**Communications of the Association for Information Systems**

Volume 43 Article 31

12-2018

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Recommended Citation
Crossler, Robert E.; Di Gangi, Paul M.; Johnston, Allen C.; Bélanger, France; and Warkentin, Merrill (2018) "Providing Theoretical Foundations: Developing an Integrated Set of Guidelines for Theory Adaptation," *Communications of the Association for Information Systems*: Vol. 43 , Article 31.
DOI: 10.17705/1CAIS.04331
Available at: https://aisel.aisnet.org/cais/vol43/iss1/31

Communications of the Association for Information Systems

Tutorial DOI: 10.17705/1CAIS.04331 ISSN: 1529-3181

# Providing Theoretical Foundations: Developing an Integrated Set of Guidelines for Theory Adaptation

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**Abstract:**

Developing and advancing theory in the information systems (IS) discipline requires scholars to use and contribute to theory. While few IS scholars create new theories, many borrow and adapt theories from other disciplines to study a variety of phenomena in the realm of IS. Over time, this practice has raised concerns as to the appropriateness and quality of theories adapted in the discipline. In particular, this practice causes issues when one considers conflicting results from many studies that claim to leverage the same theoretical foundation. We examine the issues surrounding theory adaptation in IS and provide a set of integrated theory adaptation guidelines to help scholars successfully and reliably adapt theory. We illustrate how one might use our guidelines via using Protection Motivation Theory in an organizational information security setting.

**Keywords:** Theory Adaptation, Protection Motivation Theory, Theory Assessment, Theory Translation, Theory Contribution.

This manuscript underwent peer review. It was received 01/27/2017 and was with the authors for 10 months for 2 revisions. Jonny Holmström served as Associate Editor.

# 1 Introduction

Though scholars have not come to a consensus on a definition of theory (Sutton & Staw, 1995), most agree that "a theory is a statement of concepts and their relationships that shows how and/or why a phenomenon occurs" (Corley & Gioia, 2011, p. 12). Gregor (2006) describes information systems (IS) theories as "statements providing a lens for viewing or explaining" phenomena or as "statements of relationships among constructs that can be tested" (p. 613). In other words, a theory provides a lens that allows scholars to focus their attention on particular aspects of a phenomenon while filtering out "noise" in the process (Truex, Holmström, & Keil, 2006). A theory provides a unique perspective for investigating a phenomenon, but it can also provide a limitation if it prevents the investigator from seeing all of the salient or critical elements in the domain of interest. Theories also provide scholars with the ability to generalize findings from specific results to a broader population (Yin, 1994). A lack of theory would severely limit scholars' ability to explore a phenomenon over time in a purposeful manner because they would have no foundation on which to build and expand their understanding (Gregor, 2006; Hirschheim & Klein, 2012).

Weber (2003, p. vi) states:

> *The identity of a discipline is established through the contributions it makes to theory. The core phenomena of the discipline are circumscribed via the theories "owned" by the discipline that account for these phenomena. Disciplinary identity and ownership of theories are inextricably linked.*

In several disciplines, scholars organically develop their own theories (i.e., so-called "native theories"). Native theories refer to those theories that scholars have specifically developed to describe, explain, or predict a phenomenon under investigation (Moody, Iacob, & Amrit, 2010). In many disciplines, however, scholars also borrow theory from "an external (reference) discipline" (Moody et al., 2010, p. 2) and adapt it to a specific phenomenon of interest. The prevalence of theory borrowing can help a young discipline develop credibility as a legitimate domain of scholarly inquiry (Baskerville & Myers, 2002; Whetten, Felin, & King, 2009) and can provide richness and nuance in understanding the relationships between the foci of investigations.

Of course, adapting theories from reference discipline theories has certain risks. One needs to properly adapt theory to ensure that one does not misinterpret the underlying nature of reality (Lyytinen & King, 2004), that one uses the right methodological approaches, and that one does not waste time and effort by working on something that does not apply cumulative value to the discipline and the broader scientific community (Murray, Evers, & Janda, 1995; Truex et al., 2006). One exacerbates such a challenge when one adapts an originating theory from a reference discipline with its own set of praxeological assumptions influenced by its cultural norms, cognitive interests, and social context for theorizing and conducting research (Avgerou, 2013; Murray et al., 1995; Truex et al., 2006). As many philosophers have noted, a discipline coalesces around a paradigm of how to approach its scientific phenomenon (Kuhn, 1970), and these paradigms are embedded in the discipline's physical artifacts (e.g., research articles) and scholars' social interactions (Merton, 1968; Murray et al., 1995; Truex et al., 2006). Without thoroughly understanding both a reference discipline theory's artifacts and the paradigm of practices and methods that scholars used to derive it, one faces a greater potential of misspecifying and misusing the theory (Merton, 1968).

Unfortunately, the IS discipline represents just one of the many research disciplines that must contend with adapting theory and suffers from the problems of theory misspecification and misuse that result from improper adaptation. In reality, most IS research adapts theories from other disciplines (see, e.g., reviews of e-government research (Bélanger & Carter, 2012), technology acceptance (Davis, Bagozzi, & Warshaw, 1989; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2016), decision support systems (Shim et al., 2002), electronic networks of practice (Wasko & Faraj, 2005), group support systems (Fjermestad & Hiltz, 1998, 2000), virtual team leadership (Goh & Wasko, 2012), and information privacy (Bélanger & Crossler, 2011)). IS scholars will likely continue to use and adapt theories from reference disciplines in part due to the IS discipline's cross-disciplinary nature and position at the nexus of technology, applied social psychology, economics, management, organizational theory, and other scientific perspectives from which IS scholars draw their inspiration and insights. One can find evidence of theory misspecification and misuse due to improper theory adaptation primarily in the preponderance of conflicting findings from IS scholars who have applied the same theory to a similar phenomenon. For instance, McCloskey and Igbaria (1998) found conflicting findings in the telecommuting literature, while

behavioral IS security scholars have reported similar problems and highlighted problematic theoretical foundations and definitional issues (e.g., D'Arcy & Herath, 2011).

Given that IS scholars depend on reference discipline theories and given the problems inherent in adapting them to IS-specific phenomena, several scholars have provided guidance for adapting them. For instance, Rose, Jones, and Truex (2005) challenged IS scholars to consider the tenants of a reference theory in reconciling it to a particular phenomenon. Truex et al. (2006, p. 815) synthesized the challenges that theorists face in their theory adaptation efforts and posited four high-level strategic recommendations. Several scholars, such as Weber (2012), Avgerou (2013), and Hong, Chan, Thong, Chasalow, and Dhillon (2014), have since provided often significant additional guidance to achieve these recommendations. However, to date, each theorist has focused on resolving specific theory adaptation challenges, which has resulted in a disconnected, piecemeal body of literature that limits the contributions that IS scholars can make to the broader scientific community. At present, no integrated set of theoryadaptation guidelines that can support scholars in their creative and intellectual pursuits exists.

In this paper, we bridge these gaps that the piecemeal approach to theory adaptation has created and provide an integrated set of theory adaptation guidelines to support IS scholarship. In doing so, we synthesize the extant theory adaptation research foundation to argue that current theory adaptation guidance suffers from 1) inadequate attention on the assumptions and historical contexts that pertain to reference theories, 2) no explicit rationale for selecting a reference discipline theory for adaptation, 3) no strategic guidance for developing a deliberate approach to adapting theories to a new discipline, and 4) no operational guidance for articulating the contributions of an adapted theory to our cumulative understanding of the theory and its phenomena. With this paper, we contribute to the theory adaptation literature by identifying these critical points in the theory adaptation process and offer a set of integrated guidelines to support scholars in their adaptation efforts. While others provide guidance at the meta-theory level, we operationalize the meta-theory guidance as a set of individual adaptation activities that we designed to help scholars highlight their unique theoretical contributions and to ensure the IS discipline matures in its understanding of IS phenomena and theories.

In Section 2, we synthesize the extant theory adaptation literature to develop a set of theory adaptation recommendations that several papers implicitly describe (e.g., Hong et al., 2014; Truex et al., 2006; Weber, 2012). We contribute to this literature by articulating a set of guidelines for theory adaptation that integrates prior work to support scholars when addressing these critical points.

## 2 Theory Adaptation: An Overview of IS Theory Scholars' Efforts

Over the past several decades, many papers in premier IS journals have discussed the challenges to theory adaptation in IS and theorizing in general (e.g., Avgerou, 2013; Baskerville & Myers, 2002; Gregor, 2006; Lyytinen & King, 2004; Sarker, 2016; Truex et al., 2006; Urquhart, Lehmann, & Myers, 2010; Weber, 2003, 2012). Truex et al. (2006) synthesized the cumulative knowledge on adaptation theorizing and presented four strategic recommendations. Specifically, they recommended that, in adapting a reference discipline theory to an IS phenomenon, IS scholars should:

> *1) Consider the fit between the selected theory and the phenomenon of interest, 2) consider the theory's historical context, 3) consider how the theory impacts the choice of the research method, and 4) consider the theorizing process' contribution to cumulative theory.* (p. 815)

Researchers must first select and assess a reference theory to determine whether it fits a specific phenomenon of interest before they can appropriately adapt it, which suggests a pre-adaptation theory selection decision point at which they evaluate a phenomenon and identify a set of reference theories that may be appropriate for adaptation. At this stage, they evaluate the "appropriateness" of each reference theory to the phenomenon to understand its underlying assumptions and historical context, which ultimately leads them to select a single reference theory for adaptation. Truex et al. (2006) also advanced a post-adaptation theory contribution stage in which they recommended that researchers focus on resituating an adapted theory's contributions within the larger, cumulative knowledge of the theory and the phenomenon of interest.

Some recent studies have advocated a variety of additional advice for theory adaptation. Hong et al. (2014) provided recommendations on how to adapt a reference theory to the IS discipline, while Weber (2012) and Avgerou (2013) provided insight into assessing a theory's quality and the role of social mechanisms in social-theoretical IS research, respectively. From these studies, one can articulate an integrated set of theory adaptation guidelines with three broad stages: pre-adaptation theory selection, theory adaptation, and post-adaptation theory contribution.

## 2.1 Pre-adaptation Theory Selection

In any research project that involves theory, one first needs to select a theory for understanding a phenomenon, which remains true regardless of whether the theory comes from the theory's own discipline (e.g., for the IS discipline, the technology acceptance model (TAM)) or from a reference discipline (e.g., protection motivation theory (PMT)). Whether one seeks to explain a new phenomenon or explore a known phenomenon from a new perspective, one needs to select good theory (Truex et al., 2006; Weber, 2012). As such, the first challenge researchers face concerns what theory they choose or, as Truex et al. (2006) succinctly states: "Why did you favor a certain theory versus another?" (p. 800).

Truex et al. (2006) introduced the notion of reflecting on the nature of "fit" between a reference theory and phenomenon. Here, "fit" refers in general to how well the theory explains the "facts" of the object of study. When selecting a theory, preference is given to "well-developed" theories. However, "fit" and "well developed" retain ambiguity in terms of selecting theories from reference disciplines that may each reasonably "fit" the phenomenon and, depending on the focal phenomenon, may vary in their level of development. For instance, two theories may vary in terms of their overall development if one theory's components pertain more to a focal phenomenon than the other's.

Without referencing Truex et al. (2006), Weber (2012) expanded on the "well-developed" notion by articulating an assessment for theory quality. According to Weber (2012), such an assessment begins with generally understanding a reference theory's parts and whole as per the reference theory's literature. However, this assessment lacks a theory's potential "fit" with a potentially new phenomenon. Instead, Weber (2012) focused on the cumulative knowledge about a theory that scholars have developed in its reference discipline and in relation to its focal phenomena to assess the current state of the theory. Using Bunge's (1977, 1979) work on ontology, Weber articulated this assessment approach as a useful guide for deconstructing a reference theory's structural elements and understanding its quality (i.e., its strengths, weaknesses, and places where potential problems may arise in its use). As a result, Weber provided a rigorous guide for evaluating a theory's fit to a specific phenomenon and a set of criteria to determine whether the theory itself is well developed, underdeveloped, or poorly developed (i.e., an appropriate theory for adaptation). However, we need to expand Weber's (2012) parts-whole assessment approach to include the theoretical glue that binds the parts and whole components of a theory's structural elements. Specifically, one also needs to assess the assumptions embedded in the historical context that supported the development of the reference theory to determine its quality and phenomenological flexibility. These assumptions establish a theory's foundation and boundaries and, when explicitly expressed, provide a building block for other scholars who wish to extend the theory into new phenomena.

Historical context refers to the temporal and situational influences on the individuals who theorize and on the constructs in their theories. For example, Lawlor (2016) discusses the historical context that influenced John Maynard Keynes as he developed the influential general theory of economics. He explores the influence of "Keynes' teachers, intellectual influences, business activities and public policy involvements" (p. 3). Disciplines imprint current thinking (at the time of a theory's development) into the theory through their praxeological, or disciplinary, assumptions that guide scholars in selecting specific phenomena to study, determining methodological standards to follow, and how in general they should use the theory. As Truex et al. (2006) note, "If a researcher does not understand enough of the theoretical tradition from its original setting, the researcher opens his/her work to any of the same criticisms of that theory that have already been voiced in the original discipline of inquiry" (p. 807). Thus, IS scholars must fully understand how scholars have previously applied a reference theory to study particular phenomena before considering adapting it to study an IS phenomenon. As Avgerou (2013) notes, researchers' assumptions frame their perceptions and, thus, the constructs and associations (which influence how well a theory applies to specific phenomena) they choose. Thus, scholars who fail to evaluate how research has previously applied a reference theory could cast doubt on the reference theory's validity and value as an appropriate adaptation choice. Therefore, the first gap in the literature on theory adaptation concerns

the lack of attention paid to reference theories' assumptions and to the historical context that surround theories. Thus, the first critical point in the theory adaptation process occurs when evaluating potential theories for adaptation. Therefore, we posit the first theorizing gap (TG):

> **TG1**: Scholars pay inadequate attention to the assumptions and historical contexts that pertain to the reference theories they consider and use.

Even if one incorporated a reference theory's historical context into Weber's (2012) quality assessment, selecting a particular reference theory from a set of reference theories to adapt would still involve uncertainty—especially if one found multiple well-developed theories that appropriately fit the phenomenon one wanted to study. At this point, rigorous theory adaptation focuses on not only helping scholars adapt good theories but also ensuring good science via helping them to select the most appropriate ones that will advance a discipline's understanding of a specific focal phenomenon. Such a goal contributes to Truex et al.'s (2006) notion of building on cumulative theory to make concerted efforts towards understanding phenomena. Of course, any selection criteria will depend on a variety of factors, such as 1) research purpose; 2) theory strengths and weaknesses, which includes potential fit to phenomenon; and 3) researcher judgment. While the final criterion constitutes a critical component to gaining deeper insights into how we might understand a phenomenon and allows scholars to express creativity and intellectual pursuit, the first two factors may benefit from greater structure and rigor.

Unfortunately, neither Weber (2012) nor Truex et al. (2006) provide scholars with guidance about selecting the most applicable reference theory from many they have identified as applicable. Rather, both begin the adaptation process with a selected reference theory already in mind. As we note above, two (or more) reference theories may emerge when one assesses the quality of multiple reference theories with a similar "fit", which means that one has to arbitrarily select a theory for adaptation and justify this selection through, as Weber (2012) describes, rhetoric. Thus, a second critical point in the theory adaptation process occurs when a scholar selects a theory for adaptation and first introduces it to IS researchers as a new theory useful to the discipline and to study its phenomena. Therefore, we posit the second theorizing gap:

> **TG2**: Scholars offer no explicit rationale for why they select a reference discipline theory for adaptation based on its comparable fit among alternative theories.

## 2.2 Theory Adaptation

Once one has selected a reference theory for adaptation, it remains situated in a different set of intellectual circumstances that may not directly translate to a new discipline. For instance, organizational theorists in the late 20th century were overwhelmingly functionalists in nature, which limited the potential diversity in ontological views that one could use to understand organizational phenomena (Gioia & Pitre, 1990). If researchers wanted to select a theory outside this ontological view, they had to align the theory's historical context to the historical context of their discipline to ensure they effectively adapted and established a stable bridge to the reference discipline and, thus, contributed to cumulatively building knowledge in the greater scientific community. Essential to this effort is a researcher's ability to sufficiently translate the reference theory's parts to the phenomenon under investigation. This translation requires one to deeply understand: 1) the reference theory's historical context and 2) the phenomenon one examines to ensure one rigorously translates the theory between disciplines. Unfortunately, one cannot easily overcome this issue because new phenomena in the IS discipline are likely to lack research to provide explanations and because the reference theory can provide only a general approximation of the phenomenon (Hong et al., 2014).

In their guidelines for level-one contextualization theorizing in IS research, Hong et al. (2014) suggest that scholars should add or subtract constructs for adapting a reference theory to a new discipline and phenomenological setting. They use Davis's (1989) removal of attitude from the theory of reasoned action (the reference theory) when building TAM as an example. However, Boss, Galletta, Lowry, Moody, and Polak (2015) raise concerns over arbitrarily including or excluding constructs from a reference theory, and they use protection motivation theory (PMT) as an exemplar. As reference theories likely focus on phenomena either similar to or, at a minimum, tangential to IS phenomena, IS scholars must immerse themselves in each phenomenon they investigate so that they are in tune with their environment, the factors at play, and the relationships among them (Bamberger, 2008a; Johns, 2006). Scholars often observe phenomena from the fringes, which limits their ability to see all the nuances that shape the

behaviors and interactions between technology and people. Influential theory comes from directly observing a phenomenon (Kilduff, 2006).

With greater phenomenon immersion, scholars could more readily identify factors critical to understanding the phenomenon and appropriately evaluate the relevance of these factors to it (Hong et al., 2014). However, given the historical context concern that Truex et al. (2006), Weber (2012), and Avgerou (2013) have raised, we need a more deliberate strategy for adapting theory to ensure that scholars do not a priori add new constructs or subtract core constructs and, thus, inappropriately adapt a reference theory and lack the ability to contribute back to cumulative knowledge about it. Such a strategy would need to provide a method for bridging a reference theory's discipline and the new discipline as one adapts the theory to a new phenomenological setting. To ensure they do not inappropriately modify a reference theory, scholars should initially articulate a set of constructs that they believe to be essential to the theory and then rigorously assess whether they actually are before modifying it (Anderson & Venkatesan, 1987; Murray et al., 1995; Venkatesh et al., 2016). To date, existing literature does not provide clear support on how to avoid inappropriately modifying theory. Thus, the third critical point in adapting theory concerns robustly and appropriately adapting theory. Therefore, we posit the third theorizing gap:

> **TG3**: The literature provides no strategic guidance for a deliberate approach to adapting theory to a new discipline that accounts for its historical context.

## 2.3 Post-adaptation Theory Contribution

Finally, when adapting a reference discipline theory, scholars should evaluate the contributions the theory makes to both the IS and reference discipline's literature and to explaining the phenomenon to which they apply it. Current views lack common criteria to guide both scholars and reviewers when evaluating an adapted theory's contributions and typically favor the researcher's rhetorical ability to justify the theory's contributions (Locke & Golden-Biddle, 1997; Weber, 2012). In many instances, researchers base theory contribution on assessing the contribution's relative novelty (Colquitt & Zapata-Phelan, 2007) or its utility from a practical or scientific perspective (Corley & Gioia, 2011). As the IS community examines dynamic phenomena that are relatively new to many reference discipline theories, it becomes difficult for reviewers and authors to articulate a theory's contributions. Consequently, IS scholars should consider evaluating contributions based on how the adaptation affects the reference theory (novelty from in the existing literature) and its value to our understanding of a phenomenon.

This approach centrally involves demarcating clear boundary conditions for an adapted theory by building on the assumptions one uses to adapt the theory. Therefore, structured criteria may allow researchers to compare results from one study against results from another in existing research, which ensures they develop what Truex et al. (2006) terms cumulative theory. Such criteria may also help scholars in distinguishing between contributions in terms of extending a reference theory (i.e., additional non-context-dependent constructs; removal of constructs for greater parsimony; or revised associations, events, and states), developing middle-range theory contributions (i.e., context-dependent constructs, associations, events, and states), or creating new theory distinct from its origins but native to the IS discipline. Thus, the fourth critical point in adapting theory concerns articulating one's contributions. Therefore, we posit the fourth theorizing gap:

> **TG4**: The literature provides no operational guidance for articulating how an adapted theory contributes to our cumulative understanding of the theory and the phenomena it addresses.

Table 1 depicts the four theorizing gaps and their stages in the theory adaptation process. It also includes the key literature efforts to date in addressing these gaps. In Section 3, we provide guidelines to support scholars during each stage in the theory adaptation process.

**Table 1. Summary of Gaps in the Theory Adaptation Process**

| Gap | Description | Theory adaptation stage | Meta-theory guidance | Meta-theory reference |
|---|---|---|---|---|
| 1 | Scholars pay inadequate attention to the assumptions and historical contexts that pertain to the reference theories they consider and use. | Pre-adaptation theory selection | Phenomenon fit | Truex et al. (2006) |
| | | | Historical context | Truex et al. (2006) |
| | | | Theory quality | Weber (2012) |
| 2 | Scholars offer no explicit rationale for why they select a reference discipline theory for adaptation based on its comparable fit among alternative theories. | From pre-adaptation theory selection to theory adaptation | Social mechanisms | Avgerou (2013) |
| 3 | The literature provides no strategic guidance for a deliberate approach to adapting theory to a new discipline that accounts for its historical context. | Theory adaptation | Research methods | Truex et al. (2006) |
| | | | Level-one contextualization | Hong et al. (2014) |
| 4 | The literature provides no operational guidance for articulating how an adapted theory contributes to our cumulative understanding of the theory and the phenomena it addresses. | Post-adaptation theory contribution | Theory contribution | Weber (2012) |
| | | | Cumulative theory | Truex et al. (2006) |
| | | | Middle range theory | Avgerou (2013) |

# 3 Integrated Theory Adaptation Guidelines

Taken collectively, the theorizing gaps represent critical points in the theory adaptation process. However, researchers have yet to consider these points together, so we lack an integrated set of guidelines. The proposed guidelines that we present in this paper stress the importance of explicitness in a scholar's decisions during these critical periods. Our guidelines present how one should assess a reference theory's assumptions and historical context, select a reference theory, adapt a reference theory to ensure that a bridge between the reference discipline and the new discipline is retained for cumulative theory contribution, and evaluate the adapted theory's contributions to the existing literature and to understand the focal phenomenon. We argue that this explicitness ensures the reference theory's original purpose of serving as a foundation on which scholars can build and expand their understanding of a phenomenon in the IS discipline and across disciplines, which, in turn, allows the broader scientific community to cumulatively contribute to the theory and its development.

In this section, we build on IS theory scholars' prior work by providing the "theoretical glue" that connects each of their contributions together into an integrated set of theory adaptation guidelines while resolving the existing gaps created when linking such contributions together. With this approach, we do not focus on constraining scholars through standardization; rather, we focus on providing scholars with the best opportunity to highlight their unique theoretical contributions while also ensuring the IS discipline can mature in its understanding of IS phenomena and theory. We then illustrate the approach via adapting protection motivation theory (PMT), a health psychology theory, to an organizational information security context. To date, information security scholars have frequently used PMT with contradictory results and, thus, continue to debate its adaptation (e.g., Boss et al., 2015; Johnston & Warkentin, 2010; Johnston, Warkentin, & Siponen, 2015).

## 3.1 Recommendation One: Theory Assumptions

The first gap in the theory adaptation literature concerns scholars' paying inadequate attention to the assumptions and historical contexts that pertain to the reference theories they consider and use. For this paper, we assume one has already identified a phenomenon of interest and conducted a thorough literature analysis to identify an initial group of potential reference theories that may be appropriate for studying the focal phenomenon. As we mention in Section 2.1, these theories could come from a referent discipline or other implementations in one's own discipline. As Murray et al. (1995) suggest, one needs to critically examine a reference theory to determine its potential fit to a focal phenomenon that scholars have never applied it to. While Murray et al. (1995) provide a series of questions for one to ascertain a theory's potential fit to a focal phenomenon, Weber's (2012) theory-quality evaluation contains a more refined assessment technique to decompose a theory into its parts while also retaining the theory's essence through an appraisal of its whole. Specifically, Weber (2012) provides a tool that one can use to understand a

theory's limitations and any potential areas of refinement that may improve the theory's ability to explain a focal phenomenon. Such an approach represents an important condition for understanding what constitutes "good" theory (Wacker, 1998). Because Weber clearly presents his framework in his study, we only briefly review it and illustrate this important step in our theory adaptation guidelines.

As Figure 1 shows, we extend Weber's (2012) framework to include an explicit articulation of a reference theory's assumptions and its historical context to help one understand how the theory was constructed and could be applied to a phenomenon (i.e., Truex et al.'s (2006) notion of a theory's "fit" with a phenomenon). This important step ensures that one can clearly articulate which of the theory's (praxeological, epistemological, and ontological) assumptions one relaxed or removed based on the focal phenomenon. Subsequently, one can specify the theory; that is, decompose the theory into its ontological units (i.e., things, properties, classes, etc.). Once one has appropriately specified the theory, one can assess its parts in terms of its constructs, their associations, states, and the events that drive the states. In this stage, one begins to understand how scholars have defined and applied the theory's constructs over time and conceptualized and tested their relationships. For a dynamic phenomenon, one also begins to understand how events play a role in the states of the constructs and their relationships.

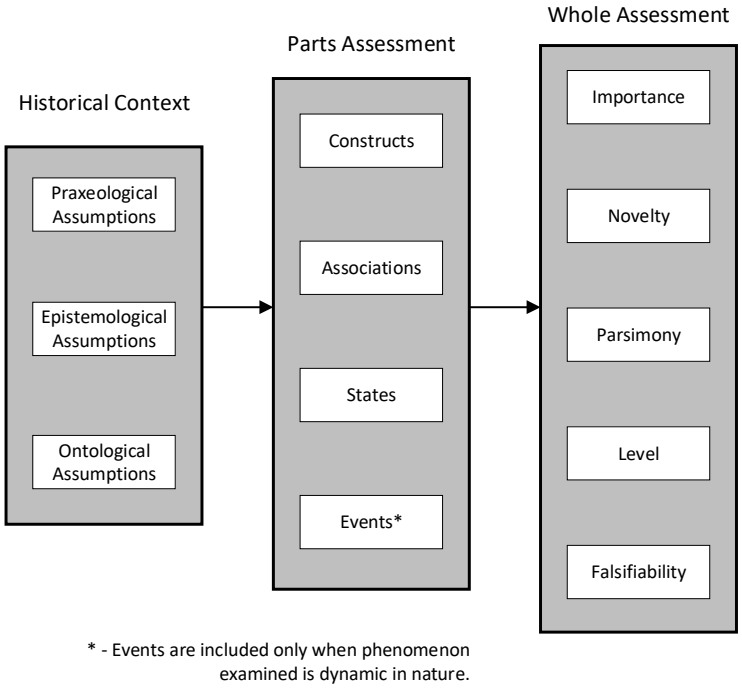


**Figure 1. Extended Weber (2012) Framework for Assessing Theory Quality**

Once one understands a theory's parts, one can begin to assess it holistically in terms of its importance to the literature and in understanding a particular phenomenon or set of phenomena, its parsimony, level of application, falsifiability, and novelty. Throughout this assessment, one needs to provide explicit evidence from the literature that supports their assessment. Note that a reference theory's historical context and assumptions directly influence how scholars have developed it. Thus, the historical context that informs the phenomenon that the theory examines and how other scholars have constructed the theory in terms of its constructs, associations, events, and states will likely temper how one assesses a reference theory's parts and whole. As one assesses a reference theory's overall quality in terms of its potential fit with a new phenomenon, this historical context will strengthen or weaken the theory's overall quality and create opportunities to identify areas where adaptation could improve the theory. This assessment produces the detailed constraints and limitations of the theory as it currently exists. Furthermore, it provides a foundation from which one can evaluate the theory's fit to a new focal phenomenon. One should analyze each possible theory in this way to ensure that one selects the best fitting reference theory to produce good science and develop cumulative knowledge in the greater scientific community. Note that one should not limit oneself to theories form one epistemological or ontological approach. For example, one might find theories from traditional qualitative work as appropriate to consider as a referent theory for emerging quantitative work.

## 3.2 Recommendation Two: Theory Selection Criteria

The second gap in the theory adaptation literature concerns scholars' offering no explicit rationale for why they select a reference discipline theory for adaptation based on its comparable fit among alternative theories. As Weber (2003, in Hong et al., 2014, p. 111) suggests, "parsimonious theories are more favorable, provided that they have reasonable levels of predictive and explanatory power". This suggestion, taken in conjunction with Truex et al.'s (2006) call for assessing the fit of a theory in relation to its power to explain a phenomenon, provides an initial criterion for comparing potential reference theories for adaptation. Specifically, one should select more parsimonious theories over less parsimonious theories (Weber, 2003). For instance, Davis et al. (1989) selected TRA as an appropriate reference theory over the theory of planned behavior (TPB) because they focused on explaining a well-known phenomenon using a reference discipline lens. As a result, they produced a phenomenon-specific adaptation of TRA (i.e., the technology acceptance model).

In addition to applying the parsimony criterion, one should consider how to best account for IS phenomena in a reference theory (Grover & Lyytinen, 2015). Including this assessment helps one to identify the theoretical application that best suits considering the IS phenomena as central to the adapted theory as opposed to as tangential or completely missing. Thus, one will likely produce a novel theory to IS as opposed to simply applying the borrowed theory into a new context (Grover & Lyytinen, 2015). Further, by choosing a theory that best considers IS phenomena, the resulting implementation of the theory will be more likely to contribute beyond the boundaries of the IS discipline and, thus, to the greater scientific community.

However, even after applying the parsimony criterion and considering the IS phenomena, multiple possible reference theories for adaptation may remain, which means that one requires additional guidance to ensure that one selects the most appropriate theory for adaptation. One such criterion pertains to the flaws in a theory's parts as determined from assessing them. Given a set of reference theories with equal parsimony, the theory that contains the fewest flaws in its parts that directly pertain to the focal phenomena may be most appropriate for adaptation over those with more flaws. However, a theory with a higher number of flaws but with flaws that do *not* pertain to the focal phenomenon may be a more appropriate choice for adaptation over a theory with a fewer number of flaws but with flaws that *do* pertain to the phenomenon. In other words, given a set of reference theories with equal parsimony, one should select the theory with the fewest flaws that pertain to a focal phenomenon for adaptation. Such a criterion complements the intention of selecting a more parsimonious model over a less parsimonious model by focusing on reducing the reference theory's weaknesses while minimizing the level of adaptation one needs to make to it so that it pertains to the phenomenon of interest.

If multiple reference theories remain after one applies the criteria for parsimony and the fewest number of applicable flaws, one may find additional guidance to select a theory in one's research purpose in conjunction with the theory's importance, falsifiability, and novelty. For example, if one focuses on introducing a well-established theory into the IS discipline, a reference theory with strong importance in its discipline may be the most appropriate choice for adaptation. If one focuses on a relatively new phenomenon of interest with little previous research, a reference theory with a low degree of falsifiability may be the most appropriate choice. If, however, one focuses on adding perspective to research on a well-studied phenomenon, a theory with a high degree of novelty may be the most appropriate choice for adaptation. Ultimately, the rationale for selecting a theory must rest with the researcher. However, with this paper, we encourage researchers to explicitly discuss this rationale so they demonstrate that they have evaluated appropriate theories that align with their research goals. By doing so, future researchers can better appreciate the historical context of why researchers used a specific reference theory. Further, future researchers can better understand how certain research may contribute to a theory's cumulative development if past researchers have exposed a flaw or weakness in the theory that means either the theory does not pertain to the focal phenomena or requires resolving through the adaptation process.

## 3.3 Recommendation Three: Theory Adaptation

The third gap in the theory adaptation literature concerns the literature's providing no strategic guidance for a deliberate approach to adapting theory to a new discipline that accounts for its historical context.. At this point in adapting theory, initially translating the reference theory to the new focal phenomenon can provide such a bridge. In particular, one should focus on initially translating a theory's assumptions and

parts as Weber (2012) outlines to the focal phenomenon. As Hong et al. (2014) advocate, this initial translation ensures that one explicitly creates (rather than implies) a bridge between disciplines.

Crucially, one needs to explicitly map a reference theory's existing assumptions and parts to the new phenomenon, which includes logical modifications that represent translations between disciplines (e.g., construct labeling based on discipline norms). At this point, one should not add or remove any assumptions, constructs, associations, states, or events from the reference theory because, when analyzing the phenomenon in depth, one may find support for including or excluding them; the more conservative approach involves retaining the reference theory's assumptions and parts without liberal edits. In other words, while one conducts the first part of the adaptation process to the best of one's ability, knowledge gaps can limit it. Any additions to or omissions from a reference theory's assumptions or parts may result in one's misapplying the theory to the new phenomenon. Therefore, one should make every effort to collect insights from actors more closely involved with the phenomenon of interest.

One can use a variety of methods to better understand a phenomenon; however, one may find qualitative approaches as particularly useful since they typically focus on understanding and describing a phenomenon (Eisenhardt & Graebner, 2007; Yin, 2010). Qualitative approaches allow scholars to refine how they initially translate a theory based on understanding the phenomenon in more depth (Alvesson & Kärreman, 2007; Eisenhardt & Graebner, 2007; Hong et al., 2014; Merton, 1968; Murray et al., 1995). Further, by using a qualitative approach, one can also ensure the IS phenomenon remains central in the adapted theory (Grover & Lyytinen, 2015).

## 3.4 Recommendation Four: Theory Contribution to Cumulative Theory

The final gap in the theory adaptation literature concerns the literature's providing no operational guidance for articulating how an adapted theory contributes to our cumulative understanding of the theory and the phenomena it addresses. One can leverage Weber's (2012) framework, which we earlier revised and used to assess reference theories, a second time to analyze such theories. As Figure 2 indicates, this analysis involves comparing a reference theory and its adapted version based on their respective parts and whole. In this analysis, scholars begin to articulate how they have redefined, extended, or reconceptualized the adapted theory's assumptions and parts and how they might position the adapted theory (as a whole) in its existing literature stream. The initial translation (see Section 3.3) is vitally important to this analysis because it bridges the IS discipline adaptation with the reference discipline and, thereby, ensures the cumulative knowledge-building opportunity that theory adaptation creates. The points of differentiation between the two theories become the potential areas from which the adapted theory can contribute to the theory's literature and to the collective knowledge of the IS phenomenon of interest.

Prior scholars have suggested that theory comparisons at this stage represent evaluations of theory contributions and, thus, rely on scholars' rhetorical skills to persuade or justify them (Locke & Golden-Biddle, 1997; Truex et al., 2006; Weber, 2012). Locke and Golden-Biddle (1997) provide a rhetorical strategy for describing a theory's contribution to both the theory's literature and the discipline's understanding of phenomenon. We reconceptualize this description of rhetorical strategy to develop a framework for assessing an adapted theory's contribution to the cumulative knowledge about its reference theory and the phenomena that the adapted theory addresses. By examining the differences in the reference and adapted theories, we can delineate theory contributions to both the literature and IS phenomena.

Locke and Golden-Biddle's (1997) approach suggests that one can assess how a theory contributes to the literature and to our understanding of a focal phenomenon via two criteria: 1) intertextual coherence and 2) problematizing. The intertextual coherence criterion focuses on a theory's contributions to the literature and has three subcategories: 1) synthesized coherence, 2) progressive coherence, and 3) non-coherence. Synthesized coherence represents the degree to which the literature contextually explains the prevailing arguments that concern a theory, its potential application, and limitations. Through synthesis, one can ensure an adapted theory's contributions to the literature pertain to its reference theory by filling in gaps in the literature or by clarifying the conditions in which the adapted theory has relevance in the reference theory's literature. In contrast, progressive coherence represents the degree to which the literature exhibits maturity and refinement over time. It suggests a stepwise progression in which the literature demonstrates an increase in precision due to an adapted theory's advancing the literature through improvements or refinements to it. Lastly, non-coherence represents the degree to which the literature about a theory exposes a lack of understanding or agreement among scholars and, thus, suggests that one can find

potential contributions to the literature in reconceptualizing and developing new theory to repair or mitigate the previous weaknesses.

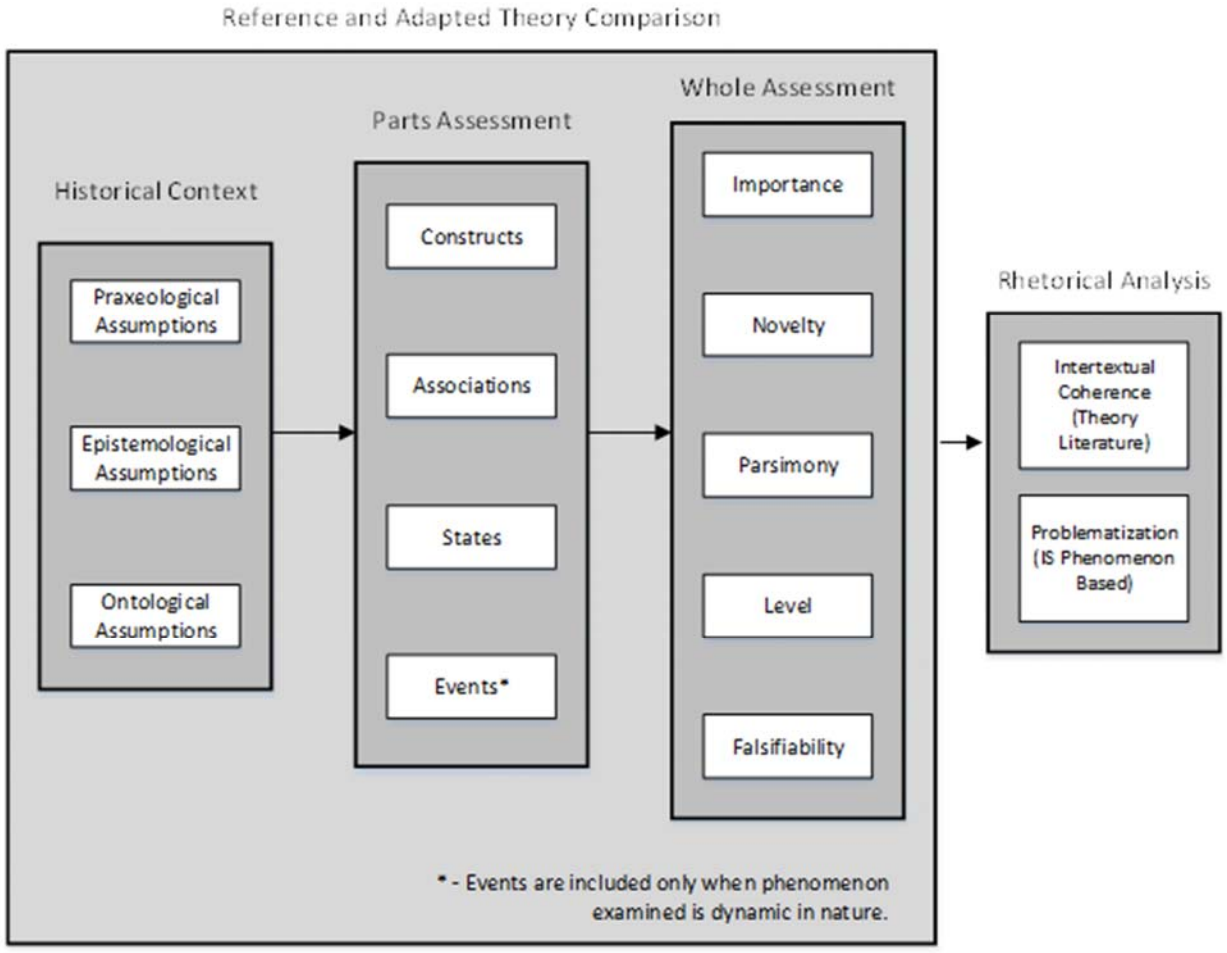


**Figure 2. Evaluation of Adapted Theory for Contributions to Cumulative Theory**

The second criterion for assessing a theory's contribution focuses on problematization. Whereas intertextual coherence focuses on situating a theory's contribution to literature, problematization focuses on demonstrating a theory's value to understanding a focal phenomenon (i.e., essentially on identifying and resolving a research problem) (Alvesson & Sandberg, 2011). Problematization also has three subcategories: 1) incompleteness, 2) inadequacy, or 3) incommensurability. Incompleteness represents the degree to which gaps exist in how scholars have applied a theory to a phenomenon, while inadequacy represents the degree to which scholars have applied multiple perspectives to understand a phenomenon. For instance, examining a phenomenon at a new level of analysis or using a theoretical lens that previously did not exist would constitute a contribution to mitigate inadequacy in how we understand the phenomenon. Finally, incommensurability represents the degree to which scholars have previously applied a theory to a phenomenon in an invalid or insufficient way that has led to poor conclusions or inconsistent results. One must proffer contributions to mitigating incommensurability either as middle-range or meso-level phenomenon-specific theories for the IS discipline (e.g., Avergou, 2013) or as more powerful grand theories with broader implications for research in general. As such, scholars can better understand both the degree to which a contribution is novel and its potential impact on the IS and its reference disciplines.

Ultimately, Locke and Golden-Biddle (1997) focus on the rhetorical strategy that scholars use to position their research in the literature and the potential impact in their discipline. We reconceptualize this work by combining the intertextual coherence and problematizing criteria because the two are inherently intertwined. Figure 3 graphically depicts criteria to evaluate a contribution to theory.

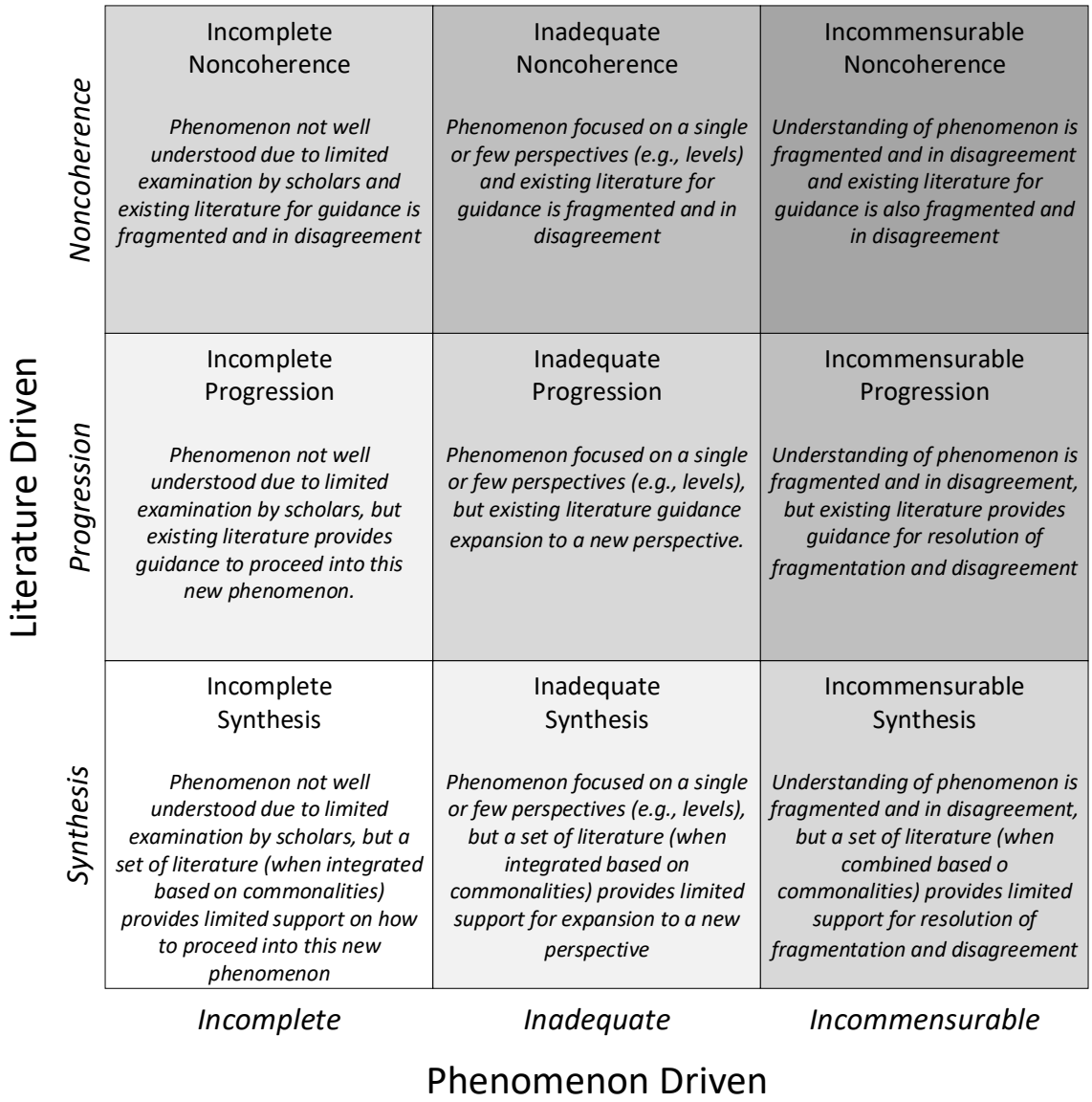


**Figure 3. Evaluation Criteria for Theory Contribution (Adapted from Locke & Golden-Biddle, 1997)**

For instance, one can synthesize the literature to identify a gap in phenomenological understanding (incomplete synthesis contribution) or to advocate for a new perspective (inadequate synthesis contribution). By taking the individual assessments from Weber's (2012) framework and aggregating them to an abstract level, we can articulate a clear, overall contribution. The lowest form of contribution (i.e., incomplete synthesis in the lower-left area of the figure) combines existing literature without interpreting or extending it and only fills a gap in how we understand a phenomenon. This type of contribution suggests the adapted theory primarily extends a theory's previously accepted set of phenomena to include a new phenomenological setting with no change to the existing theory. In contrast, an incommensurable non-coherence contribution (top right) resolves conflict in both the theory's literature and phenomenon, which provides scholars with the ability to advance the discipline beyond its current disagreements. Such a contribution may result in a new IS native theory if reconciling the findings of the adapted theory with the reference theory's existing literature warrants separating the adapted theory's discipline's literature from the existing theory's literature's literature to reduce disagreement or contradiction. A middle ground contribution occurs when we examine a phenomenon with a new perspective when the literature has called for such examination (i.e., inadequate progression contribution; middle of Figure 3) and the resulting adapted theory identifies context-specific constructs, associations, events, and/or states and, thereby, contributes to developing a middle-range theory that may build on cumulative theory.

# 4 Illustrated Example of Theory Adaptation Guidelines: Organizational Employee Security Behavior

In this section, we demonstrate how our guidelines contribute to a refined, more complete approach to adapting theory. Using the IS security behavioral research stream as an illustration, we apply our theory adaptation guidelines to the phenomenon of employee motivation to comply with information security policy (which we refer to as compliance motivation from here on), an organizational employee-security behavior. Our illustration focuses on two competing theories from the social psychology reference discipline, the protection motivation theory (PMT) and the extended parallel process model (EPPM). Researchers have used both theories in the social psychology literature to study how individuals process and cope with threats, a common denominator of policy-compliance behavior.

## 4.1 Step One: Assessing Theory Quality

We recognize that scholars can find the challenges in evaluating potential theories for adaptation to be quite cumbersome. Fortunately, Weber's (2012) theory-quality evaluation enables us to identify two potential theories relevant to studying organizational security. In particular, both theories are well cited in their reference discipline and at the intended level of analysis, and they both have robust literature bases to enable one to appreciate how these theories have developed over time and codified their assumptions. Our extension to Weber (2012) provides a means by which to understand the boundaries of a theory and, ultimately, its approximate fit to a particular phenomenon. Through our first guideline, we can assess both the quality of the individual components that make up a theory (e.g., the precision of construct terminology and definitions) and the range of phenomena to which one can apply it. By applying our extension of Weber (2012) to critically assess a theory, we can come to clearly understand the theory's assumptions, constructs, associations, states, events, and overall constraints and determine if and how we may need to further refine and assess it.

### 4.1.1 PMT and EPPM Theory Assumptions

Both PMT and EPPM have several underlying assumptions that govern their applicability to particular contexts and how one may conceptualize their constructs in a nomological network. While Weber's (2012) framework implicitly explains the role of assumptions, we believe this implicit tone undermines their importance in informing an assessment of a theory's parts and whole, which explains why we extended his framework. Explicit statements of PMT's and EPPM's assumptions inform our assessment of their respective parts and whole. These assumptions emerged over time from the norms for language and meaning that scholars in social psychology established. These scholars understand the PMT and EPPM constructs, such as perceived threat severity and self-efficacy, to have a particular meaning. For instance, they perceive threat severity as "personal" threat severity (Milne, Sheeran, & Orbell, 2000). Based on the directions scholars took, they shaped the purpose and context around the PMT and EPPM constructs. However, when one adapts the constructs outside the reference discipline, scholars often leave their original applied contexts behind and often interpret their meanings in a literal sense. Thus, assessing the theories can help one to identify the assumptions that define their respective boundaries and relevant range.

We assume that PMT and EPPM are behavioral-change theories. Scholars designed them both to capture the influence of a communication event that warns of a threat and provides a recommended threat-response behavior (Milne et al., 2000; Rogers, 1975). To this extent, we understand that the states of the theories' constructs will reflect a state change from pre- and post-communication exposure. Scholars in social psychology intended PMT and EPPM to explain and predict an individual's response to a communicated threat to which an actionable recommended response exists (Milne, 2000; Rogers, 1983; Witte, 1992).

Further, PMT and EPPM assume that the communicated threats must have personal relevance. Without a critical level of personal relevance, individuals will not assess a threat assessment and will lack the motivation to engage in protective behaviors (Johnston et al., 2015; Milne et al., 2000). For the most part, the extant reference discipline literature that involves PMT and EPPM has remained in tune to this assumption since most studies involve threats to one's health or physical wellbeing (Milne et al., 2000; Neuwirth, Dunwoody, & Griffin, 2000).

Both PMT and EPPM articulate threat- and coping-appraisal processes that lead individuals to form either adaptive or maladaptive responses. While they are referenced differently in PMT and EPPM, these processes share an underlying assumption that an individual will either accept or reject a message depending on how the individual assesses the message's expressed threat and efficacy components. However, EPPM differentiates itself from PMT in that it includes fear as an important motivator for threat assessment. For EPPM to apply to a study on threatening communication, the threat must be one that can elicit a sense of fear in the message audience.

### 4.1.2 PMT and EPPM Parts Assessment

Assessing the parts of PMT and EPPM, we can start with an inventory of the theories' constructs, construct associations, construct states, and the events that dictate the states. From reviewing the PMT and EPPM-based literature, we found variation in the terminology studies have used to describe the constructs, variation in whether some of the constructs appear or not, and variation in the associations among constructs (Neuwirth et al. 2000). For instance, some studies refer to threat vulnerability as threat susceptibility (e.g., Melamed, Rabinowitz, Feiner, Weisberg, & Ribak, 1996; Taylor & May, 1996). Several studies omit response cost from PMT (e.g., Orbell & Sheeran, 1998; Rippetoe & Rogers, 1987), and very few include intrinsic and extrinsic rewards (Neuwirth et al., 2000). EPPM does not include response cost at all. In terms of construct associations, the PMT- and EPPM-based literatures offer multiple competing models that confound our understanding of the appropriate model for a particular phenomenon. For instance, some studies include an interaction effect between the threat-appraisal and coping-appraisal constructs, while others do not (e.g., Orbell & Sheeran, 1998). Because scholars have not used EPPM as often, it has remained relatively unchanged since its initial conceptualization (Witte, 1992).

In general, both the PMT or EPPM literatures lack consensus as to the potential states of each theory's constructs, but the vast majority of studies demonstrate a state change for each construct based on pre- and post-communication exposure. However, the literatures do display a general consensus about the events inside the boundaries of PMT and EPPM and those outside their boundaries. The literatures clearly indicate that PMT and EPPM focus on modeling behavioral responses to a communicated threat of personal relevance. Most of these events concern threats to one's safety or health and come from environmental sources (e.g., verbal persuasion, vicarious experience, etc.) or intrapersonal sources (e.g., feedback from prior experiences).

### 4.1.3 PMT and EPPM Whole Assessment

From assessing the whole of PMT and EPPM, we understand the theories to pertain to the individual level and to focus on understanding an individual's response to a communicated threat and a recommended response to the threat. We also understand that much research that involves PMT-based phenomena exists, especially in the healthcare and public safety literatures; in contrast, much less research uses EPPM toward to study similar phenomena (Neuwirth et al., 2000). Therefore, PMT has a strong importance to the social and health psychology literatures, yet, as a result, it has limited novelty in those literature streams. Compared to PMT, EPPM does not have a strong importance but stronger novelty. However, social and health psychology disciplines view PMT as a seminal theory for studying fear appeals and other fear-inducing communications— much more so than EPPM. In terms of parsimony, scholars have extended PMT many times since its inception, which means it has taken on new constructs to provide more explanatory and predictive capability for the variety of phenomena to which scholars have applied it. Consequently, research has regularly empirically tested the many versions of PMT that these extension efforts have produced, yet the tests have mostly produced conflicting results (Neuwirth et al., 2000). Therefore, we can conclude that PMT has a high degree of falsifiability. The opposite situation applies for EPPM: scholars have applied and extended it far less frequently than PMT, and it has a much lower degree of falsifiability. Table 2 summarizes our PMT evaluation, while Table 3 summarizes our EPPM evaluation. We evaluate both theories based on applying our extended Weber (2012) framework to them. These summaries explain each theory's constraints and limitations and preliminary show which theory best pertains to studying compliance motivation and how we may need to translate each one to better fit the phenomenon.

**Table 2. Summary of PMT Theory Quality Assessment**

| PMT's assumptions | |
|---|---|
| 1) PMT is a behavioral-change theory. The theory focuses on modeling threat and coping appraisals to a threat communicated from environmental sources.<br>2) The theory presumes threats to have personal relevance. | |
| **Parts criterion** | **Summary evaluation** |
| Constructs | • The PMT literature espouses competing construct definitions and lacks consistency in the constructs that appear among various PMT adaptations. |
| Associations | • The PMT literature suggests multiple interpretations for construct associations (Neuwirth et al., 2000). In describing PMT's application in the literature, Neuwirth et al. (2000, p. 723) state, "the functional form of the interactions and specific variables involved often differ across studies and are at variance with PMT's original formulation".<br>• The variability in construct inclusion and definition precision inhibits one from rigorously describing the full population of potential associations. |
| States | • The PMT literature lacks consensus as to the potential states of the constructs, but we do expect a state change for each construct based on pre- and post-communication exposure. |
| Events | • The PMT literature displays a general consensus as to the events inside the boundary of PMT and those outside the boundary. The literature clearly indicates that PMT focuses on modeling behavioral responses to a communicated threat of personal relevance.<br>• The communication events can come from environmental sources (e.g., verbal persuasion, vicarious experience, etc.) or from intrapersonal sources (e.g., feedback from prior experiences). |
| **Whole criterion** | **Summary evaluation** |
| Level (relevant range) | • PMT is an individual-level theory that focuses on understanding an individual's response to a communicated threat and recommended response to the threat. |
| Importance | • Much research that involves PMT-based phenomena exists. |
| Novelty | • The referent discipline views PMT as a seminal theory for studying fear appeals and other fear-inducing communications. |
| Parsimony | • With many extensions over the years, PMT has evolved to encompass several new constructs (e.g., threat susceptibility, threat vulnerability, rewards, response efficacy, self-efficacy, and response costs). As such, scholars must tread carefully in determining which models best pertain to their particular phenomenon of interest. |
| Falsifiability | • Several studies have empirically tested various models of PMT but with inconsistent results. |

**Table 3. Summary of EPPM Theory-quality Assessment**

| EPPM's assumptions | |
|---|---|
| 1) EPPM is a behavioral-change theory. The theory focuses on modeling threat and coping appraisals to a communicated threat from external stimuli.<br>2) The theory presumes threats to have personal relevance.<br>3) The theory presumes threats to be able to induce fear. | |
| **Parts criterion** | **Summary evaluation** |
| Constructs | • The EPPM literature espouses relatively similar construct definitions and displays consistency in the constructs that appear among various EPPM adaptations. |
| Associations | • The EPPM literature suggests consistency in construct associations (Neuwirth et al., 2000). |
| States | • The EPPM literature displays little consensus as to the potential states of the constructs, but we do expect a state change for each construct based on pre- and post-communication exposure. |
| Events | • The EPPM literature displays a general consensus as to the events inside the boundary of EPPM and those outside the boundary. The literature clearly indicates that EPPM focuses on modeling behavioral response to a communicated threat of personal relevance.<br>• The communication events can come from external stimuli (e.g., verbal persuasion, vicarious experience, etc.) or from intrapersonal sources (e.g., feedback from prior experiences). |

**Table 3. Summary of EPPM Theory-quality Assessment**

| Whole criterion | Summary evaluation |
|---|---|
| Level (relevant range) | EPPM is an individual-level theory that focuses on understanding an individual's response to a communicated threat and recommended response to the threat. |
| Importance | Much research that involves EPPM-based phenomena exists. |
| Novelty | The referent discipline views EPPM as a relatively new theory for studying fear appeals and other fear-inducing communications. |
| Parsimony | With few extensions over the years, EPPM has remained relatively stable but still less parsimonious than PMT dues to its being an extension of PMT. |
| Falsifiability | A relatively small number of studies have empirically tested EPPM. |

## 4.2 Step Two: Select Theory for Adaptation

To determine which of the two reference theories to adapt to the compliance motivation phenomenon, we consider them relative to the theory-selection criteria that we propose in this study. Specifically, we focus on 1) research purpose, 2) theory strengths and weaknesses (which includes potential fit to phenomenon), and 3) researcher judgment.

For our research purposes, we sought a theory that information security scholars have used and that has inconsistent results that theory adaptation may potentially explain. Information security scholars have used both EPPM and PMT with inconsistent findings; thus, we turn to our second criteria and look at each theory's relative strengths and weaknesses. Relative to EPPM, PMT has more parsimony, a greater importance in the social psychology literature, and a lower degree of falsifiability. Also, EPPM has an underlying assumption that may impede its applicability to studying compliance motivation: it assumes fear is associated with the communicated threat. Information security threats are not always personally relevant and able to elicit a fear response. Thus, EPPM may not be an appropriate lens through which to examine threat mitigation from information security compliance behavior. Lastly, we decided to examine PMT due to the current debate unfolding around PMT in information security about its adaptation from health psychology and believe this exemplar could provide guidance to scholars who wish to adapt PMT to the IS discipline. For these reasons, we argue that PMT represents a more appropriate choice for adaptation to the compliance motivation phenomenon.

Note that, through this selection rationale, we purposely provide a supportive criterion that enables scholars to inject their creativity and intellectual curiosity into the research process. The explicit rationale for selecting a theory for adaptation ensures that scholars codify the praxeological assumptions that guide them so future scholars can call on said assumptions in future adaptations in both the IS or other disciplines.

## 4.3 Step Three: Translate and Adapt Theory

Since we have identified PMT as a more appropriate choice than EPPM for studying compliance motivation, we now follow an initial translation approach to adapting PMT to the phenomenon as our guidelines recommend. To accomplish this task, we use Keuchler and Vaishnavi's (2012) logical form and semantic-mapping approach to theory development. This approach uses a variety of techniques for taking an abstract representation of a theory and translating it to IS-specific phenomena. Analogical reasoning plays a key role in this step in that it focuses on the similarities between how a theory's reference discipline has applied the theory to explain phenomena and what we know about how likely one is to successfully apply it to new phenomena. As Keuchler and Vaishnavi (2012) advise, one should apply analogical reasoning liberally to the mapping based on one's understanding of the focal phenomenon. However, one must validate the translations against a deeper understanding of the focal phenomenon via a rigorous research methodology. Further, this approach produces a theory artifact in the form of a translation table that enables one to connect PMT factors from the reference discipline with their adapted factors that align with the context of the study. This artifact provides explicit connection between the two disciplines and information that future scholars can build on to ensure they retain the cumulative-contribution link as they adapt the theory to a new discipline.

We begin by initially translating PMT to the compliance motivation phenomenon to ensure we explicitly connect the theory's discipline to the IS discipline for cumulative theory contributions. We first posit

potential adaptation points and then confirm these adaptations via analyzing the focal phenomenon in depth. We rely primarily on analogical reasoning to translate PMT's constructs, associations, states, and events to the compliance motivation phenomenon. We then validate this initial translation using thematic analysis.

### 4.3.1 PMT Initial Translation

As we describe in Section 4.1, PMT has several underlying assumptions. One must account for such assumptions when initially translating a theory to a focal phenomenon. First, we must account for the fact that PMT is an individual-level behavioral-change theory. Scholars designed it to focus on explaining and predicting an individual's behavioral response to a communicated threat. Therefore, communication events (typically referred to as fear appeals) constitute the relevant events that influence the state of its constructs. Second, we must account for the fact that the communicated threats must have personal relevance. Threats to individuals' information assets differ from threats to their health, and, thus, we do not regard them in the same light in the translation. For example, threats to individuals' health (e.g., skin cancer, lung cancer, venereal disease, and car accidents) are personal, and, thus, individuals will likely assess such threats with more scrutiny than threats to their organizational information assets, which have less personal relevance but still maintain some relevance through individuals' connection to their firm. Therefore, we translate the threat appraisal constructs—threat severity and threat susceptibility—in a way that reflects the personal nature of the threat assessment.

Based on these observations, we first adapt PMT's central assumptions to fit the focal phenomenon that includes an organizational context and, more importantly, organizational relevance as it relates to security threats. We need to slightly extend the first assumption to incorporate the interpersonal information sharing that occurs in an organizational environment. We also need to narrow the second assumption to include the organizational context so that it includes only threats that presume personal *and* organizational relevance because organizations typically care about the personal relevance of a threat only when it occurs in conjunction with threats to the organization as well. For instance, a new malware attack on a specific mobile operating system may create a personally relevant threat to an individual. However, the organization may not consider this attack as a relevant threat if its organizational infrastructure supports a competitor's mobile operating system and only approved employer-controlled devices. However, personal mobile-device security may become an organizational issue when the organization allows its employees to attach their personal mobile devices to its network infrastructure. Therefore, an adaptation of PMT must adhere to both revised assumptions given the new focal phenomenon.

Rogers (1983) originally viewed PMT's intrinsic and extrinsic personal rewards component as a way to capture how individuals assess the benefits that they perceive they gain from not adopting the recommended threat response. While this component has a minimal presence in the PMT literature (Milne et al., 2000), we include it in our initial translation of the theory by positioning it as a negative predictor of compliance motivation. In terms of efficacy appraisal, the constructs self-efficacy and response efficacy are generally similar across contexts. Therefore, the adapted constructs mirror those that the reference discipline literature provides. Response costs and fear are similar to efficacy appraisal in that assessing the fear from a threat and the costs of responding to a threat are consistent across contexts. Table 4 shows our initial translation of PMT's assumptions and constructs to the compliance motivation phenomenon.

**Table 4. PMT Initial Translation**

| PMT assumptions | Initial translation | Semantic rationale |
|---|---|---|
| PMT is a behavioral-change theory. PMT focuses on modeling threat and coping appraisals to a threat communicated from environmental sources. | PMT is a behavioral-change theory. PMT focuses on modeling threat and coping appraisals to a threat communicated from environmental sources. | Organizational settings facilitate interpersonal information sharing. The second assumption must narrow the scope of the theory to the organizational context and include only threats that depict personal *and/or* organizational relevance. |
| The theory presumes threats to have personal relevance. | The theory presumes threats to have personal and/or organizational relevance. | Organizations typically care about the personal relevance of a threat only when it also represents a threat to the organization. |
| **PMT constructs** | **Initial translation** | **Semantic rationale** |

**Table 4. PMT Initial Translation**

| | | |
|---|---|---|
| Threat severity | Personal threat severity | To elicit a behavioral response, communicated threats must have personal relevance. |
| Threat vulnerability | Personal threat vulnerability | To elicit a behavioral response, communicated threats must have personal relevance. |
| Intrinsic and extrinsic personal rewards | Intrinsic and extrinsic personal rewards | Intrinsic and extrinsic personal rewards maintain common meaning in both health-related and organizational contexts. |
| Self-efficacy | Self-efficacy | Self-efficacy maintains a common meaning in both health-related and organizational contexts. |
| Response efficacy | Response efficacy | Response efficacy maintains a common meaning in both health-related and organizational contexts. |
| Response costs | Response costs | Response costs maintains a common meaning in both health-related and organizational contexts. |
| Protection motivation | Compliance motivation | Only one security goal, protection, constraints protection motivation. Motivation for IS security policy compliance extends beyond protection. Employees are motivated to comply with IS security policies for protection and remediation purposes. |
| **Reference theory associations** | **Initial translation** | **Semantic rationale** |
| Threat severity and threat vulnerability are direct negative antecedents of self-efficacy and response efficacy. | Personal threat severity and personal threat vulnerability are direct negative antecedents of self-efficacy and response efficacy. | No evidence at this time suggests that the general relationship structure between the threat and efficacy variables is not consistent with the original PMT relational model. |
| Threat severity and threat vulnerability are direct positive antecedents of compliance motivation. | Personal threat severity and personal threat vulnerability are direct positive antecedents of compliance motivation. | No evidence at this time suggests that the general relationship structure between the threat variables and compliance motivation is not consistent with the original PMT relational model. |
| Self-efficacy and response efficacy are direct positive antecedents of protection motivation. | Self-efficacy and response efficacy are direct positive antecedents of compliance motivation. | No evidence at this time suggests that the general relationship structure among the efficacy variables and compliance motivation is not consistent with the original PMT relational model. |
| Intrinsic and extrinsic personal rewards are direct negative antecedents of protection motivation. | Intrinsic and extrinsic personal rewards are direct negative antecedents of compliance motivation. | No evidence at this time suggests that the general relationship structure between intrinsic and extrinsic personal rewards and compliance motivation is not consistent with the original PMT relational model. |
| Response costs is a direct negative antecedent of protection motivation. | Response costs is a direct negative antecedent of compliance motivation. | No evidence at this time suggests that the general relationship structure between response costs and compliance motivation is not consistent with the original PMT relational model. |
| **Reference theory states** | **Initial translation** | **Semantic rationale** |
| The states of the constructs range from low to high. | The states of the constructs range from low to high. | No evidence at this time suggests the states of the translated constructs will not mirror the original PMT construct states. |
| **Reference theory events** | **Initial translation** | **Semantic rationale** |
| The events that set the PMT construct states include communicated threats of personal relevance from environmental or intrapersonal sources. | The events that set the translated construct states include communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources. | Similar to the semantic rationale for translating the assumptions of PMT, the events also now include organizational communication activities from interpersonal sources. |

PMT's construct associations, states, and events remain relatively unchanged following their initial translation. At this point in the adaptation process, we have no reason to believe that the theory's relationship structure, states, and events differ when applied to the IS security policy compliance motivation phenomenon.

Because our initial translation process uses semantic rationale, we analyzed our phenomenon in depth to ensure the initial translation was appropriate. We conducted a qualitative case study using a relatively large and diverse organization that employed over 24,000 individuals in numerous facilities across the United States (with the vast majority concentrated in the Southeastern region) as a research site to examine IS security policy compliance motivation. We interviewed 12 employees from this organization over a six-month period. To ensure a diverse sample population, we solicited individuals from a variety of job roles and levels, including traditional administrative roles such as human resources, research scientists, and upper-level managers. All participants possessed at least a graduate degree, and six had completed an advanced doctoral degree program. Tenure in the organization ranged from two to 29 years with an average of just over 12 years. Eight of the individuals we interviewed were male, one was a Pacific Islander, two were Asian, three were African American, and the remainder were Caucasian.

To analyze the data for theory translation, we developed an initial codebook for thematic analysis based on reviewing the PMT literature. Data collected from the interviews provide insights into how employees respond to communicated warning of threats to their information assets. The second and third authors conducted initial coding and then refined the codebook to ensure the reliability and validity of the analysis. The inter-rater reliability of the coding was greater than 90 percent, which suggests a reliable codebook (Landis & Koch, 1977).

### 4.3.2 Validation of Initial Translation

From analyzing the interview data, we confirmed that IS security policy compliance motivation is an event-driven phenomenon. In describing her reaction to communications surrounding a recent malware infestation event (see below), one of the interviewees stated: "Security hasn't even crossed our minds until now". Another interviewee commented: "I haven't heard a conversation about [security] until now" and "We never even thought about security until now". Only when the organization communicates threats to employees and situates elements of the IS security policies as prescriptive guidance for addressing the threats do we begin to see evidence of the themes that shape employees' perspectives and responses.

Several salient factors of employees' perspectives and responses to fear appeal communications become apparent as does the relational structure of the factors in motivating IS security policy compliance. From analyzing the interview data, we found a need to clarify, alter, and/or remove several constructs that we included in our initial translation of PMT to the focal phenomenon; specifically, we found that we needed to refine some constructs' focus from communicated threats of personal relevance to communicated threats targeted at information and data assets. We also found that several new constructs and associations among the constructs emerged. Table 5 lists the constructs, their definitions, potential states, and events that motivate their states as refined from our thematic analysis. We further describe the refinement process in the next paragraphs.

In terms of threat assessment, we found that employees regard the assets in an IS security policy compliance context to have shared value: value to both the individual and to the organization. Therefore, when assessing threats to these assets, employees consider how the threat impacts them directly and through its impact on their organization indirectly. Employees make this assessment in terms of the severity of the threat and their and their organization's vulnerability to the threat. For instance, one interviewee speaking about data theft noted: "I wasn't really that concerned with what was being stolen, but I knew that others were and their pain is really my pain too". This quote points to the shared value of the threatened assets and the notion that, while the employee perceived the data theft threat as directly insignificant (severity and vulnerability), the employee found it indirectly significant due to its potential to harm the organization.

Our findings also suggest that, when considering their efficacy to perform a recommended action in response to a personal threat, employees' self-efficacy does not depend as much on other factors as when determining their efficacy to comply with policy. When assessing communicated policy, employees need to sufficiently recognize and understand what is being communicated to form a perception of both the policy's efficacy and their own efficacy to protect the policy or engage in recovery solutions. Therefore, the factor policy comprehension emerged from the interview data. When an organization positions a

security policy as the recommended response to a particular threat or general set of threats, an individual's ability to execute the policies depends on the individual's ability to comprehend the policy (self-efficacy) and to comprehend its potential effectiveness (response efficacy). As one of the interviewee's stated: "Knowing what the policy is makes a difference. It seems as though the policies that are in place are more stringent than we perceive the need for.".

**Table 5. PMT Revised Translation**

| Construct (persistent, refined, or new) | Definition | States (potential set of construct values) | Events (activities that shape the construct states) |
|---|---|---|---|
| Personal threat severity* *(refined)* | Degree to which one perceives a threat as harmful to oneself | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Organizational threat severity* *(refined)* | Degree to which one perceives a threat as harmful to one's organization | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Personal threat vulnerability** *(refined)* | Degree to which one perceives a threat as likely to inflict harm on oneself | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Organizational threat vulnerability** *(refined)* | Degree to which one perceives a threat as likely to inflict harm on one's organization | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Self-efficacy *(persistent)* | Degree to which one perceives one can comply with policy | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Response efficacy *(persistent)* | Degree to which one perceives policy to be an effective solution to a threat | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Response costs *(persistent)* | Perceived burden associated with complying with policy | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Personal non-response costs*** *(new)* | Perceived personal costs associated with non-compliance with policy | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Organizational non-response costs*** *(new)* | Perceived organizational costs associated with non-compliance with policy | High, moderate, low | Communicated threats of personal and/or organizational relevance from environmental, intrapersonal, and/or interpersonal sources |
| Communication clarity *(new)* | Degree to which communication is clear and apparent | High, moderate, low | Response team meetings, employee gatherings, policy reminders, fear appeals, and other communicated threats |
| Policy comprehension *(new)* | Degree to which one understands policy | High, moderate, low | Response team meetings, employee gatherings, policy reminders, fear appeals, and other communicated threats |
| Note: * dimensions of threat severity; ** dimension of threat vulnerability; *** dimension of non-response costs | | | |

Communication clarity also emerged as another factor with a direct influence on efficacy assessment. Many of the interviewees mentioned confusion about the security policies their organization asked them to follow and pointed to the method of communication as the primary culprit for their lack of understanding or preparedness in following them. One interviewee in particular pointed to the evolution of how the organization distributed temporary "WiFi" passwords to guests and insinuated that the organization changed when and how it distributed guidance about the passwords and that, eventually, informal channels of communication became the primary means by which employees learnt about the changes. As he noted, fellow employees communicated the policy for this issue through "more of a peer influence. We sort of help them understand what is okay, what is not okay, why you shouldn't do this, and why you shouldn't do that.". Another interviewee stated: "Some people respond best to the printed word and then some people have a hard time internalizing that for behavior, so when you give them an example, a story, something they can relate to, they remember". From these interview data, we see the importance of communication clarity in motivating employees to comply with policies; indeed, poor communication clarity has a detrimental impact on self-efficacy and the perceived efficacy of the policies.

The interview data supports response costs as an important condition for policy compliance. As the costs associated with engaging in policy increase, the likelihood of complying with policy decreases. As one interviewee stated:

> *There's a range of...there's a range, I mean some of them are seen locking the door, seen as being a common sense sort of thing, other ones are seen as excessive. The requirement that our laptops be encrypted for example is one that widely was perceived as being overkill. It varies from one policy to the next.*

While the interview data provided support for intrinsic or extrinsic rewards that stem from IS security policy non-compliance, some interviewees cited the costs associated with non-compliance (both to the interviewee and to the organization) as instrumental in their compliance decisions. This perception differs from intrinsic and extrinsic rewards and from response costs in that it focuses on the penalties potentially imposed from non-compliance with a recommended response. Therefore, personal and organizational non-response costs represent new constructs in the adapted theory. From analyzing the construct relationships expressed in the interview data, we generated a variance model for how the constructs relate to one another (see Figure 4). Developing a variance model in this manner (theory adaptation) contrasts with how many scholars generate models based on integrating existing models. We ground our approach in the focal phenomenon and, thereby, provide a degree of parsimony otherwise unobtainable.

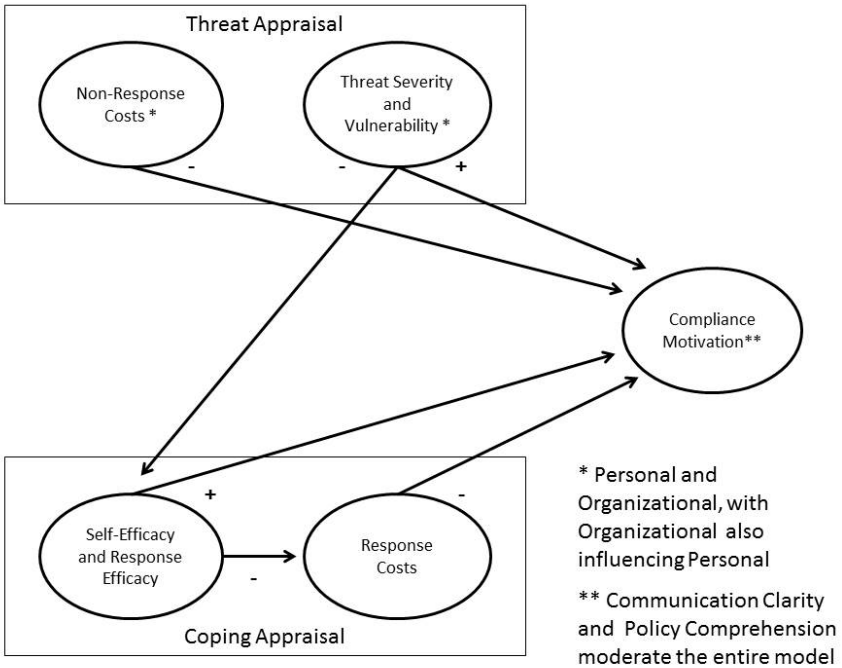


**Figure 2. Adapted PMT Variance Model**

## 4.4 Step Four: Assess and Compare the Theory's Contribution

The final step in our theory adaptation guidelines requires that we evaluate the adapted version of PMT based on the IS security compliance motivation phenomenon and the existing literature on PMT to derive cumulative theory contributions and advance our understanding of compliance motivation. First, we compare the adapted theory's quality to the reference theory's quality. Second, we analyze the adapted theory's contribution(s) to the literature and to the focal phenomenon.

### 4.4.1 Theory Comparison

For the assumptions and parts of theory, we improved the adapted PMT via the translation process that we describe for step three. Through the hybrid thematic-analysis approach, we refined PMT's assumptions and parts to fit the IS security policy compliance motivation phenomenon. Specifically, we extended the assumptions of PMT to include phenomena at the organizational level, including events (threat incidents) with impacts on both the personal and organizational levels. As such, we also extended threat sources to include interpersonal sources that exist in an organizational setting. We also clarified the definitions of various constructs and associations among the constructs, removed some constructs and associations that do not pertain the IS security policy compliance motivation phenomenon, and added others that do.

In terms of the whole assessment, we extended PMT from an individual level to an organizational level and, thereby, provide a means by which to understand the influence of threats (with impacts on both the individual employee and the employing organization) that emanate from an organizational setting. The adapted theory is both important and novel to the IS literature and, in particular, to studying IS security policy compliance motivation since most studies that have examined this phenomenon have done so in an organizational environment. The adapted theory has more parsimony than the reference discipline PMT in that its constructs and associations precisely pertain to the phenomenon of interest. This precision directly results from our triangulating interview data, documentary evidence, and other evidence that we collected as part of the translation process. This precision also provides a better footing by which scholars can empirically test the adapted theory for falsifiability.

### 4.4.2 Contributions to Theory

We can summarize our contributions to the PMT literature and to the understanding of IS security policy compliance motivation in multiple ways (Locke & Golden-Biddle, 1997). From synthesizing the PMT literature, we found many conflicts among scholars that have used PMT. Consequently, our adaptation process mitigates these conflicts by providing clear definitions and associations among PMT constructs. Based on this newfound clarity, we progress PMT to a new phenomenological context— a form of middle-range theory contribution (Avgerou, 2013; Bamberger, 2008b).

Whereas scholars have historically used PMT at the individual level, our PMT adaptation examines organizational-level compliance behaviors in an organizational setting. As such, it seems that scholars have insufficiently considered multiple perspectives when examining such behaviors in the past. By adding this new organizational-level perspective, we identified additional theory assumptions, constructs, and construct associations, which help more holistically explain the phenomenon while simultaneously progressing the PMT literature. Using our reconceptualization of Locke and Golden-Biddle's (1997) rhetorical strategy approach for evaluating contribution for cumulative theory, our parts assessment suggests an incomplete non-coherence contribution because we provide clarity to a fragmented literature stream with wide disagreement about PMT's construct definitions and associations when applied to an organizational context. In contrast, our whole assessment suggests an inadequate progression contribution because we answer the call from prior security scholars about examining the phenomenon at an organizational level. Overall, both contributions suggest a middle-range, context-specific theory contribution. Table 6 summarizes the translation results and contributions to the PMT literature and the IS security policy compliance motivation phenomenon.

**Table 6. Theory Contributions Summary**

| Assumptions | Contributions |
|---|---|
| 1) PMT is a behavioral change model. As such threat and coping appraisals were intended to be in response to a communicated threat, from environmental sources or from intrapersonal and/or interpersonal sources.<br>2) Threats are presumed to have both personal and organizational relevance. | We extend PMT's assumptions to include organizational contexts, which extends the theory's relevance beyond the individual context to the organizational context. To this extent, we contribute to advancing the PMT literature while resolving an inadequacy in perspectives for studying the IS security policy compliance motivation phenomenon (inadequate progression). |

| Parts criterion | Summary evaluation and differentiation (based on comparing the new theory to the old theory) | Contributions (contribution type[1]) |
|---|---|---|
| Constructs | • We added communication clarity and policy comprehension<br>• We added personal and organizational non-response costs<br>• We refined threat severity and vulnerability to add the personal and organizational-specific dimensions<br>• We removed fear and intrinsic and extrinsic rewards were | We help to resolve non-coherence in the PMT literature by clarifying construct definitions and associations among constructs central to PMT. We also help to resolve incompleteness in how the IS security policy compliance motivation phenomenon has been explored by adding and refining constructs, associations, and events specific to PMT's application to the phenomenon. |
| Associations | • We determined communication clarity and policy comprehension to have a moderating influence on the entire model<br>• We found personal and organizational non-response costs to have a negative influence on compliance motivation | |
| States | • No new contribution | |
| Events | • In line with one of the underlying assumptions of PMT, the events are fear appeals or persuasive communications that involve a threat warning and a recommended policy compliance response | |
| Falsifiability | • Revised constructs and associations may lead to a more easily testable model for the revised theory for quantitatively testing the focal phenomenon | |
| **Whole criterion** | **Summary evaluation and differentiation** | **Contributions** |
| Level (relevant range) | • We extend an individual-level theory focused on IS security policy compliance in response to a communicated threat | By extending the level of application from the individual level to the organizational level, we help to resolve an inadequacy of perspective that has plagued the study of IS security policy compliance motivation in organizational settings. We also contribute to advancing the PMT literature by translating PMT to a new phenomenon and adding clarity to the model when addressing threats in an organizational setting. |
| Importance | • The adapted theory potentially has a high level of importance because existing PMT applications in the IS literature (particularly to the phenomenon of IS security policy compliance motivation) misspecify PMT and its underlying assumptions | |
| Novelty | • We adapt PMT to the IS discipline and expand the revised theory to apply to the IS security policy compliance phenomenon. | |
| Parsimony | • The adaptation process we used resulted in a more parsimonious outcome than prior research by translating PMT constructs to the focal phenomenon<br>• Adapted theory ensures only applicable constructs remained | |
| Falsifiability | • Revised constructs and associations may lead to a more easily testable model for the revised theory for quantitatively testing the focal phenomenon. | |

[1] See Figure 4 for details describing contribution type.

# 5 Contributions and Implications

Adapting a theory from one discipline to study phenomena in another has its share of risks, such as the potential for theory misspecification and misuse. Over the years, IS scholars (e.g., Avgerou, 2013; Hong et al., 2014; Truex et al., 2006; Weber, 2012) have noted these risks and their detrimental impact on the IS discipline. They have also provided guidance for scholars to mitigate these risks while adapting theory. Due to their naturally focusing their attention on the adaptation process's individual components, scholars have created gaps between their contributions that need further refinement and mitigation. In this paper, we synthesize previous guidance and identify four key gaps in the existing literature on theory adaptation. We contribute to the theory adaptation literature by developing practical mitigation strategies to ensure a rigorous theory adaptation approach. In doing so, we make several contributions to the IS discipline and its scholars' theory adaption efforts. Table 7 restates our identified theory adaptation gaps, the existing meta-theory guidance, and our integrated operational guidance to adapt a reference theory to the IS discipline and its phenomena.

**Table 7. Bridging the Gaps in the Theory Adaptation Process**

| Gap | Description | Meta-theory guidance | Meta-theory reference | Our proposed operational guidance |
|---|---|---|---|---|
| 1 | Scholars pay inadequate attention to the assumptions and historical contexts that pertain to the reference theories they consider and use. | Phenomenon fit | Truex et al. (2006) | 1) Integrate historical context when assessing theory quality, which includes its praxeological, epistemological, and ontological assumptions.<br>2) Assess theory quality in relation to reference discipline literature and the focal phenomenon to identify potential areas of weakness.<br>3) Explicitly articulate the reference theory's assumptions and historical context. |
| | | Historical context | Truex et a.l (2006) | |
| | | Theory quality | Weber (2012) | |
| 2 | Scholars offer no explicit rationale for why they select a reference discipline theory for adaptation based on its comparable fit among alternative theories. | Social mechanisms | Avgerou (2013) | 1) Provide explicit rationale for selecting a theory.<br>2) Select theory based on key criteria: research purpose, theory strengths and weaknesses (including parsimony and potential fit to focal phenomenon), and researcher judgment. |
| 3 | The literature provides no strategic guidance for a deliberate approach to adapting theory to a new discipline that accounts for its historical context. | Research methods | Truex et al. (2006) | 1) Explicitly map reference theory to the translated adapted theory based on the focal phenomenon, including its existing assumptions and individual parts (see Weber, 2012). |
| | | Level-one contextualization | Hong et al. (2014) | |
| 4 | The literature provides no operational guidance for articulating how an adapted theory contributes to our cumulative understanding of the theory and the phenomena it addresses. | Theory contribution | Weber (2012) | 1) Assess the adapted theory's quality.<br>2) Compare and contrast the adapted theory's quality against the reference theory's quality to identify points of differentiation.<br>3) Assess contributions based on advancing the literature and explaining the focal phenomenon. |
| | | Cumulative theory | Truex et al. (2006) | |
| | | Middle-range theory | Avgerou (2013) | |

Our integrated theory adaptation guidelines contribute to the literature in several ways. First, our guidelines contribute at the operational level where others have focused on providing meta-theorizing guidance. For instance, in synthesizing the literature, we found a piecemeal approach to our first gap that focuses on understanding the theory's assumptions, historical context, and its application to a focal

phenomenon. Truex et al. (2006) recommend that one focus on phenomenon "fit" and pay attention to the historical context of the reference theory, while Weber (2012) recommend that one focus on understanding the quality of the reference theory in its existing literature. While these scholars overlap in their attention to addressing our first gap, their guidance remains at the meta-theory level, which means scholars still need to determine how to operationalize these recommendations. We contribute through our integrated operational guidance by including the historical context, including the praxeological, epistemological, and ontological assumptions, into the quality-assessment step so that one can more deeply understand the reference theory's quality. We then recommend that, in this quality assessment, one also considers how the focal phenomenon of interest would align with the assessment to identify potential weaknesses of the reference theory and areas in need of adaptation for the IS discipline.

Second, our guidelines may help scholars select the most appropriate reference theory to study a focal phenomenon. Similar to other scholars, IS scholars must frequently choose from several potential theoretical lenses to investigate a phenomenon. Our guidelines challenge the implicit understanding of assumptions that many research studies make by specifically calling for scholars to discuss a theory's assumptions and explicitly state which ones they modify or include. This challenge also echoes Hong et al. (2014). A theory has its grounding in the shared language, norms, and social mechanisms of the discipline in which it originated (Avgerou, 2013; Kuhn, 1970; Truex et al., 2006; Weber, 2012). As a result, scholars can lose a theory's implicit assumptions (those that scholars in its native discipline know) when translating it if they do explicitly state them in their work. By explicitly stating and examining a reference theory's assumptions, we believe research will progress more carefully and provide scholars with the ability to dissect confounding results when they apply a theory to similar phenomena.

Our guidelines convert meta-theorizing recommendations into operational guidance that makes explicit the previously implicit actions of evaluating a theory's assumptions and historical context. These actions ensure scholars achieve a sufficient level of rigor when evaluating theory. By doing so, scholars build a case for using a specific reference theory over potential alternatives while identifying areas of weakness that require additional theory adaptation before they can apply it to the focal phenomenon. Second, the explicit translations made between the reference theory and its discipline and the IS discipline allow for a direct bridge between the two disciplines to ensure the growth of cumulative theory. By providing a pre-adaptation staging step, a scholar can provide a phenomenological context around the reference theory and embed IS discipline perspectives through a conservative, stepwise process that they may reverse and map back to the original reference discipline.

We also provide operational guidance beyond selecting the most parsimonious model (Weber, 2012) that enables scholars to account for IS phenomena in the reference theory (Grover & Lyytinen, 2015). This step in the process may be the most crucial to the theory adaptation process given that, in it, one chooses the reference theory specifically for how appropriately it provides insight into understanding the focal phenomena from an IS lens. This step also provides the foundation on which one can map a reference theory's assumptions and parts to the assumptions and parts of the focal phenomena. As we demonstrate in the exemplar, providing an explicit mapping is a detailed process that communicates a significant amount of information to future researchers regarding decisions that one made and the conditions under which the adapted theory applies. Such an approach should provide scholars with critical information for explaining conflicting results—a necessary component to ensure that they can properly build on and expand the theory as research advances.

Also, scholars can use our novel reconceptualization of Locke and Golden-Biddle's (1997) rhetorical strategy for conveying theory contributions to both assess and convey contribution. Where Weber (2012) uses Locke and Golden-Biddle's (1997) research to demonstrate how one can convey a contribution to a theory post adaptation individually in terms of intertextual coherence and problematization, we suggest that one can integrate the two approaches as dimensions for assessing theory contributions in terms of both the theory's literature and the phenomenon the theory addresses. Such a strategy provides scholars with the ability to contribute in several ways. Specifically, theory adaptation may result in contributions to theory and/or phenomenon in varying degrees. For instance, one may discover a demarcation point that leads one to develop a native IS theory that has its historical roots in a reference discipline but is distinct and contributes to the greater scientific community in its own manner (e.g., TAM in relation to TRA). Beyond its value to scholars seeking to situate their theory adaptation efforts in a theory's literature and to our understanding of particular phenomena, such an approach may help journal reviewers and editors in evaluating the rigor of a theorizing manuscript and identify the contributions it makes to the greater scientific community and, in particular, the IS discipline. Such practices may also allow IS scholars to more

clearly demonstrate their contributions to their fellow colleagues and serve as a filter against criticism from other disciplines about theorizing in IS.

We also contribute to the literature on theory by demonstrating how to combine several recommendations from prior research into the same set of guidelines. Such an inclusive set of guidelines helps to tie together what the entire theory adaption process looks like as opposed to forcing scholars to have to rely on separate steps from various scholars to consistently conduct their theory adaptation processes. Further, from a practical standpoint, this paper may serve as guide to doctoral students who have begun their career and would benefit from operational guidance on the activities involved in adapting theory for IS scholarship.

# 6 Limitations

Our guidelines for theory adaptation offer many opportunities for IS scholars. However, we also recognize that certain challenges accompany the opportunities. First, our theory adaptation guidelines require much time and extensive early-stage work. However, this work ensures that one selects the most appropriate reference theory to adapt and that one fully understands the phenomenon that one adapts and applies the theory to. Though we adopt a qualitative approach in our illustrated example (i.e., thematic analysis), alternative methods may be appropriate depending on the theory one adapts. As Truex et al. (2006) note in their third recommendation, one should consider a reference theory and its historical context when choosing the methods to use to adapt it. Future research should explore whether one can use quantitative approaches to assess whether one can validly adapt and apply a reference theory to a focal phenomenon. Additionally, future research should examine whether one should consider similar characteristics or factors from the phenomenological perspective in addition to the perspective that the reference theory and its discipline provide. Doing so may provide a more comprehensive guide to the theory adaptation step. Regardless, one needs to include a bridging artifact (e.g., the initial translation table shown in our illustrated example) to maintain the connective relationship between the reference theory and its discipline and the new adapted theory created for the IS discipline. This connection ensures cumulative contributions to both theory and focal phenomena.

Another limitation concerns the fact that semantic rationale relies on researcher judgment and rational justification for translating the constructs. We elected to adopt this approach in our illustrated example to be conservative and to ensure that one rigorously assesses the justification before moving into using an adapted theory. Nevertheless, it remains a potentially challenging area. When scholars review a paper that involves adapting a theory, they need to evaluate the level of rigor the authors have applied to assessing whether the adapted constructs were in fact present.

Our proposed approach to ensuring that scholars make cumulative contributions to theory focuses on a scholar from the non-reference discipline's (i.e., the IS discipline) interpreting one's contributions. One may find it desirable to have an expert from the reference discipline assess the theoretical contributions one makes to the original reference discipline. This practice would also help explain the boundary between theory adaptation and creation but, of course, presents an additional challenge to the proposed approach.

Though our guidelines, built on the contributions of earlier authors, provide scholars with suggestions for improving the rigor of the theorizing process and of theory adaptation and contextualization, we also recognize the value of flexibility and creativity in this process and expect that future researchers will identify alternate theorizing processes that are appropriate for various contexts and circumstances. Though the overall theory adaptation process needs "quality checks", we do not propose a rigid set of criteria that imposes a straightjacket of constraints that could limit scholars from valuably exploring various phenomena in diverse contexts with emerging theoretical approaches.

Lastly, our approach focuses on type IV theory (Gregor, 2006) because it is one of the most frequently used types of reference theories. However, one could use our approach for any type of theory development with minor modifications. Further, we focus on a positivist quantitative approach to research. However, as we discuss in our recommendations, these guidelines inherently lack anything that would prevent one from applying them in interpretive and qualitative research including in their adaptation into a quantitative study.

# 7 Conclusion

Via developing and illustrating our theory adaptation guidelines, we mitigate deficiencies in existing theory adaptation practices in the IS discipline for adapting reference theories to study IS discipline-specific phenomena. In doing so, we identify several gaps in the synthesized literature and provide mitigation techniques that combine both rigor and relevance to theorizing in the IS discipline. With this paper, we answer IS theory scholars' call to improve theorizing in the IS discipline by reviewing its current state of affairs and building on the shoulders of our proverbial giants in the theorizing realm. Scholars need to develop and apply valid theories in order to advance each scientific discipline, which includes IS. Holmström and Truex (2011) argue that we must be willing to loosen our tight grip on existing theoretical and methodological tools so we may be open to consider the "fit" between problem domain, theory, and the relationship of the chosen theory to the method of inquiry. When adapting theories from other research domains, however, IS scholars often obtain conflicting results, even when using similar theories and constructs. Through this paper, we provide practical, operational guidance that allow them to purposefully apply prior theory scholars' meta-theorizing recommendations.

# Acknowledgments

Several scholars have contributed to developing this manuscript through their advice and critique. We thank Ron Weber and the participants of the IFIP WG 8.11/11.13 Dewald Roode Workshop on Information Systems Security Research.

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