technology;
4. The less neurotic are the users, the lesser would be the effect of techno-stress on intention to use the technology; and,
5. The more open are the users, the lesser would be the effect of techno-stress on intention to use the technology.

Conclusion

In today world, rapid technological advancements increasingly help various businesses further advance their interests. Introducing new technologies to established firms, however, raises various challenges sometimes, if not almost frequently. According to psychological approach to organizational behaviour, one of the significant challenges that sometimes stalemates adoption of new technologies in an organizational setting is a human factor called Techno-stress. Techno-stress is defined as feeling discomfort and uneasiness in dealing with new technologies that are expected to increase a firm's effectiveness and efficiency.

A major path through which techno-stress might hinder technology adoption is through its effect on Perceived Ease of Use of the Technology, alternately called Technology Acceptance. The easier personnel perceive the use of a certain technology in their firm, the readier they will be to adopt that technology. However, rate of technology acceptance decreases with techno-stress.

In our research, Enterprise Resource Planning (ERP) was selected as the test technology since it is one of the latest technologies to be adopted in accounting industry. ERP systems are well-known for being complicated with high risk of failure but with high efficiency if they are implemented successfully. Target participants are employees of local accounting firms which implemented ERP systems. The final results of the research will be presented in the due time.

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