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Article

Innovation Attributes and Managers' Decisions about the Adoption of Innovations in Organizations: A Meta-Analytical Review

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Abstract: The adoption of innovations has emerged as a dominant research topic in the management of innovation in organizations, although investigations often yield mixed results. To help managers and researchers improve their effectiveness, the authors employed a meta-analysis integrated with structural equation modeling to analyze the associations between the attributes of innovation, managers' behavioral preferences, and adoption decisions in a mediated-moderated framework. Our findings offer evidence that innovation attributes influence managers' behavioral preferences and, consequently, adoption decisions in organizations. We also observe the significance of the context in which the adoption decision occurs as well as the research settings employed by scholars. Finally, we discuss the theoretical contribution and practical implications of our meta-analytical results.
Keywords: Innovation Attributes; Adoption; Organizations; Meta-Analysis; Mediation-Moderation

1. Introduction

Innovations are essential for firms to build core competences and create sustainable competitive advantage (Porter, 2005; Reed & DeFillippi, 1990; Rogers, 1983; Schumpeter, 1934). At the organizational level, Damanpour and Gopalakrishnan (1998) observed that a new idea, behavior, practice, or product (i.e., innovation) may come to organizations in two distinct ways: innovations may be either generated or adopted. When generated, an innovation is initiated and developed within organizations; when adopted, it is generated elsewhere than in the adopting organization (Angle & Van de Ven, 1989; Rogers, 1983; Zaltman, Duncan & Holbek, 1973). Moreover, and as observed by March and Simon (1958), most innovations in organizations result from borrowing rather than invention. This proposition is supported by a wide range of research on innovation adoption—particularly, on the identification of factors that facilitate organizations to adopt a new technology—across several levels of analysis, which have been produced within several disciplines in management sciences over the decades (Crossan & Apaydin, 2010; Wolfe, 1994).

Since the elaboration of the innovation diffusion theory (Rogers, 1983), many studies have considered how innovations' attributes influence managers' adoption decisions in organizations. However, different studies that address the same topic often have conflicting results. Downs and Mohr (1976) suggested that innovations' attributes are interdependent with organizations' characteristics. Therefore, it is unlikely to find the same relationship between an innovation's given attribute and adoption decisions across a large array of organizations. Wolf (1994) noted that the most consistent result of innovation research is that results are inconsistent. Other scholars have further noted that extant studies exhibited somehow conflicting results, with variations in magnitude, statistical significance, and direction of the observed relationships between innovation attributes and adoption decisions (Bruque & Moyano, 2007; Premkumar, 2003). Specifically, several classes of conflicts can be identified. One concerns the relationship between perceived benefits and adoption decisions. Consider, for example, Kurnia et al. (2015), whose work noted that perceived benefits are negatively associated with adoption decisions. Conversely, Premkumar (2003) found a significant, positive association between the same variables.

Similar contradictory results can be found in the relationships between compatibility and adoption decisions. Some studies have reported that compatibility has a positive relationship with the decision to adopt an innovation (Gupta, Seetharaman, & Raj, 2013; Luqman & Abdullah, 2011), while others have provided evidence of a significant, negative relationship between compatibility and the innovation adoption decision (Wanyoike, Mukulu, & Waititu, 2012). Consequently, it has been highlighted that several decades of empirical studies regarding organizations' adoption of innovations have failed to provide clear and consistent findings (Keupp, Palmié, & Gassmann, 2012; Tidd, 2001).

Hence, the first research question underlying this paper aims to understand how practitioners and researchers identify innovation attributes, which are more critical to managerial decisions regarding organizations' adoption of such innovation. An important task for future studies involves not only the systematization of the work to date on innovation research, but also the identification of areas for future enquiry (Anderson, Potočnik, & Zhou, 2014). Therefore, we employ a meta-analysis to integrate the empirical findings on the effects of innovations' specific attributes (i.e., relative advantage, compatibility, complexity, observability, and trialability) on managerial decisions regarding organizations' adoption of innovation. Note that the use of a meta-analysis allows us to combine data collected from companies with different characteristics and operating in various industries and countries, which would be unfeasible in typical field research.

Moreover, we perceive the effects of innovations' attributes (i.e., relative advantage, compatibility, and complexity) on adoption decisions as mediated by managers' one or more behavioral preferences, as represented by attitudes, subjective norms, and perceived behavioral control. In conceptualizing such a mediating relationship, we evolve from a number of studies in extant literature. Pierce and Delbecq (1977) conceive organizations' innovation adoption behavior as a decision made by the appropriate manager, providing a mandate and resources for change in the organization. Kimbery (1981) provides further insight, in that decision-makers' preferences are key to explaining organizations' innovation adoption decisions. Fishbein and Ajzen (1975) and Ajzen's (1985; 1987; 1991) seminal works on the theory of planned behavior have further identified and modeled the effects of decision-makers' preferences on adoption decisions. Moreover, Taylor and Todd (1995a) developed a decomposed theory of planned behavior to link some innovation attributes—as detailed within the innovation adoption theory—to decision-makers' behavioral preferences. Therefore, we consider these studies and offer a first attempt to integrate the innovation diffusion theory with the theory of planned behavior. In a field study of organizations' innovation adoption, efforts to integrate such theories would probably constitute one of the most important contributions to progress in research activities (Downs & Mohr, 1976).

If one considers that existing literature on managerial decisions to adopt innovation in organizations offers a wide range of antecedents for the considered mediators, it can also be noted that researchers disagree about which one best influences these decisions. For example, Rogers (1983) suggests that organizational decision-makers' attitudes are likely to mediate the relationships between all five innovation attributes and the adoption decision. Other studies based on the technology acceptance model (Davis, 1989) instead suggest that only a subset of innovation attributes, such as relative advantage and complexity, are mediated by the decision-makers' attitudes. Other studies suggest that both attitudes and the decision-maker's subjective norms and perceived behavioral controls mediate innovation attribute-adoption linkages (Taylor & Todd, 1995b). Further, while different studies suggest that attributes' effects on innovation are fully mediated by decision-makers' behavioral preferences (e.g., Harrison, Mykytyn, Jr., & Riemenschneider, 1997; Riemenschneider, Harrison, & Mykytyn, 2003). However, others consider that innovation attributes directly impact managers' decisions about organizations' adoption of innovation (Tornatzky & Klein, 1982). Other studies consider managers' behavioral preferences as independent variables (as innovation attributes) that are likely to directly affect adoption decisions (Kimberly & Evanisko, 1981; Premkumar & Roberts, 1999; Thong & Yap, 1995). Finally, researchers have also offered evidence that the implications of managers' behavioral preferences on adoption decisions may be influenced by the contexts in which such decisions occur (e.g., Damanpour, 1996) as well as scholars' research settings (e.g., Tornatzky & Klein, 1982).

Thus, the different mediators and their various antecedents, moderators, and consequences as noted in literature trigger our second research question, regarding how decision-makers' behavioral preferences contribute to mediating the attributes of organizations' innovation-adoption decision relationships.

Narrative and quantitative reviews of the literature on the attributes of the innovation-adoption linkage are available (e.g., Anderson et al., 2014; Jeyaraj, Rottman, & Lacity, 2006; Kapoor, Dwivedi, & Williams, 2014a; Kapoor, Dwivedi, & Williams, 2014b; King & He, 2006; Tornatzky & Klein, 1982; Weigel, Hazen, Cegielski, & Hall, 2014). However, an empirical review has yet to be conducted that fully addresses the relationship between the attributes of innovation decision-makers' behavioral preferences and organizations' adoption decisions. This study attempts to fill this void by proposing a meta-analytic framework (see Figure 1) that tests hypotheses based on a sample of 165 unique studies published over two decades of research on the antecedents of innovation adoption decisions in organizations. In doing so, this paper builds on and further augments previous literature by offering insight into a number of related issues, which stem from our two primary research questions, as aforementioned: (1) How do variations in innovation attributes account for variations in managers' decisions about innovation adoption in organizations? (2) Which decision-makers' behavioral preferences are the most affected by variations in innovation attributes? (3) How do variations in decision-makers' behavioral preferences account for variations in organizations' innovation adoption decisions? (4) How do variations in the contexts of adoption and research settings influence the linkages between decision-makers' behavioral preferences and organizations' adoption decisions?

Our results answer each of these issues. First, in terms of the role of innovation attributes, we found consistent evidence that with the exception of relative advantage, compatibility and complexity are attributes likely to more greatly stimulate organizations' decisions to adopt innovation. Additionally, our results evidence that the correlation coefficient of the trialabi

lity-adoption association has the lowest magnitude among innovation attributes. Second, one key finding in terms of the effect of decision-makers' behavioral preferences is that such preferences mediate (although partially) the attributes of the innovation-adoption linkage. Third, and regarding the influence of the adoption context, we observed that both the decision-maker's hierarchical position and scholars' research settings are both significant for empirical predictions. Specifically, we found evidence that measuring adoption as an intention or expectation, as well as measuring dependent and independent variables with the same or different format, influences empirical estimates' magnitude, yet their direction and levels of significance remain constant.

We anticipate that by advancing our understanding on each of the aforementioned issues, our results will help organizations develop new technologies that even other organizations are likely to successfully adopt. Simultaneously, this will provide researchers with insights into how to build more precise, comprehensive, and rigorous models for organizations' adoption of innovations.

2. Conceptual Framework

This study developed a meta-analytic framework that encompasses the potential mediating mechanisms and moderating variables that may potentially shape the innovation attribute-adoption relationships in organizations (Figure 1). The following paragraphs present our theoretical background as divided into different sections, with each addressing our two primary research questions and their related issues as explained in the Introduction section. First, we review the literature on the innovation attribute-adoption relationship, then investigate its mediators. Finally, we study its potential moderators.

Insert Figure 1 above here

2.1 Main Relationships between Innovation Attributes and Managerial Decisions about the Adoption of Innovation in Organizations

The innovation diffusion theory is a basic theoretical perspective addressing innovation attributes' main effects on organizations' adoption decisions (Rogers, 1983). This perspective has inspired most empirical studies on innovation adoption (for a recent review, see Kapoor et al., 2014a; Kapoor et al., 2014b). Further, this has created a foundation for many widely acknowledged frameworks in literature, such as the technology, organization, and environment framework (Tornatzky & Klein, 1982); the technology acceptance model (Davis, 1989); the five contextual factors model (Kwon & Zmud, 1987); and the competitive effects model (Robertson & Gatignon, 1986).

The adoption decision is conceived in the innovation diffusion theory as a choice to fully use an innovation as the best course of action available in an organization (Rogers, 1983, p. 20). The innovation diffusion theory defines the adoption decision to consider a decision-maker that can assess innovations' attributes—and therefore, their expected net benefits—and can decide whether to adopt an innovation according to such an assessment. As in expectancy-value models (Fishbein & Ajzen, 1975), decision-makers are more likely to adopt innovations that are slightly uncertain and expected to produce outcomes with a positive variance (see also Abrahamson, 1991; Taylor & Todd, 1995a).

The innovation attributes likely to influence adoption decisions in the innovation diffusion theory include relative advantage, compatibility, complexity, observability, and trialability (Rogers, 1983, p. 211). Specifically, relative advantage refers to the degree to which an innovation provides desirable consequences for the adopter compared to other available alternatives. This also provides decision-makers with an insight as to its net benefits, which will consequently favor the innovation adoption decision (e.g., Premkumar, 2003). Compatibility refers to the degree to which an innovation consistently fits with existing business processes, values, past experiences, and needs. A more compatible innovation is also less uncertain for the decision-maker (Rogers, 1983, p. 223). Moreover, greater compatibility levels increase an innovation's expected net benefits, as the innovation will require less effort by the decision-maker to integrate the new technology with that which is already deployed. Therefore, an innovation's greater levels of compatibility are expected to positively influence adoption decisions in organizations (e.g., Jeon, Han, & Lee, 2006). Regarding complexity, a new technology that is intricate and difficult to master requires that decision-makers invest greater resources to understand it, and subsequently, to catch up with its adoption. This in turn negatively impacts the assessment of the innovation's net benefits. Moreover, a more complex innovation is more uncertain to the decision-maker. Therefore, greater levels of complexity are expected to negatively influence adoption decisions in organizations (Thong, 1999).

Trialability and observability offer the decision-maker the possibility to more effectively assess the innovation's net benefits; specifically, observability may help the decision-maker assess an innovation's positive features. Additionally, greater levels of observability may offer the decision-maker greater opportunities to learn the new technologies, which increases its net benefits and favors adoption decisions as a result (e.g., Hashem & Tann, 2007). Finally, the innovation's availability on a trial basis allows decision-makers to experiment with new technology, exploring its possibilities in advance, and even identifying and resolving the ex-ante problems associated with the innovation before committing to its full adoption. These possibilities increase the net benefits that innovations offer to decision-makers. Thus, greater levels of trialability are expected to positively influence adoption decisions (e.g., Ramdani, Kawalek, & Lorenzo, 2009). Therefore, this discussion leads to the following:

Hypothesis 1: Greater levels of relative advantage, observability, and trialability (or complexity) are likely to have positive (or negative) effects on innovation adoption decisions in organizations.

2.2 Mediators of the Relationship between Innovation Attributes and Managerial Decisions about the Adoption of Innovations in Organizations

If innovation attributes affect the decision to adopt a new technology, this effect should be mediated by the mechanisms that affect this decision. First, adoption decisions in organizations require intervention from a decision-maker. Second, and as noted by March and Simon (1958), a manager brings his or her own preferences to the decision-making context; these preferences are likely to exert a meaningful influence on organizational behaviors (Staw, 1991), and hence, on innovation adoption behavior. Rogers (1983) observed that an assessment of innovation attributes as well as decision-makers' preferences are key for an adoption decision to occur (see also Baldridge & Burnham, 1975; Hage & Dewar, 1973; Kimberly & Evanisko, 1981; Miller, Manfred, & Toulouse, 1982).

We referenced the theory of planned behavior in representing managers' behavioral preferences, or their attitudes, norms, and perceived behavioral control (Ajzen, 1991). This behavioral theory is derived from social psychology, and further extends the expectancy theory (Vroom, 1864), which has generally been employed in understanding different behaviors (Armitage & Conner, 2001; Sutton, 1998). Extant studies have employed the considered theory to explain important organizational decisions (e.g., Cordano & Frieze, 2000) and, more specifically, the adoption of innovation in organizations (e.g., Harrison et al., 1997; Marcati, Guido, & Peluso, 2008; Riemenschneider et al., 2003). The innovation diffusion theory and the theory of planned behavior both focus on decision-makers, yet also examine two distinct but complementary aspects: on the one hand, they assess innovation attributes; on the other hand, they also note decision-makers' behavioral preferences. We jointly consider both of these aspects in our framework, and expect to offer further explanatory power on such decisions for organizations to adopt innovations.

The assessment of innovation attributes in our framework is likely to influence organizational decision-makers' behavioral preferences; these preferences consequently create opportunities and the pressure to adopt innovations. Specifically, we integrated the innovation diffusion theory (Rogers, 1983) and the theory of planned behavior in a decomposed form (Oliver & Bearden, 1985; Taylor & Todd, 1995a) to consider the relationship between the attributes of managers' innovation-behavioral preferences and adoption decision. It must be noted that the theory of planned behavior in its decomposed form considers all the attributes of an innovation but observability and trialability (see also Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). Moreover, we related the adoption decision to both innovation attributes and managers' preferences to introduce a behavioral element. According to the latter, an innovation can be adopted or rejected in organizations not only due to its expected net benefits but, for example, because of pressures stemming from the environment or a perceived lack of resources, which are necessary in adopting new technology.

The first potential mediating variable is attitude, which refers to the individual's positive or negative evaluation of an action to be taken (Ajzen, 1987; Fishbein & Ajzen, 1975). The attributes considered in the relationship between the assessments of innovation attributes (i.e., relative advantage, compatibility, and complexity) and attitudes are similar to attitudinal beliefs. The latter typically identify the advantages and disadvantages associated with performing a behavior (Shimp & Kavas, 1984), and are used in studies based on the theory of planned behavior, where they are considered as antecedents of the attitudes (Ajzen, 1991). Specifically, attitudes are formed by associating a behavior with a certain outcome. Consistent with the expectancy-value model, the attributes that come to be linked to the behavior can be then valued positively or negatively. Decision-makers tend to develop either favorable or unfavorable attitudes toward the behavior because of these evaluations (Ajzen, 1987; Fishbein & Ajzen, 1975). Thus, some attributes are more likely to favor the development of a favorable attitude toward innovation adoption than others. Innovations can be included in the first case that are characterized by such desirable consequences as increases in customer satisfaction, decreased costs, enhancement of the relationships with customers and suppliers, and various economies associated with their compatibility with the organization's existing technology and their ease of use. The second case can instead encompass those innovations characterized by more limited (or greater) levels of relative advantage and compatibility (or complexity) (Taylor & Todd, 1995a). Concerning the implications of attitudes on the adoption decision, the theories of reasoned actions and propositional control posit that if a decision-maker holds the belief that a given behavior will lead to a certain event, and such an event is positive, the decision-maker's adoption of the behavior should increase (Dulany, 1961; Fishbein, 1967). Similarly, the theory of planned behavior considers that decision-makers tend to adopt behaviors with positive effects (Ajzen, 1987; Ajzen, 1991; Rogers, 1983). Thus, the more favorable a decision-maker's attitude toward a new technology, the stronger their tendency should be to adopt the innovation. This discussion leads to the following hypothesis:

Hypothesis 2: Attitude positively relates to relative advantage and compatibility, and negatively relates to complexity; this mediates the relationship between relative advantage, compatibility, and complexity, as well as organizations' innovation adoption decisions.

The second mediator is subjective norms (or simply "norms"), which reflect one's agreement (or disagreement) with statements that refer to others' preferences (such as those of owners, employees, suppliers, or customers) about performing the decision under examination (Ajzen, 1987; Fishbein & Ajzen, 1975). Concerning the relationship between innovation attributes (i.e., relative advantage, compatibility, and complexity) and norms, Ryan (1982) offered a premise based on Fishbein and Ajzen's (1975) work, in that the perception of the attitudinal beliefs that stem from assessments of innovation attributes may affect not only attitudes, but also other types of behavioral preferences, such as norms, through secondary mechanisms. Shimp and Kavas (1984) elaborated on these mechanisms by introducing the "false consensus" (Oliver & Bearden, 1985; Ross, 1977; Taylor & Todd, 1995a). Developed within studies of individuals' behaviors, this mechanism was observed in all social environments in which some behaviors are important to recognize, but often difficult to determine (Cross & Brodt, 2001; Flynn & Wiltermuth, 2010; Gross & Miller, 1997). Specifically, the false consensus mechanism notes that decision-makers tend to overestimate the importance of personal and dispositional factors relative to external pressures; by doing so they, tend to infer broad personal dispositions and expect consistent behavior or outcomes across widely disparate situations and contexts. A decision-maker's strongly held perceptions about relative advantage, compatibility, or the complexity of a given innovation may then lead them to consider that these perceptions are common and widely legitimate, and that others would not only agree with these beliefs, but would state them in a prescriptive manner. Similarly, the false consensus resembles an "anchoring and adjustment" process, whereby decision-makers anchor their own preferences and inadequately adjust for ways in which they tend to vary from others (Davis, Hoch, & Ragsdale, 1986). This leads to the implications of subjective norms toward an adoption decision. Even if the decision-maker tends to produce a distorted interpretation of the social environment by overestimating others' support of their own perceptions of an innovation's relative advantages, compatibility, and complexity (Taylor & Todd, 1995a), these erroneous norms are likely to influence people's decisions through compliance mechanisms (Ajzen, 1991; Fishbein & Ajzen, 1975). Thus, the decision-maker may be sufficiently motivated to comply with this idea in cases in which he or she believes that other people support an innovation's adoption, such as a new technology. Consequently, this is likely to influence the decision-maker's choice to adopt the innovation. From this discussion, the following hypothesis states:

Hypothesis 3: Norms positively (or negatively) relate to relative advantage and compatibility (or complexity) and mediate the relationship between relative advantage, compatibility, and complexity, as well as organizations' innovation adoption decisions.

The third mediator this paper considers is perceived behavioral control, which reflects beliefs regarding access to the resources and opportunities needed to perform a behavior (Ajzen, 1991; Ajzen & Driver, 1992). Concerning the relationship between innovation attributes and perceived behavioral control, it has been observed that the greater the amount of resources and opportunities a decision-maker perceives to possess, and the fewer obstacles and impediments they anticipate, the greater their perceived control should be over the behavior (Ajzen, 1991). The adoption of highly complex innovations requires the decision-maker to overcome different obstacles and invest greater levels of resources for its understanding (Triandis, 1979). More relevantly, this requires the decision-maker to sustain the processes required to use and assimilate the new technology within the organization once adopted (Attewell, 1992). Moreover, complex technologies are often composed of many interacting parts that must be configured with high reliability, and even small variations in performance can induce a high risk of failure (Perrow, 1994). These risky characteristics of complex innovations increase the possibility that a decision maker will perceive the innovation as subjectively threatening (Bandura, 1977). Accordingly, an innovation's increased complexity may induce the perception that available resources are inadequate, and that more extended obstacles and impediments are associated to the adoption of the new technology. As a result, this decreases the perceived control over the innovation (Taylor &

Todd, 1995a). Regarding the perceived behavioral control's implications for the adoption decision, greater levels of perceived control for innovations are associated with greater levels of confidence that the decision-maker will successfully adopt the innovation. Additionally, high perceived control of innovations decreases the uncertainties and risks associated with innovation adoption, which also favors the adoption decision (Ajzen, 1985). This discussion results in the following:

Hypothesis 4: Perceived behavioral control negatively relates to complexity, and mediates the relationship between complexity and innovation adoption decisions in organizations.

2.3 Potential Moderators of the Relationship between Decision-Makers' Behavioral Preferences and Innovation Adoption

The model conceptualized herein can be referenced in many different contexts in which an adoption decision may occur (Huber, 1990; Mowday & Sutton, 1993). Therefore, we introduced a set of post hoc analyses that seek to explain the moderating effect on the mediator-adoption linkage. These moderators are introduced to account for the contexts in which the adoption decision occurs, as well as scholars' research settings in measuring the constructs under examination.

The adoption decision's organizational contexts. Managers' behavioral preferences can be expressed through an adoption behavior only if the decision-maker can actually influence the behavior, such as if the person can decide whether to perform the behavior (Ajzen, 1991). It is well-acknowledged that the organizational decision-maker can influence adoption behaviors, and researchers recognize that the extent of such an influence varies (Bass & Stogdill, 1990). Consequently, when a decision-maker has substantial influence on organizational behaviors, an innovation adoption behavior can be expected to occur in the organization if the decision-maker develops appropriate attitudes, norms, and behavioral controls for the innovation. In contrast, if such an influence is small, the decision-maker's behavioral preferences may play a more limited role in shaping the final adoption decision. Specifically, the following section in this study considers two determinants that may affect the decision-maker's influence on the organization: a) the decision-maker's hierarchical position, and b) the organization's size (Ettlie, 1983; Miller & Friesen, 1982).

The decision-maker's hierarchical position represents a key variable in studies of organizational behavior (Staw, 1991). Top managers are less subject to rules and procedures because of their positions, and their decisions often entail a significant degree of discretion (Baldridge & Burnham, 1975). As one descends the organizational levels, rules, procedures, and supervisory processes become prominent; thus, any particular individual's influence on organizational behaviors is likely to decrease (Staw, 1991). Consequently, top managers may take actions that more easily reflect their own preferences than other decision-makers, characterized by fewer degrees of autonomy. Additionally, top managers have direct and personal contacts with most levels of management, whereby they shape key organizational behaviors (Kets de Vries & Miller, 1984). Consequently, we should expect decision-makers' hierarchical position to moderate behavioral preferences' effects on organizations' innovation adoption decisions.

Hypothesis 5: The effect of attitudes, norms, and perceived behavioral controls on organizations' adoption decisions will be stronger when the decision-maker is a top manager, rather than a lower-level manager.

Organizational size represents a critical variable in micro-organizational studies (Kimberly, 1976). Individuals in organizations of more limited size tend to make most key decisions themselves (Chen & Hambrick, 1995), directly influence other managers, and tightly control and channel operations (Mowday & Sutton, 1993). For example, Miller and Droge (1986) observed that the individual decision-maker's preferences are likely to be a critical and perhaps tremendously important element in small organizations, in which the leader can have a direct and pervasive impact (Premkumar, 2003; Unsworth, Sawang, Murray, & Sorbello, 2009; Welsh & White, 1981). In contrast, large organizations may have their own procedures, routines, style, and bureaucratic momentum, which can more easily absorb or resist leaders' initiatives. Additionally, extant studies in strategic management posit that larger firms tend to be associated with many and varying stakeholders, with often conflicting interests and preferences (Fombrun & Shanley, 1990), and are more likely to be under regulatory and public scrutiny (Bloom & Kotler, 1975). Consequently, individual behaviors in large-sized organizations are less often under a single decision-maker's control (Thompson, 1967). These arguments suggest that organizational size will moderate behavioral preferences' effects on organizations' innovation adoption decisions; thus:

Hypothesis 6: The effect of attitudes, norms, and perceived behavioral controls on organizations' adoption decisions will be stronger in smaller organizations than in larger ones.

The research settings of the adoption decision. The adoption decision in organizations involves different, contingent choices (Eveland, 1979). Accordingly, the key issue involves which of these choices is in fact crucial, or the one that correctly identifies the moment at which the organization shifts from a non-adopter to adopter category. Scholars' research settings tend to first identify one or a few decisions that they believe to be critical in some sense; they then use the occurrence of that decision as an indication of adoption. Second, they search for documentary evidence in organizations or with specified critical decision-makers, and ask them about the organization's adoption (Becker, 1970). It is commonly understood that selecting one measure for the adoption decision instead of another, as well as measuring the adoption decision according to self-reported or objective data, impacts the empirical results. For example, data can be easily collected from a decision-maker, but may be affected by the choice of people to supply it. Further, to what extent does a top manager know about what their organization is really doing with an innovation (Eveland, 1979)? Therefore, our study considers additional moderator, such as measures of the adoption decision and the presence of a common method variance in self-reported data. These have a methodological nature and capture some of the key elements of research settings employed by scholars in their studies.

The dependent variable in extant empirical studies has been measured as either a future expectation, current intention, or behavioral action, but these different measures of the same dependent variable (i.e., adoption) are significant for empirical estimates. First, literature's assessment of the behavioral preferences-adoption decisions linkage has introduced a distinction between intentions and expectations. While an intention often involves the behavioral commitment to perform an action (or not), the expectation is one's estimated likelihood of performing such as action, regardless of whether a commitment has been made (Warshaw & Davis, 1985). In forming expectations, decision-makers are likely to consider not only their current behavioral preferences, but also their future beliefs, as well as beliefs toward alternative actions or outcomes. Therefore, current behavioral preferences may play a less relevant role than intentions in predicting expectations. Additionally, expectations involve considering the potential impediments or barriers that may prevent the behavior's implementation (Warshaw & Davis, 1985), which may not be under the decision-maker's volitional control (Saltzer, 1981). Therefore, this may render the decision-maker's current behavioral preferences less relevant for the adoption decision (Sheppard, Hartwick & Warshaw, 1988). The above arguments suggest the following hypothesis:

Hypothesis 7: The effect of attitudes, norms, and perceived behavioral controls on organizations' adoption decisions will be stronger when decision-makers are asked to indicate their present intentions than when they are asked to estimate their future expectations.

Moreover, literature has also introduced a distinction between behavior (the adoption decision) and intentions/expectations toward the behavior (the intention to adopt). The theory of planned behavior posits that attitudes and norms are associated with intention, but not adoption, while perceived behavioral control affects both intention and adoption (Ajzen, 1985; Ajzen, 1991; Fishbein & Ajzen, 1975). Consequently, the measure of the adoption decision moderates the attitude and norm-adoption linkages:

Hypothesis 8: The effect of attitudes and norms on organizations' adoption decisions will be stronger when decision-makers are asked to indicate their intentions than when they are asked to estimate the innovation's effective adoption.

The common method variance refers to cases in which variance is associated with the measurement method, rather than the constructs that such measures represent (Campbell & Fiske, 1959). Further studies suggest how the common method variance bias affects researchers' estimates based on self-reported data (Crampton & Wagner, 1994). For example, extant literature evidences that attitudes and norms are strongly associated with self-reported daily behaviors, but did not correlate with objective evidence of the same behavior (Armitage & Conner, 1999; Armitage & Conner, 2001). The effect of the common method variance bias on estimates is likely to vary, not only across studies based on objective data, but also within studies based on self-reported data. For example, the considered bias in the context of an information system's adoption, which is induced by scholars' research settings, increases the magnitude of the association between variables (Malhotra, Kim & Patil, 2006). The above arguments suggest the following hypothesis:

Hypothesis 9: The effect of attitudes, norms, and perceived behavioral controls on organizations' adoption decisions will be stronger in studies that are highly affected by the common method bias than in studies that are affected by the same bias but to a more limited extent.

2.4 Empirical studies on the innovation attributes-innovation adoption linkages

Empirical studies have evidenced the relative advantage-, compatibility-, complexity-, and observability-innovation adoption associations consistent with theoretical predictions. However, a few studies have offered contrary evidence despite these consistent patterns, and several "classes" of conflicting evidence can be identified. One concerns the effects of perceived relative advantage on innovation adoption decisions. Further, some studies reported how greater perceived benefits about an innovation are likely to decrease organizations' propensity to adopt such new technology (Kurnia et al., 2015). Another class addresses the effects of complexity; although complexity discourages innovation adoption, studies have evidenced a positive, significant association between complexity and innovation adoption (Messerschmidt & Hinz, 2013; Seyal & Rahman, 2003). A further class of conflicting evidence deals with trialability, with studies on the trialability-innovation adoption linkage extremely mixed. Some works prove positive, significant associations (L99986), and others demonstrate negative, significant associations (Premkumar, Ramamurthy & Crum, 1997).

Empirical studies regarding mediating variables instead offered consistent evidence of attitude-, norm-, and behavioral control-innovation adoption associations, with only one study reporting a slightly negative association between norm and innovation adoption in organizations (Hsu, Ray, & Li-Hsieh, 2014). Regarding the innovation attribute-mediating variable associations, empirical studies have demonstrated a consistent pattern in the relative advantage-, compatibility-, and complexity-attitude associations. Such consistent patterns are also observable for relative advantage- and compatibility-norm associations. Although studies provided evidence of negative associations between complexity and norms, one work offered empirical evidence of a negative, significant association (Tashkandi & Al-Jabri, 2015).

We must note that although extant empirical studies are abundant regarding the primary effects of innovation attributes on organizations' innovation adoption decisions, we discovered only a few studies that tested the mediation effects of managers' preferences on the innovation attribute- adoption linkages (Harrison et al., 1997).

Many previous meta-analyses and reviews on innovation adoption have focused on many important issues, including: (a) the factors affecting information technology usage (Mahmood, Hall, & Swanberg, 2001); (b) the drivers of intention and adoption behavior in consumer adoption (Arts, Frambach, & Bijmolt, 2011); (c) the determinants of information systems' success (DeLone & McLean, 2003; Sabherwal, Jeyaraj, & Chowa, 2006); (d) the performance implications of the adoption of innovations in organizations (Rosenbusch, Brinckmann, & Bausch, 2011); (e) the role of organizational characteristics and the adoption of IT technologies in organizations (Hameed, Counsell, & Swift, 2012); (f) the technological, organizational, and individual factors that influence the adoption and diffusion of IT-based innovations by both individuals and organizations (Jeyaraj et al., 2006); (g) the effect of Rogers' (1983) innovation-attributes on the adoption of innovation by both individuals and organizations (Arts et al., 2011; Kapoor et al., 2014b; Tornatzky & Klein, 1982); (h) the determinants of individuals' technology acceptance (King & He, 2006; Schepers & Wetzels, 2007); (i) the application of innovation diffusion models (Sultan, Farley, & Lehmann, 1990); and (j) the performance implications of innovation adoption (Rosenbusch et al., 2011).

Therefore, one contribution of this paper already lies in its focus on the adoption of innovations in organizations, while integrating the potential mediators/moderators of the innovation attribute- adoption relationships. To the best of our knowledge, no previous meta-analysis has offered an integration of the potential mediators/moderators on the innovation attribute-adoption relationships in organizations. One exception is the meta-analysis by Weigel et al. (2014), in which researchers combined innovation diffusion and the theory of planned behavior to develop an innovation adoption behavioral model. However, the researchers' analysis combined studies on innovation adoption by consumers as well as managers in organizations. Moreover, they used antecedents of innovation diffusion and the theory of planned behavior, and offered only evidence of their primary effects on innovation adoption decisions.

3 Research Method

3.1 Database Development and Inclusion Criteria

We selected the most important studies that explored the relationship between an adoption decision and its correlations by following some general rules established in literature (e.g., Chen, Damanpour, & Reilly, 2010). First, we searched relevant bibliographic databases, namely ABI/INFORM Global, Business Source Premier, JStore, ProQuest, IEEExplore, Science Direct, Scopus, and the ISI Web of Science. We identified relevant journal articles, conference papers, and dissertation works published in English by performing searches based on the following Boolean expressions: ("organization") AND ("adoption") AND ("innovation"), where "organization" includes, for example, such keywords as "business," "enterprise," "company," and "organization." The term "adoption" includes, for example, "adoption, "intention to adopt," "adopters," and "non-adopters," while the term "innovation" includes such terms as "innovation," "new technology," "information system," "cost accounting," "payroll," "enterprise resource planning," "computer-assisted manufacturing," "e-commerce," "e-business," and "customer relationship management."

We integrated the first database search with a thorough examination of primary journals in relevant research fields, such as innovation management, strategic management, technology and research and development (R&D), organizational behavior, entrepreneurship, and marketing. We then mitigated any publication bias (Begg, 1994) with a bottom-up search approach, and considered existing meta-analyses and seminal papers that have addressed the relationships under study, then carefully examined their reference lists. Additionally, we analyzed cross-references in the acquired reports, and sent requests for working papers and forthcoming publications. Specifically, we used two-way "snowballing," or the backward-tracing of all references reported in previously identified articles, and forward-tracing all articles that cited these articles using Google Scholar and the ISI Web of Knowledge.

Each collected study was scrutinized following the work of Damanpour (1991), and was included in the meta-analysis only if it met the following eligibility criteria: First, we focused on studies that address innovation adoption. Reports focusing specifically on either awareness or post-adoption aspects (e.g., "infusion," or "satisfaction with the innovation," or "the innovation's impact on firms' performance") were excluded. Although we acknowledge the importance of post-adoption aspects (Angle & Van de Ven, 1989; Damanpour & Wischnevsky, 2006; Rogers, 1983; Zaltman et al., 1973), it has been observed that mixing innovation stages increases the risk of inconsistent and contradictory research results. This is because the direction of some determinants' influence on innovation is also contingent on the decision being considered (Wolfe, 1994). Specifically, adoption and post-adoption stages imply different conceptualizations of the decision to be taken in organizations (for an early review of post-adoption studies see DeLone & McLean, 1992; 2003). The nature of the considered correlates between pairs of variables also differs due to the conceptual differences in the dependent variable between adoption and post-adoption studies. Further, even if one can observe a partial overlapping between the attributes of an innovation emphasized in adoption and post-adoption studies (e.g., see Larsen, 2003), these aspects may express dissimilar underlying conceptualizations. Consequently, aggregating under the same label variables that reveal incredibly different constructs may induce an excess of heterogeneity into our study, which may simultaneously render the interpretation of results more difficult.

Second, we conducted our analysis at an organizational level, rather than individually or based on an organizational population. As observed by Tornatzky and Klein (1982), research should study innovations that will be adopted by managers in organizations, and not by individuals operating alone. This is because it is illogical to attempt to generalize an individual adoption process to the organizational innovation process, as the two processes may substantially differ. Moreover, it must be noted that such concepts and variables as organizational size and decision-makers' hierarchical position apply to organizations, but not to individuals.

Third, studies had to include at least one innovation attribute that is expected to correlate with the decision to adopt innovations to be eligible. Fourth, we checked for the presence of adopter information, and excluded reports that presented no sourced information about the sample of studied organizations. As the concepts of attitude, norms, and perceived behavioral control have been used to refer to individual decision-makers and by extension their team- or group decision-making has not been developed, we controlled for studies that measured managers' behavioral preferences with respect to the individual decision-maker. In the case of multiple respondents, we controlled for each sample organization, in that these preferences were individually derived for each member belonging to an organization (Harrison et al., 1997). Fifth, each study was verified as published in a scholarly book, PhD thesis, or journal to be included in our analysis. Finally, we required a study to include appropriate statistics, in that we only synthesized studies that provided information to calculate the correlation between the considered constructs as noted in Table 1 (Hunter & Schmidt, 2004).

Although unintentional omissions might have occurred, these comprehensive search steps ultimately identified 986 correlations from 165 different manuscripts to yield a combined sample size of 31,626. A list of the articles used in our empirical meta-analysis is available as an electronic companion from the journal webpage.

3.2 Variables Coding

We considered literature on organizations' decisions to adopt innovation and observed many constructs with similar definitions that operate under diverse aliases, as well as constructs with comparable names but diverse operationalization. Thus, we used a single-construct definition to code existing research, which included only those aspects extensively analyzed across multiple studies that conceptually fit (see Table 1). In terms of the procedure followed, four experts coded the variables considered in Table 1, two experts evaluated all of the studies for all variables excluding the innovation attributes, and a third expert coded the variables for the innovation attributes as well as the correlations. Subsequently, a fourth expert reevaluated a random sample of 20% of all of the manuscripts. The experts' initial average inter-rater agreement was 96%. Occasional disagreements were resolved by repeated discussion between the coders until reaching a consensus, according to a procedure originally suggested by Bullock & Svyantek (1985) and already employed in previous meta-analytic works (Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007; Chen et al., 2010; Damanpour, 1991). We also collected the following information in coding our variables: affiliation, publication year, country, technology, and industry.

Insert Table 1 above here

Innovation attributes. Extant studies observed that the relative advantage concept is akin to the concept of perceived usefulness (Moore & Benbasat, 1991), and in studies that consider both their correlation coefficient is often very high. Therefore, we included perceived usefulness under a label of "relative advantage." Moreover, some studies referred to the variable of ease of use instead of the variable of complexity (Moore & Benbasat, 1991). The differences in the expected sign of correlation coefficients between complexity and ease of use, on the one hand, and the decision to adopt, on the other hand, compelled us to report results for ease of use under the complexity label, but recode the correlation coefficient. Additionally, it must be observed that some studies refer to the concept of demonstrability. As this concept strongly relates to the construct of observability (Moore & Benbasat, 1991), this meta-analysis included under the “observability” label those reports that referred to demonstrability as an attribute that correlates to the decision to adopt a new technology.

Decision-makers’ behavioral preferences. We evaluated attitudes by referring to the evaluative property: how positively or negatively a decision-maker feels toward the innovation to adopt. Measures of the evaluative property consider the extent to which decision-makers feel favorably or unfavorably, or supportive or antagonistic, toward the innovation (Ostrom, Bond, Knosnick, & Sedikides, 1994). Scholars sometimes derive a decision-maker’s attitude by weighing their beliefs regarding the potential outcomes associated with the adoption of an innovation through a subjective evaluation of the effects of these outcomes (e.g., Marcati et al., 2008; Nasco, Toledo, & Mykytyn, 2008). Finally, some studies measure attitude according to the decision-maker’s consequent beliefs, and omitted to correct such beliefs by the decision-maker’s evaluation of outcomes (Thong, 1999). We attenuate the possibility that the variable of attitude may enter the mediation analysis as simply a reflection of innovation attributes (Fiedler, Schott, & Meiser, 2011) by excluding such operationalization from the current meta-analysis. Following Fishbein and Ajzen (1975), we posit that norms are affected by a set of salient beliefs about specific actors’ normative prescriptions, weighted by the incentive to fulfill with each of those actors. Norms are typically measured by global, subjective measures as well as according to belief-based measures. This meta-analysis combined both (e.g., see Riemenschneider & McKinney, 2001/2002). Finally, the perceived behavioral control construct encompasses two components. The first includes such aspects as self-efficacy (Ajzen, 1991), or an individual’s self-confidence in his or her ability to perform a behavior (Bandura, 1977, 1982). The second component includes the facilitating conditions and the resources needed to engage in a behavior (Triandis, 1979), which might include access to the time, money, and other specialized resources required to engage in a behavior (e.g., employees' skills or experience, or the availability of complementary resources).

Adoption decision. The considered construct commonly includes assessments on subjective basis, or whether the decision-maker has adopted an innovation (Pontikakis, Lin, & Demirbas, 2006) or a set of correlated technologies (e.g., Thong, 1999). Other studies used a dependent variable: a measure of intentions that assessed the future intent or willingness to adopt an innovation (e.g., Harrison et al., 1997). Other studies considered adoption as a process, and asked the decision-maker about the organization's current stage of adoption (e.g., Oliveira, Thomas, & Espadanal, 2014). We also discovered few studies that employed objective adoption measures. As observed, we excluded studies that specifically addressed post-adoption aspects, or studies in which organizations had adopted the innovation and were considering it for further adoption (e.g., Lefebvre, Lefebvre, & Harvey, 1996). We also omitted studies in which the innovation relates to the benefits offered to the firm (e.g., Wu & Chuang, 2010); those that deal with the decision-maker's satisfaction with the innovation (e.g., Thong, 2001); and those that address the adoption decision, but measured the adoption decision in ways that are difficult to distinguish from innovation attributes (e.g., Gupta et al., 2013).

Moderators. We labeled a study as predominantly small when the number of employees was less than the median number of employees in the sampled organizations; otherwise, we labeled the study as predominantly large. We also analyzed the percentage of respondents represented by top managers, such as senior executives/directors or higher positions as defined by Hambrick (1984). Further, we labeled a study as having predominantly higher positions when the percentage of top managers in the sample was greater than the median percentage of top managers in the sampled organizations. Otherwise, we labeled the study as having predominantly lower positions. We considered scholars' different measures to address the dependent variable, and distinguished between adoption, the intention to adopt, and the expectation to adopt (see Table 1). As observed by Mitchell (1985), a common method variance may influence estimates when dependent and independent variables are measured with the same format. Accordingly, we distinguished studies that measure the dependent and independent variables with the same or different formats. Note that alternatives ways exist to control for common method variance (i.e., measures based on self-reported versus objective data, or whether respondents for dependent and independent variables are the same or differ), although infeasible for this study due to constraints in the available data.

3.3 Univariate Analyses

We follow the works of Chen et al. (2010) and Damanpour (1991), and based our meta-analysis procedure on three fundamental steps: (1) the testing of main effects; (2) the mediation analysis; and (3) the moderator analysis. We relied on correlation coefficients for the effect size, and it must be observed that correlation coefficients were the primary statistics in our meta-analysis, in most cases, but a few coefficients were derived from studies in which logistic regression models or discriminant analysis were applied. Although no universally accepted method for handling such data in a meta-analysis is reported, we retained these studies and used available formulas to calculate effect size estimates from findings presented in a logistic regression and discriminant analysis format (Fern & Monroe, 1996; Lau, Sigelman, Heldman, & Babbitt, 1999; Lipsey & Wilson, 2001). We also tested our results' robustness by excluding findings that originate from studies that used either logistic regressions or discriminant analyses, and observed consistent results. Finally, when studies drawn from the same sample of observations were published several times, we primarily considered works published in academic journals, when available.

Regarding the collected data, we calculated the mean correlation on the relationship between the decision to adopt and its correlates across studies, weighed by sample size. Next, the variance among correlations (observed variance), the variance due to sampling errors, and the residual variance were determined. We followed Hunter and Schmidt's (2004) work by calculating the corrected means and residual variances. A 95% confidence interval around the mean correlation was computed based on the mean correlation, the number of correlations, and the variance due to sampling errors, to check if this interval included zero. Similar to previous meta-analyses, we made no adjustments for range restrictions, which were hardly assessable in many of the selected studies on organizations' innovation adoption decisions (Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés, & Boronat-Navarro, 2004; Chen et al., 2010; Damanpour, 1991; Gooding & Wagner, 1985). We also checked the salience of each association by considering comparisons with the conventional medium effect size of the population, according to ".30 rule" (Cohen & Cohen, 1983). We additionally addressed publication biases by computing the classical file drawer N for each considered association (Rosenthal, 1979), and evaluated the publication and eligibility using the normal quantile plot method (Wang & Bushman, 1999).

The magnitude of effects in the mediation analysis was evaluated according to multiple methods. First, we computed a partial correlation (corrected for unreliability) for each innovation attribute-adoption decision relationship after controlling for the considered mediators. We inferred the presence of a mediating effect when the original correlation coefficient between attributes of innovations and the decision to adopt a new technology was reduced once the influence of the potential mediator was controlled (Blalock, 1961). Specifically, on the one hand, if the correlation coefficient associated with the direct effect did not significantly diverge from zero, this suggests that the mediator completely accounts for the relationships between innovation attributes and the decision to adopt. On the other hand, if the partial correlation is identical to the original, then this indicates that no mediation effect exists. If the original correlation is greater than the partial correlation and a significance test of the partial correlation indicates that this differs from zero, then one can conclude that the mediator has a partial intervening effect (Gajendran & Harrison, 2007). Second, we follow the work of Sobel (1982) and calculated the total unstandardized indirect effect, estimated by the product of correlation coefficients associated with the innovation attribute-mediator and mediator-adoption paths. The indirect effect is then divided by its estimated standard error, which approximately follows a standard normal distribution. The estimated corrected standard errors were calculated according to the multivariate delta method introduced by Bobko and Rieck (1980). This suggested method has been employed in different studies (Cheung, 2009), and it has a favorable characteristic that allows one to directly obtain standard errors from correlation coefficients. Finally, we follow the work of Viswesvaran and Ones (1995) and used the harmonic mean of the sample sizes for each of the involved meta-analytic correlations as our sample size.

We introduced multiple tests to evaluate the need for a moderation analysis. The first test refers to the so-called "75% rule" (Gooding & Wagner, 1985), by which we cannot accept the hypothesis of homogeneity among empirical correlations if the variance caused by the sampling error does not account for 75 percent of the observed variance. Thus, we had to search for other moderating variables that affect the correlations. The second test refers to the chi-square homogeneity test (Hunter & Schmidt, 2004); specifically, a non-significant chi-square statistic suggested there was no true variation across studies. When a moderation analysis was appropriate, we followed Hunter and Schmidt's (2004) subgroup analysis, in that a moderator could produce its effects on estimates in two ways: (1) the expected variance will be lower in the subgroup than in the entire population, and (2) the corrected mean correlations will differ from one group to another. We captured two effects by conducting a *t*-approximation test of differences between the mean correlations of the associations across different subgroups (Wagner & Gooding, 1987, p.249). Note that the moderating analysis focuses on the differences between different groups of organizations and studies. In the context of our study, the relative difference between the characteristics of organizations and studies is more relevant than the absolute characteristics of each considered organization or study. For example, in considering organization size, the "small" and "large" categories relate to a relative concept rather than absolutely. In other words, organizations that differ greatly in size will reveal differences in adoption behavior, conceivably not of the extent of differences between absolutely large and small organizations, but of significant variations. Finally, some recent studies suggested to apply two techniques in the moderation analysis for robustness. Thus, we employed a meta-regression procedure with random effects (Lipsey & Wilson, 2001).

3.4 Structural Equation Modeling

In addition to pairwise analyses, we aggregated the studies to test the causal model implicit in Figure 1. This multivariate technique has the benefit of simultaneously considering all linkages, and has been recommended by many scholars (Colquitt, LePine, & Noe, 2000; Shadish, 1996; Viswesvaran & Ones, 1995).

We followed a procedure based on two stages. First, the application of this technique needed to comply to the following prerequisites: (i) the primary study must report either the covariance matrix or the variances of the variables included in their analysis, and (ii) the effects (correlation coefficients) must be available between each construct in the model and all other constructs, and not just the pairwise effects for constructs with proposed relationships (Brown and Peterson 1993).

We followed two procedures in analyzing the data. First, we meta-analyzed the covariance matrix, then converted the results to structural relationships. Second, we converted a covariance matrix for each individual study into path coefficients, then meta-analyzed the obtained results (King & He, 2006). As the two procedures tended to produce only trivial differences, we reported only the results obtained from the first procedure. We needed to evaluate an overall sample size for the analysis, and employed the harmonic mean to measure the matrix's sample size (Colquitt et al., 2000; Viswesvaran & Ones, 1995). Table 3 displays the sample sizes.

In the second stage, the intercorrelation matrix was analyzed in a random effect model using the maximum likelihood estimation available in the STATA 13 statistical package (see also Montazemi & Qahri-Saremi, 2015). We estimated the model's fit by measuring the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standard chi-square statistic (Bentler, 1990). Note that we limited the use of the structural equation model to an analysis of the main and mediating effects given the constraints posed by the data.

4 Results

This section provides the results of our analyses structured around our focal research questions. Specifically, we describe the sample of considered studies and provide evidence of the correlations between the considered constructs. We then introduce mediation and moderation analyses and propose additional analyses to test the robustness of our results.

4.1 Sampled Studies and Correlations between Constructs

Concerning the characteristics of sampled studies, the retrieved manuscripts were published between 1995 and 2015, and most were gathered around 2009. In terms of continents, 46% were collected from Asia, 28% from North America, 10% from Europe, 6% from Africa, and 2% from Australia. Regarding firm characteristics, approximately 44% operated in non-service industries. In terms of technologies, about 67% of studies considered such technical innovation as CAD or CAM systems, Flexible Manufacturing Systems, ERP, EDI, and e-commerce; only 5% considered multiple technologies for adoption. Finally, in terms of adoption, nearly 31% of the sample organizations had already adopted the innovation at the time of the study.

The average number of the sample firms is 197 and the standard deviation is 143, with a median number of 100 employees. Approximately 86% of respondents were top managers.

Concerning the research method employed by scholars in their works, the average response rate was 31%. Moreover, 25% of the reports used a random sample, 28% used personal interviews to collect data, and 27% addressed the potential differences between respondents and non-respondents. Regarding measurement procedures, the cross-sectional design was the method of choice.

Moreover, in measuring adoption decisions, 41% (or 24%) of studies measured the adoption decision with a single item (or with more than 3 items). We also observed that 85% of studies reported Cronbach's alpha, and 73% referred to past studies in building their measures of studies; 57% adapted measures of constructs. Content, convergent, and discriminant validities were reported in 57%, 77%, and 72% of available reports, respectively. The dependent and independent variables were measured with different scales in 45% of reports. Finally, the adoption of cross-validation or holdout samples, as well as tests for endogeneity between dependent and independent variables, were nearly non-existent.

Given the available pairwise correlation coefficients, we then determined the average-adjusted intercorrelation among all constructs in our proposed framework. Table 2 presents the results.

INSERT TABLE 2 ABOUT HERE

From these results, we observed that although the associations between variables concerning both innovation attributes and decision-makers' behavioral preferences were generally high, no correlation scored greater than the recommended level of 0.65 (Tabachnick & Fidell, 1996); thus, problems induced by a lack of discriminant validity are not likely to bias our data. Additionally, we calculated the variance inflation factor (VIF) for multicollinearity (Montazemi & Qahri-Saremi, 2015), and observed that the VIF for all antecedent pairs included in our analysis ranges from 1.03

to 1.73. As the VIFs were less than the level of 1.87, the data does not violate our assumption of the constructs' independence (Larsson, 1993).

Moreover, the correlation matrix provides some primary indications about the relationships between the constructs: the reliability-corrected relationship between the attributes of innovations and the adoption decision ranges between -0.39 and -0.33, while those between managers' behavioral preferences and adoption decisions range between 0.54 and 0.38.

4.2 Which Innovation Attributes are Most Effective in Triggering Managerial Decisions about Organizations' Innovation Adoption?

Table 3 displays the results for the meta-analysis on the innovation attribute-adoption decision linkages.

INSERT TABLE 3 ABOUT HERE

Given the results reported in Table 3, we noted that the innovation attributes tend to consistently influence adoption, as well as the directionality across different studies, organizations, contexts, and research settings. Moreover, the results appear to be robust relative to the number of null studies needed to render the observed effects as zero (mean file-drawer N is 51,443). Consequently, the innovation attributes are significant for organizations' adoption decisions.

Our results further suggest that the innovation attributes influence adoption decisions with different signs and salience. In terms of signs, relative advantage, compatibility, observability, and trialability tend to favor the adoption decision, while complexity hampers such decisions. According to the .30 rule, innovation attributes that are ultimately salient determinants of organizations' innovation adoption decisions include relative advantage, compatibility, and complexity (see also Tornatzky & Klein, 1982). We further calculated the combined direct effect of innovations' salient attributes on the adoption decision as estimated by structural equation model.

The path coefficient is positive, greater than the .30 rule, and highly significant, which suggests synergic, combined effects between the three salient attributes of an innovation in triggering an adoption decision. Overall, the results provide evidence that confirms Hypothesis 1.

4.3 Which Decision-Makers' Behavioral Preferences are the Most Affected by Variations in Innovation Attributes?

Table 3 also reveals the results for the meta-analysis on the attributes of innovation-decision makers' behavioral preferences. The average of the absolute sample-weighted, reliability-adjusted correlations among the attributes of innovations and mediators is 0.39. All paths, from antecedents to mediators, are supported in both the pairwise analyses and the structural equation model. All the findings appear to be robust relative to the number of null studies needed to render the observed effects as zero (mean file-drawer N is 4,333).

Different innovation attributes also have differential influences on decision-maker-level variables. Relative advantage has the largest positive impact on the mediators of all antecedents, in support of this attribute's relevance in forming decision-makers' favorable attitudes. The significant impact of innovation attributes on norms indicates that the false consensus mechanism matters to decision-makers. However, the explained variance for the considered associations also suggests that the false consensus mechanism does not monopolize the norm-formation process. Instead, complexity has a negative impact on all the behavioral preferences of decision-makers, suggesting that greater levels of complexity negatively influence attitudes, norms, and perceived control perceptions of the innovation to be adopted. We also evaluated the innovation attributes' combined effects on the considered mediators. The path coefficient is positive, greater than the .30 rule, and highly significant, which indicates the innovation attributes' joint effects on decision-makers' behavioral preferences.

4.4 How do Variations in Decision-Makers' Behavioral Preferences Account for Variations in Organizations' Innovation Adoption Decisions?

We now consider the latter part of the model: the mediator-adoption decision relationships. Table 3 notes the average sample-weighted reliability-adjusted correlation among mediators and adoption decisions as 0.44. All paths, from mediators to the outcome, are supported in the pairwise analyses as well as in structural equation model. All of the findings appear to be robust relative to the number of null studies needed to render the observed effects as zero (mean file-drawer N is 35,669).

Generally, decision makers' behavioral preferences are widely effective in innovation adoption. The combined effect on the adoption decision, as captured by structural equation model, is positive, far greater than the .30 rule, and highly significant. This result suggests that decision-makers' behavioral preferences may produce synergistic effects. The chances of an innovation's adoption tend to increase when the new technology can simultaneously stimulate favorable attitudes, norms, and perceived behavioral controls in the decision-maker. The different mediators tend to produce varying influences on adoption decisions; attitude has the greatest influence on adoption decisions, while norms and behavioral controls have more attenuated effects, although highly significant. This implies that stimulating a decision-maker's favorable attitude toward the innovation is a key determinant for its adoption in organizations. We further evaluated the strengths of the effects in the attributes of innovation-adoption decision linkages, which are likely to be mediated by decision-makers' behavioral preferences. Table 4 reports the results regarding these hypothesized relationships.

INSERT TABLE 4 ABOUT HERE

Specifically, the analysis evidences that if one controls for attitudes, norms, and perceived behavioral controls in the attributes of innovation-adoption decision relationships, the resulting corrected partial correlation coefficients will be less than the unmediated correlations between the considered variables. Moreover, we evaluate the strength and significance of the mediation effects using Sobel's (1982) test, and observe that the total standardized mediation effects for the considered variables are significant (see Table 4). A pairwise analysis then offers evidence that supports Hypotheses 2, 3, and 4. Note that the magnitude of the corrected partial correlation coefficients is less than the magnitude of coefficients associated with unmediated effects, yet were still highly significant for all the considered associations (see Table 4).

Regarding robustness, we again refer to the structural equation model. Specifically, we performed a preliminary structural equation model that included the decision-maker's behavioral preferences as mediators of the innovation attribute-adoption association (Model 1). We also conducted a second model that included the direct and mediating effects between innovation attributes and adoption decisions (Model 2). The fit statistics of Model 1 are $\chi^2(8) = 433.49$, RMSEA = 0.20, $p < 0.01$, and CFI = 0.77; those of Model 2 are $\chi^2(5) = 381.42$, RSMEA = 0.24, $p < 0.01$, and CFI = 0.75. These models allow us to calculate direct, indirect, and total effects (Brown, 1997). The direct effects include the innovation attributes' effects on the adoption decision, as unmediated by other variables. The indirect effects were computed as the product of the paths from the innovation attributes to the managers' behavioral preferences, and from the managers' behavioral preferences to the adoption decision. These effects for relative advantage (Beta = 0.13, $p < 0.05$), compatibility (Beta = 0.20, $p < 0.05$) and complexity (Beta = -0.09, $p < 0.05$) were all significant, further supporting Hypotheses 2, 3, and 4. We also calculated the innovation attributes' direct effects on adoption decisions by controlling for decision-makers' behavioral preferences for relative advantage (Beta = 0.13, $p < 0.05$), compatibility (Beta = 0.05, $p < 0.05$), and complexity (Beta = -0.09, $p < 0.05$). We observed that these coefficients are much lower than the corresponded unmediated coefficients for relative advantage (Beta = 0.21, $p < 0.05$), compatibility (Beta = 0.17, $p < 0.05$), and complexity (Beta = -0.15, $p < 0.05$). On the one hand, these results confirm the mediating role of decision-makers' behavioral preferences on the innovation attribute-adoption linkages. On the other hand, the mediated coefficients for the considered innovation attributes are still significant. This result is consistent with an analysis of partial correlation coefficients, and suggests that other potential mediators are to intervene in the innovation attribute-adoption linkage.

4.5 How do Variations in Contexts of Adoption and Research Settings Influence the Linkages between Decision-Makers' Behavioral Preferences and Organizations' Adoption Decisions?

In introducing the moderation analysis, we observed that the explained variance of associations between mediators and the adoption decision is well below the threshold of 75%, and the homogeneity test is always significant for all considered associations between mediators and organizations' adoption decisions. Outcomes from the considered tests motivate an investigation of the potential sources for the reported different effect sizes. Table 5 illustrates the results.

INSERT TABLE 5 ABOUT HERE

These tests supported the premise that behavioral control perceptions have a greater impact on the adoption decision when one considers top managers. The same effect was not found for attitudes and norms. Therefore, the data partially confirms Hypothesis 5. An insignificant moderating effect was found regarding the organization's size on the decision-maker's behavioral preference-adoption associations, as the *t*-test and the beta coefficients calculated with a meta-analytical regression model were never significant. Consequently, our data does not provide consistent evidence that supports Hypothesis 6. However, this result suggests that the considered associations hold across organizations of different sizes. As for robustness, we tested the moderating effects of organizational size by observing different thresholds for size. Specifically, we followed the OECD and considered thresholds of both 250 and 500 employees for organizational size. This analysis revealed results consistent with our main findings.

Considering the research settings, the hypothesis that behavioral preferences matter more when the decision maker can control innovation adoption is confirmed for all but perceived behavioral control. Specifically, the magnitude of the attitude and norm-adoption associations is greater when the adoption decision is measured as an intention rather than as an expectation. Therefore, we found Hypothesis 7 is partially supported.

We did not find any confirming evidence for Hypothesis 8, as attitudes and norms have significant implications not only for the intention to adopt an innovation, but also for the adoption decision. Finally, we found evidence that the common method variance may inflate correlation coefficients in the considered studies, and particularly for the attitude- and norm-adoption linkages. Therefore, Hypothesis 9 is partially confirmed by the available data. On the one hand, it must be noted that, when significant, the observed differences concerned the correlation's magnitude, while the direction and significance level are consistent with our main results. On the other hand, non-significant results must be cautiously considered, and one should avoid concluding based on the moderator's limited relevance, as its insignificance may relate to the power of the test.

4.6 Additional Analyses

As for robustness, we evaluated the possibility that a mediating variable as measured in the study may only be spurious. Thus, we performed a regression with random effects (Lipsey & Wilson, 2001) for each mediator on the variables capturing other measured characteristics of our studies (i.e., country, technology, industry, and year). The analysis revealed that none of the considered variables were significantly associated with attitude (min p-value = 0.21; max p-value = 0.96; R-squared = 0.23), norms (min p-value = 0.10; max p-value = 0.90; R-squared = 0.18), and perceived behavioral control (min p-value = 0.06; max p-value = 0.72; R-squared = 0.26).

We also further assess publication and eligibility biases through a quantile-plot analysis, here omitted but available on request from the corresponding author, in which the empirical values of considered associations contrast expected values under the assumption of normality. This analysis demonstrated that the sample of effect sizes for the considered associations were gathered around the diagonal, and generally fell within the 95% CIs of the normality line. Therefore, we can conclude that publication and eligibility biases are limited in our study (Wang & Bushman, 1999). We also excluded extreme outliers from the sample of observation, and noted that our findings remained unaltered, which confirms our results' robustness. We then analyzed associations for the specific sample measures as reported in Table 1, and again discovered that our main results hold. Finally, we conducted a one-sample-removed analysis to report each individual sample's influence on our results (Borenstein, Hedges, Higgins, & Rothstein, 2009). The analysis revealed that our primary findings remain constant.

5 Discussion

No single study has simultaneously analyzed the linkages noted within Figure 1; a meta-analysis combined with path modeling permitted us to conduct such a study. We found consistent evidence that innovation attributes play a key role in innovation adoption, and relative advantage, compatibility, and complexity are attributes likely to more greatly stimulate organizations' decision to adopt innovations. However, our sampled studies noted work in which greater levels of relative advantage are significantly associated (p = 0.02) with more limited adoption levels (Kurnia et al., 2015). Authors have suggested that such a finding is likely to be attributed to a lack of understanding within the surveyed organizations regarding not only the new technologies' benefits, but also the presence of barriers that favor the formation of negative perceptions that outweigh the positive impressions of new technologies' impacts. An alternative explanation is derived from studies developed within the protection motivation theory for individuals. We proposed that the perceptions of lower (even negative) benefits may be more effective than perceptions of greater positive benefits in stimulating the decision-maker to adopt a behavior. This is the case when a behavior has low efficacy, or the uncertainty exists that the behavior will result in the desired outcome.

Additionally, decision-makers are more likely to become involved in an extended search for a behavior that is less certain to lead to the expected outcome, than for a behavior that is more likely to lead to the expected outcome (Block & Keller, 1995). This result calls for future studies considering the mechanisms and the conditions that may explain a reverse relationship between relative advantage and organizations' innovation adoption. For instance, a further explanation under such conditions may derive from analyzing the process by which organizations adopt innovations by resorting to external sources. Scholars have addressed this point by typically distinguishing between pecuniary and non-pecuniary inflows (Dahalander & Gann, 2010), as significant pecuniary costs might be involved in adopting innovation from external sources, which typically occurs through contractual licensing agreements (Wes & Bogers, 2014). The pecuniary cost of innovation adoption may be perceived as a proxy for the innovation perceived as competitive advantage. However, many scholars in this vein have demonstrated that the strength of the intellectual property protection regime, as reflected by the "price" of the innovation, may ultimately deter innovation adoption from external providers. This occurs because of the fear that the adopting organization might experience reduced value capture and decreasing profitability, especially when the cost of innovation acquisition exceeds its associated incremental value creation

(Faems et al., 2010). Thus, future research might examine the price variable's role in the innovation adoption process, and more generally, on the performance net benefits of innovation adoption.

Incidentally, we must observe that of Rogers' (1983) five innovation attributes, observability and trialability were the least used in empirical studies. Some reasons for their more limited utilization relate to our sampled studies, and particularly to the adopted technologies' specificity (e.g., Hashem & Tann, 2007) relative to the findings proposed by Tornatzky and Klein's (1982) study, as well as prior research based on a technological, organizational, and environmental framework (Agarwal & Prasad, 1998; Hashem & Tann, 2007; Hsing Wu, Kao, & Lin, 2013; Thong, 1999). Other studies refer to the technological acceptance model, in which only usefulness and ease of use—which relate to the concepts of relative advantage and complexity, respectively—are considered (Davis, 1989); and to the decomposed theory of planned behavior, in which only relative advantage, compatibility, and complexity are discussed as potential variables affecting decision-makers' behavioral preferences (Taylor & Todd, 1995a). However, we provided evidence that both observability and trialability are significant regarding organizations' adoption of innovations. We then suggest that future studies should consider all innovation attributes in understanding adoption decisions.

Our results evidence that the correlation coefficient of the trialability-adoption association has the lowest magnitude among the innovation attributes. This result may be influenced by available empirical estimates as well as the conceptualization/operationalization of trialability. Concerning empirical estimates, our sample revealed three studies in which greater levels of trialability were associated in a significant way ($p < 0.05$) to more limited levels of adoption (Aubert, Schroeder, & Grimaudo, 2012; Hussin, Nor, & Suhaimi, 2008; Ramdani et al., 2009). Authors have explained this result by considering that the negative trialability-adoption association may relate to non-adopters' incorrect impressions of the possibility to test the new technology. As such technology is often complex and composed of different parts, this would be an inherently difficult attempt. Non-adopters in the considered studies were noted as perceiving the innovation as easier to try than it really was (Aubert et al., 2012). We may attempt to propose an alternative explanation for this result. Instead of framing the considered association within the expectancy-value model, one can consider the cognitive reassurance theory and observe that with high expectations of efficacy (e.g., if the technology has a perceived high trialability), the subjects use this opinion as a basis for their behavior, without further evaluation. However, with low expectations of efficacy (e.g., if the technology's perceived trialability is low), people seek reassurance, which may influence their attitudes toward the behavior and, consequently, the decision to adopt (Gleicher & Petty, 1992). Therefore, we could consider the possibility that decision-makers who perceived the innovation as difficult to attempt were involved in understanding and experimenting with the innovation to a greater extent, which then favored their decision to adopt the innovation. Future research must address and interpret the mechanisms in which the observed negative association between trialability and adoption prevails. Similarly, research should compare the expectancy-value model's predicted validity with the cognitive reassurance theory or alternative theories across different contexts and technologies.

Concerning the conceptualization/operationalization of the construct of trialability, Banerjee, Wei, and Ma (2012) observed that if one considers highly uncertain contexts, and perceive trialability not only as a belief-based factor, but as an active post-intent recursive experimentation process—focused on accumulating information on and experience with the innovation—then trialability may become an important determinant of the adoption decision. The initial perception of an innovation's trialability as well as the decision-maker's effective intention to try it are both important for an adoption decision to occur. Considering the negative association between trialability and adoption, we may also envision the possibility that greater perceived levels of trialability may decrease the decision-maker's probability to try the innovation, which may then negatively influence adoption decisions. Therefore, further elaborating on the concepts of observability and trialability, as well as investigating their implications across different contexts and technologies, represents an important task for future research.

We found strong support for the linkages between the effects of the innovation attribute-decision-makers' behavioral preferences link as well as the decision-makers' behavioral preferences –organizations' adoption decision link. One key finding is that the decision-makers' behavioral preferences mediate, albeit partially, the innovation attribute-adoption decision linkage. Therefore, to the extent that future studies are interested in understanding the mechanisms involved in adoption decisions, the considered constructs of attitudes, norms, and perceived behavioral controls should be included.

We also observed that the contexts in which the adoption occurs (i.e., the decision-maker's hierarchical position) as well as scholars' research settings are both significant in empirical predictions. We discovered evidence that measuring adoption as an intention or expectation, as well as measuring dependent and independent variables with the same or different formats, influences the magnitude of empirical estimates, yet the direction and levels of significance remain constant. Future studies, and particularly those interested in precisely estimating the innovation attribute- adoption link, should address the problem of measuring the adoption construct. This could be accomplished by considering alternatives that are both consistent with conceptual definitions and address the common method variance bias, such as combining data from multiple, different sources or by using multiple respondents.

5.1 Our Findings in the Context of Past Meta-Analytical Works

Our study relates to many previous meta-analyses. Concerning innovation attributes' main effects on innovation adoption, our study relates to the work of Arts, Frambach, and Bijmolt

(2011), which addresses consumers' adoption of innovations. It is noteworthy that the innovation attributes' influence on the decision to adopt was greater when the adopting unit was an organization, rather than a consumer. Additionally, and considering consumers' innovation adoption, the correlation coefficients associated with the attributes of complexity, observability, and trialability were close to zero, and generally not significant. This comparison suggested that while organizations generally tend to care about all innovation attributes, consumers generally tend to care less about such attributes and in a selective manner.

It must be further noted that the meta-analyses that combined adoptions by organizations and consumers (Kapoor et al., 2014b) reported coefficients associated with innovation attributes that were generally less than the current study, and greater than those reported by Arts, Frambach, and Bijmolt (2011) for consumers. Specifically, both our study and Arts, Frambach, and Bijmolt's (2011) meta-analysis depicted the upper and lower boundaries within which the mean correlation coefficients associated with the attributes of relative advantage (0.39; 0.19), compatibility (0.36; 0.21), complexity (-0.33; -0.01), observability (0.30; 0.05), trialability (0.11; 0.03) tend to be distributed.

Our study focused on adoption decisions, and thus, our results correlate with studies on post-adoption, and particularly with those reviews that examined the performance outcomes of innovation adoption in organizations (Rosenbusch et al., 2011). Although results from the two studies cannot be combined as their samples differ, both reviews address an important research need—understanding the antecedents in the innovation performance chain—and suggest a call for future studies aimed to develop an integrated model that accounts for the relationships among innovation attributes, adoption decisions, and the performance implications of innovations in organizations.

5.2 Limitations of this Meta-Analysis

This study has several limitations to discuss prior to its conclusion, which concern the correlational nature of the results; the validity of self-reporting innovation adoption; and the difficulty of analyzing more complex interactions in the proposed framework, as well as the generalizability of its conclusions to the sample of studies and to the population of potential studies on the topic.

First, our study is correlational in nature. The specific composition of the sample of organizations, the particular researchers' preferences, and other uncontrollable variables can co-vary with other studies' characteristics or methods. However, this limitation is fortunately mitigated by the use of mediational analysis and multiple measures and methods. Another limitation refers to the potential inaccuracy of managers' self-reported behaviors. However, various factors influence the accuracy of self-reporting, such as the length of the time interval and the social context of the adoption, as well as the order in which the participants answered questions (March & Sutton, 1997). The accuracy of self-reporting may also differ across groups. For example, if the innovation conveys a particular status to the adopter, respondents may tend to report that their firm has adopted the innovation even in the absence of an adoption decision. Given these possibilities, future studies may combine self-reporting measures regarding the adoption decision with the objective obtained, for example, from archival data or third parties, such as the suppliers of the new technology.

An additional limitation concerns the associations between innovation attributes and managers' behavioral preferences. We excluded observability and trialability because of the available conceptualization, but we anticipate future studies will consider how the attributes of observability and trialability may influence managers' behavioral preferences and, consequently, stimulate adoption decisions. Mediating processes and moderating variables may interact among each other, and such interactions may generate further effects on innovation attribute-adoption relationships. Additionally, second-order relationships can also be envisaged. Finally, by synthesizing the largest number of adoption decision studies that provide source information, the findings from our meta-analysis are likely the most generalizable to date. Future research could complement these findings by offering a sufficiently large number of effect sizes to estimate population variances and establish the tenability of our conclusions in the broader spectrum of all possible studies.

5.3 Implications in Practice

This study has also implications in practice. Without knowing potential adopters' characteristics, business executives interested in diffusing an innovation should design new technology to at least offer greater benefits compared with the alternatives already available. Simultaneously, such innovation should be compatible, easy to use, and have observable benefits.

Managers must also recognize that innovation attributes' influence (particularly, relative advantage, compatibility, and complexity) on the decision to adopt innovations are mediated to a greater extent by influences on the decision-maker's attitudes, norms, and perceived behavioral controls. Thus, the innovation attributes must stimulate positive attitudes, norms, and perceived behavioral controls in the decision-maker, and particularly those who are top managers. Our results suggest that targeted approaches may improve the diffusion of innovation. Innovation attributes tend to operate through different mediators, which differently influence adoption decisions. Thus, a manager who recognizes that the adopting organization's decision-maker may lack the necessary resources to spot the innovation should design technologies with incredibly limited complexity. Managers who target firms that are highly connected with other organizations, such as those in business ecosystems, could improve innovation diffusion by investing resources to increase perceptions of the innovation's relative advantage. This could be accomplished by adopting not only various target organizations, but also the partners associated with these organizations.

Business executives should also consider the innovation attributes' differential effects on decision-makers' behavioral preferences and, consequently, on adoption decisions. For example, consider that while relative advantage has a significant, positive effect on decision-makers' attitudes and norms, complexity has a negative effect on attitudes, norms, and perceived behavioral control of the innovation. Therefore, one can increase an innovation's diffusion by increasing its relative advantage or by decreasing its complexity. Our structural equation model also revealed that the relative advantage's positive effect on the decision-maker's behavioral preferences (Beta = 0.58, $p < 0.05$) is greater in magnitude than the negative effect of complexity on these behavioral preferences (Beta = -0.27, $p < 0.05$). Thus, when trade-offs between relative advantage and complexity exist in the design of new technologies, investing resources to provide innovations with greater relative advantages may become beneficial in terms of its diffusion. This is the case even if such increases occur at the expense of moderate increases in the levels of complexity. However, and from a different perspective, if an organization prefers to deter adopting another organization's innovation, business executives could increase the innovation's complexity and decrease its relative advantage—as well as its compatibility for other organizations—and assume that this perception will be shared by most of the players in an industry.

5.4 Future Research Directions

Our findings prove that something can be gained by integrating the innovation diffusion theory and the theory of planned behavior. Such an integration offers a richer but more articulated explanation of organizations' adoption decisions as well as their determinants. Specifically, we posited and proved that decision-makers will contribute to an adoption decision by not only forming their own interpretation of innovation attributes, but also developing a more complex set of behavioral preferences which will consequently influence the adoption decision. The decision-maker's important role in the adoption decision was also envisaged by Rogers (1983), who suggested that an individual in the adoption process is expected to evolve from knowing of an innovation to forming an attitude toward the new technology. Once formed, such attitudes are key in explaining an innovation adoption decision (Rogers, 1983, p. 36). We augment Rogers' (1983) initial insight, in that both attitude and other behavioral preferences—such as norms and perceived behavioral control—are significant in the adoption decision.

Our results further suggest the importance of scholars' continued analysis of decomposition and crossover effects in the theory of planned behavior (Taylor & Todd, 1995a). Future research should also incorporate the attributes of observability and trialability as antecedents of decision-makers' behavioral preferences. To the best of our knowledge, a theoretical discussion of nature (e.g., direct correlates or moderating variables of the attributes of the innovation-behavioral preferences linkage), expected association (i.e., which behavioral preferences are influenced), and the direction of these innovation attributes' effects on decision-makers' behavioral preferences is required.

Moreover, innovation attributes' direct effects on adoption decisions are still significant, even if controlling for the decision-maker's behavioral preferences. The presence of these direct effects may originate with considering an organization's adoption decisions. For example, an organization's decision-maker may have a very limited attitude toward the innovation, but will pursue its adoption to achieve various benefits and rewards for them or the organization, extrinsic to the decision-maker's own use of the technology (Davis et al., 1989). Therefore, studies on organizations' adoption of innovations should elaborate on the distinction between decision-makers' behavioral preferences that are considered as intrinsic or extrinsic to the use of the innovation. Further, researchers should evaluate how these distinct preferences are likely to mediate the innovation attribute-adoption relationship.

It seems noteworthy to clarify that the adoption decision may be affected by the function assumed by the decision-maker (i.e., entrepreneur or manager). Although the data does not allow us to introduce such a distinction, conceptually conceiving and empirically separating adoption decisions taken by entrepreneurs from those by managers may be relevant to understanding organizations' adoption of innovations. On the one hand, entrepreneurial decisions tend to be more affected by specific biases and heuristics than managerial ones. This can lead them to differently perceive the competitive environment, such as through overconfidence and representation—such as the willingness to rely on small, nonrandom samples in decision making (Busenitz & Barney, 1997)—thereby influencing innovation adoption decisions.

Strategic management literature generally acknowledges that entrepreneurs do think and behave differently than managers, and especially in large organizations (Busenitz & Barney, 1997). If different individuals are cognitively biased in different ways, than they differently perceive competitive characteristics; hence, they also tend to make strategic decisions, such as innovation adoption, in substantially different ways (Stumpf & Dunbar, 1991). Competitive characteristics relate to the decision-makers' perceptions about their competitive environment. On the one hand, innovation adoption from this perspective is the result of a perceived competitive environment, which can be identified either broadly (e.g., financial services) or narrowly (e.g., private banking) according to the specific decision-maker. On the other hand, literature also widely acknowledges the manager's role as the "architects of the innovation imperative" (Cooper, 1998, p. 493). Specifically, scholars have proven that managers help their organizations develop all prerequisites in terms of the skills and adaptations that precede innovation adoption.

In understanding organizations' innovation adoption, research should also elaborate and even extend the concept of decision-makers' behavioral preferences. Specifically, areas of study that appear to hold promise include such aspects as the decision-maker's awareness of innovation attributes and trust in the innovation providers or vendors. Note that awareness has been extensively considered within the awareness-motivation-skills and capabilities framework to understand various adoption decision behaviors (Dutton & Jackson, 1987; Kiesler & Sproull, 1982; Lant, Milliken, & Batra, 1992). Further, trust has been considered in innovation adoption studies as an antecedent of the decision-maker's attitude (Pavlou & Fygenson, 2006).

Research should also consider a possible multidimensional perspective on managers' behavioral preferences, and investigate the potential interdependencies not only among the behavioral preferences of organizational decision-makers, but also across the preferences of different organizations' decision-makers. Researchers should also identify relationships that are potentially complementary or substitutable, and evaluate how these interactive preferences mediate innovation attribute-adoption linkages. Simultaneously, and given the decision-maker's significance in the adoption decision, we envision the possibility of integrating innovation adoption and behavioral economics literatures to explicitly study the effects of heuristics and decision-makers' biases on adoption decisions.

Our study also provides evidence of the presence of heterogeneity across nearly all linkages, even after we accounted for moderators. Therefore, an important task for future research involves theoretically addressing and empirically analyzing moderating variables' implications for antecedent-adoption linkages. Concerning the moderating variables associated with the contexts of innovation adoption, decision-makers' past experiences (Cordano & Frieze, 2000) and espoused national cultural values (Mueller, Rosenbusch, & Bausch, 2013; Srite & Karahanna, 2006) represent important aspects to be considered in future studies. The organizational size's moderating effect on the decision-maker's behavioral preferences-adoption associations was found insignificant in this study; however, it must be noted that studies adopt a different operationalization of organizational size, such as those focusing on small and medium-sized enterprises (SMEs) as defined by the European Commission, or European businesses that employ up to 500 people (OECD, 1998). Such studies have discovered a significant relationship between the perceived direct and indirect benefits of innovation and adoption decisions depending on the organization's size, such as Scupola's (2003) study on SMEs' adoption of e-commerce in southern Italy. Therefore, it would be of interest for future research to address whether and how different organizational size thresholds may differently affect decision-makers' behavioral preference-adoption linkages.

Additionally, organizational size's non-significant moderating effect, as this paper discovered, could stimulate further research on the antecedents of such an effect. A well-known explanation in literature, for instance, observes the different endowment of financial resources between small and large-sized organizations as one common explanation of diverging innovation adoption behaviors. For instance, van de Vrande et al.'s (2009) study concluded that innovation adoption in SMEs is hampered by a lack of financial resources, while larger organizations are not only more prone to innovation adoption, but also reserve more structural funds to finance innovation exploitation and exploration upon adoption. In light of these results, our non-significant moderating effect of size should thus encourage scholars to analyze organizational size in greater depth. This provides an important contingent factor to influence trends toward innovation adoption, as well as the extent to which differently sized organizations can then engage in innovation exploration and exploitation activities. Finally, one could also explore the relative advantage—or the adoption link—in the view of the "innovator's dilemma" by including additional moderating variables both at the firm- (e.g., age) and industry-level (e.g., turbulence, dynamicity, and heterogeneity). This is an important issue to be addressed in future studies.

Concerning scholars' overall research settings, this review suggests that various other studies do not meet some "ideal" conditions, as suggested by Tornasky and Klein (1982). We then suggest that future studies continue to embrace a predictive rather than retrospective stance; use research approaches and measures that are reliable, replicable, and permit some degree of statistical power; consider longitudinal design; and introduce cross-sample validation. Scholars should also carefully spot issues with endogeneity and chronology, and should design their work and consider their findings in a way that considers: (a) the decision to adopt innovations may induce the decision-maker to associate certain attributes with the new technology (i.e., the adoption decision determines innovation attributes); (b) different time lags may exist between the time at which a decision-maker is exposed to an innovation and the time at which a decision is made (i.e., the adoption decision becomes contingent upon the interview period); and (c) in some organizations, the decision-makers always change (i.e., the decision-maker who decides to adopt the innovation may differ from the individual who evaluates the innovation attributes).

Extant studies suggest that the innovation diffusion theory is affected by pro-innovation biases (Jeyaraj et al., 2006), the presence of which makes it difficult for scholars to address such challenging questions as when and how organizations adopt "inefficient" innovations. Further, when and how do organizations reject "efficient" innovations? In addressing these challenging questions, Abrahamson's (1991) early study considered how other organizations influence the decision-maker, among other decisions. This may represent a potential mechanism to understand the adoption of inefficient innovations, or the rejection of those that are efficient. The integration of the innovation diffusion theory with the theory of planned behavior may offer a complementary perspective on the adoption of inefficient innovations. Specifically, our model not only incorporates the possibility that an organization may adopt inefficient innovations (e.g., an innovation with limited relative advantages and/or that is highly complex) through the decision-makers' formation of norms, but also offers some direction on the conditions for the occurrence of these adoption decisions. Moreover, our model suggests that organizations are likely to adopt inefficient innovations when the magnitude of effects produced by external pressures on decision-makers' norms will be greater than the magnitude of both innovation attributes' direct effects on attitudes and these attributes' crossover effects on the decision-makers' norms. An important issue for future studies involves an empirical estimate of the conditions by which external pressures' effects tend to dominate the effects of innovation attributes on the adoption of inefficient innovations.

Conflicts of Interest: The authors declare no conflict of interest.

References

Details of all works included in our meta-analysis are reported in an electronic companion available from the journal's website.

Abrahamson, E. 1991. Managerial fads and fashions: The diffusion and refection of innovations. *Academy of Management Review, 16(3)*: 586-612.

Agarwal, R., & Prasad, J. 1998. The antecedents and consequents of user perceptions in information technology adoption. *Decision Support Systems, 22(1)*: 15-29.

Ajzen, I. 1985. From intentions to actions: A theory of planned behavior. In J. Kuhl and J. Beckmann (Eds.), *Action-control: From cognition to behavior*: 11-39. Heidelberg: Springer.

Ajzen, I. 1987. Attitudes, traits, and actions: Dispositional prediction of behavior in personality and social psychology. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*. New York: Academic Press.

Ajzen, I. 1991. The theory of planned behavior. *Organizational behavior and human decision processes, 50(2)*: 179-211.

Ajzen, I., & Driver, B. L. 1992. Contingent value measurement: On the nature and meaning of willingess to pay. *Journal of Consumer Psychology, 1(4)*: 297-316.

Alam, S. S., & Noor, M. K. M. 2009. ICT adoption in small and medium enterprises: An empirical evidence of service sectors in Malaysia. *International Journal of Business and Management, 4(2)*: 112-125.

Anderson, N., Potočnik, K., & Zhou, J. 2014. Innovation and creativity in organizations a state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management, 40(5)*: 1297-1333.

Angle, H. L., & Van de Ven, A. H. 1989. Suggestions for managing the innovation journey. In A. H. Van de Ven, H. L. Angle and M. S. Poole (Eds.), *Research on the management of innovation: The Minnesota studies*: da trovare. New York: Oxford University Press.

Armitage, C. J., & Conner, M. 1999. Distinguishing perceptions of control from self-efficacy: Predicting consumption of a low-fat diet using the theory of planned behavior. *Journal of Applied Social Psychology, 29(1)*: 72-90.
Armitage, C. J., & Conner, M. 2001. Efficacy of the theory of planned behaviour: A meta-analytic review. *British journal of social psychology, 40(4)*: 471-499.
Arpaci, I. 2013. *Organizational adoption of mobile communication technologies*, Middle East Technical University, Ankara.
Arts, J. W. C., Frambach, R. T., & Bijmolt, T. H. A. 2011. Generalizations on consumer innovation adoption: A meta-analysis on drivers of intention and behavior. *International Journal of Research in Marketing, 28(2)*: 134-144.
Askarany, D., Brierley, J. A., & Yazdifar, H. 2012. The effect of innovation characteristics on activity-based costing adoption. *International Journal of Managerial and Financial Accounting, 4(3)*: 291-313.
Attewell, P. 1992. Technology diffusion and organizational learning: The case of business computing. *Organization Science, 3(1)*: 1-19.
Aubert, B. A., Schroeder, A., & Grimaudo, J. 2012. IT as enabler of sustainable farming: An empirical analysis of farmers' adoption decision of precision agriculture technology. *Decision Support Systems, 54(1)*: 510–520.
Baldridge, J. V., & Burnham, R. A. 1975. Organizational innovation: individual, organizational, and environmental impacts. *Administrative Science Quarterly, 20(2)*: 165-176.
Bandura, A. 1977. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84(2)*: 191-215.
Banerjee, P., Wei, K. K., & Ma, L. C. 2012. Role of trialability in B2B e-business adoption: theoretical insights from two case studies. *Behaviour & Information Technology, 31(9)*: 815-827.
Bass, B. M., & Stogdill, R. M. 1990. *Handbook of leadership*. New York: Free Press.
Bauer, T. N., Bodner, T., Erdogan, B., Truxillo, D. M., & Tucker, J. S. 2007. Newcomer adjustment during organizational socialization: a meta-analytic review of antecedents, outcomes, and methods. *Journal of Applied Psychology, 92(3)*: 707.
Becker, M. H. 1970. Sociometric location and innovativeness: Reformulation and extension of the diffusion model. *American Sociological Review, 35(2)*: 267-282.
Begg, C. B. 1994. Publication bias. In H. Cooper and L. V. Hedges (Eds.), *The handbook of research synthesis*: 399-409. New York: Russel Sage Foundation.
Bentler, P. M. 1990. Comparative fit indexes in structural models. *Psychological Bulletin, 107(2)*: 238-246.
Blalock, H. 1961. *Causal inferences in nonexperimental research*. Chapel Hill: University of North Carolina Press.
Block, L. G., & Keller, P. A. 1995. When to accentuate the negative: The effects of perceived efficacy and message framing on intentions to perform a health-related behavior. *Journal of Marketing Research, 32(2)*: 192-203.
Bloom, P. N., & Kotler, P. 1975. Strategies for high market-share companies. *Harvard Business Review, 53(6)*: 63-72.

Bobko, P., & Rieck, A. 1980. Large sample estimators for standard errors of functions of correlation coefficients. *Applied Psychological Measurement, 4(3)*: 385-398.
Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. 2009. *Introduction to meta-analysis*. West Sussex, UK: Wiley.
Brown, R. L. 1997. Assessing specific mediational effects in complex theoretical models. *Structural Equation Modeling: A Multidisciplinary Journal, 4(2)*: 142-156.
Bruque, S., & Moyano, J. 2007. Organisational determinants of information technology adoption and implementation in SMEs: The case of family and cooperative firms. *Technovation, 27(5)*: 241-253.
Bullock, R. J., & Svyantek, D. J. 1985. Analyzing meta-analysis: Potential problems, an unsuccessful replication, and evaluation criteria. *Journal of Applied Psychology, 70(1)*: 108-115.
Busenitz, L. W., & Barney, J. B. 1997. Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing, 12(1)*: 9-30.
Camisón-Zornoza, C., Lapiedra-Alcamí, R., Segarra-Ciprés, M., & Boronat-Navarro, M. 2004. A meta-analysis of innovation and organizational size. *Organization Studies, 25(3)*: 331-361.
Campbell, D. T., & Fiske, D. W. 1959. Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56(2)*: 81-105.
Chen, J., Damanpour, F., & Reilly, R. R. 2010. Understanding antecedents of new product development speed: A meta-analysis. *Journal of Operations Management, 28(1)*: 17-33.
Chen, M.-J., & Hambrick, D. C. 1995. Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of management journal, 38(2)*: 453-482.
Cheung, M. W. L. 2009. Comparison of methods for constructing confidence intervals of standardized indirect effects. *Behavior Research Methods, 41(2)*: 425-438.
Cohen, J., & Cohen, P. 1983. *Applied multiple regression/correlation analysis for the behavioral sciences. Second ed.* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
Colquitt, J. A., LePine, J. A., & Noe, R. A. 2000. Toward an integrative theory of training motivation: a meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology, 85(5)*: 678.
Cooper, J. R. 1998. A multidimensional approach to the adoption of innovation. *Management Decision, 36(8)*: 493-502.
Cordano, M., & Frieze, I. H. 2000. Pollution reduction preferences of U.S. environmental managers: Applying Ajzen's theory of planned behavior. *Academy of management journal, 43(4)*: 627-641.
Crampton, S. M., & Wagner, J. A. 1994. Percept-percept inflation in microorganizational research: An investigation of prevalence and effect. *Journal of Applied Psychology, 79(1)*: 67-76.
Cross, R. L., & Brodt, S. E. 2001. How assumptions of consensus undermine decision making. *MIT Sloan Management Review, 42(2)*: 86-94.

Crossan, M. M., & Apaydin, M. 2010. A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies, 47(6)*: 1154-1191.
Damanpour, F. 1991. Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of management journal, 34(3)*: 555-590.
Damanpour, F. 1996. Organizational complexity and innovation: developing and testing multiple contingency models. *Management Science, 42(5)*: 693-716.
Damanpour, F., & Gopalakrishnan, S. 1998. Theories of organizational structure and innovation adoption: the role of environmental change. *Journal of Engineering and Technology management, 15(1)*: 1-24.
Damanpour, F., & Wischnevsky, D. J. 2006. Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations. *Journal of Engineering and Technology management, 23(4)*: 269-291.
Daryanto, A., Khan, H., Matlay, H., & Chakrabarti, R. 2013. Adoption of country-specific business websites. The case of UK small businesses entering the Chinese market. *Journal of Small Business and Enterprise Development, 20(3)*: 650-660.
Davis, F. D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13(4)*: 319-340.
Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. 1989. User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35(8)*: 982-1003.
DeLone, W. H., & McLean, E. R. 1992. Information systems success: The quest for the dependent variable. *Information Systems Research, 3(1)*: 60-95.
DeLone, W. H., & McLean, E. R. 2003. The DeLone and McLean model of information systems success: A Ten-year update. *Journal of management information systems, 19(4)*: 9-30.
Downs, J. G. W., & Mohr, L. B. 1976. Conceptual issues in the study of innovation. *Administrative Science Quarterly, 21(4)*: 700-714.
Dulany, D. E., Jr. 1961. Hypotheses and habits in verbal 'operant conditioning.'. *Journal of Abnormal and Social Psychology, 63(2)*: 251-263.
Dutton, J. E., & Jackson, S. E. 1987. Categorizing strategic issues: Links to organizational action. *Academy of Management Review, 12(1)*: 76-90.
Ettlie, J. E. 1983. Organizational policy and innovation among suppliers to the food processing sector. *Academy of management journal, 26(1)*: 27-44.
Eveland, J. D. 1979. Issues in using the concept of "adoption of innovations". *Journal of Technology Transfer, 4(1)*: 1-13.
Fern, E. F., & Monroe, K. B. 1996. Effect-size estimates: Issues and problems in interpretation. *Journal of Consumer Research, 23(2)*: 89-105.
Fiedler, K., Schott, M., & Meiser, T. 2011. What mediation analysis can (not) do. *Journal of Experimental Social Psychology, 47(6)*: 1231-1236.
Fishbein, M. 1967. Attitude and the prediction of behavior. In M. Fishbein (Ed.), *Readings in attitude theory and measurement*: 477-492. New York: John Wiley & Sons.
Fishbein, M., & Ajzen, I. 1975. *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Flynn, F. J., & Wiltermuth, S. S. 2010. Who's with me? False consensus, brokerage, and ethical decision making in organizations. *Academy of management journal, 53(5)*: 1074-1089.
Fombrun, C., & Shanley, M. 1990. What's in a name? Reputation building and corporate strategy. *Academy of management journal, 33(2)*: 233-258.
Gajendran, R. S., & Harrison, D. A. 2007. The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92(6)*: 1524-1541.
Gamal Aboelmaged, M. 2010. Predicting e-procurement adoption in a developing country: An empirical integration of technology acceptance model and theory of planned behaviour. *Industrial Management & Data Systems, 110(3)*: 392-414.
Ghobakhloo, M., & Tang, S. H. 2013. The role of owner/manager in adoption of electronic commerce in small businesses: The case of developing countries. *Journal of Small Business and Enterprise Development, 20(4)*: 754-787.
Gleicher, F., & Petty, R. E. 1992. Expectations of reassurance influence the nature of fear-stimulated attitude
change. *Journal of Experimental Social Psychology, 28(1)*: 86-100.
Gooding, R. Z., & Wagner, J. A. 1985. A meta-analytic review of the relationship between size and performance. *Administrative Science Quarterly, 30(3)*: 462-481.
Gross, S. R., & Miller, N. 1997. The 'golden section' and bias in perceptions of social consensus. *Personality & Social Psychology Review, 1(3)*: 241-272.
Gu, V. C., Cao, Q., & Duan, W. 2012. Unified Modeling Language (UML) IT adoption—A holistic model of organizational capabilities perspective. *Decision Support Systems, 54(1)*: 257-269.
Gupta, P., Seetharaman, A., & Raj, J. R. 2013. The usage and adoption of cloud computing by small and medium businesses. *International journal of information management, 33(5)*: 861-874.
Hage, J., & Dewar, R. 1973. Elite values versus organizational structure in predicting innovation. *Administrative Science Quarterly, 18(3)*: 279-290.
Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9(2)*: 193-206.
Hameed, M. A., Counsell, S., & Swift, S. 2012. A meta-analysis of relationships between organizational characteristics and IT innovation adoption in organizations. *Information & Management, 49(5)*: 218-232.
Harrison, D. A., Mykytyn Jr, P. P., & Riemenschneider, C. K. 1997. Executive decisions about adoption of information technology in small business: theory and empirical tests. *Information Systems Research, 8(2)*: 171-195.
Hashem, G., & Tann, J. 2007. The adoption of ISO 9000 standards within the Egyptian context: A diffusion of innovation approach. *Total Quality Management & Business Excellence, 18(6)*: 631-652.
He, Q., Duan, Y., Fu, Z., & Li, D. 2006. An innovation adoption study of online e-payment in chinese companies. *Journal of Electronic Commerce in Organizations, 4(1)*: 48-69.

Henderson, D., Sheetz, S. D., & Trinkle, B. S. 2012. The determinants of inter-organizational and internal in-house adoption of XBRL: A structural equation model. *International Journal of Accounting Information Systems, 13(2)*: 109-140.
Heyder, M., Theuvsen, L., & Hollmann-Hespos, T. 2012. Investments in tracking and tracing systems in the food industry: A PLS analysis. *Food Policy, 37(1)*: 102-113.
Hossain, M. A., & Quaddus, M. 2015. Radio frequency identification (RFID) adoption: A cross-sectional comparison of voluntary and mandatory contexts. *Information Systems Frontiers, 17(5)*: 1057-1076.
Hsing Wu, C., Kao, S.-C., & Lin, H.-H. 2013. Acceptance of enterprise blog for service industry. *Internet Research, 23(3)*: 260-297.
Hsu, C.-L., & Lin, J.-C. 2015. Factors affecting the adoption of cloud services in enterprises. *Information Systems and e-Business Management, First online: 21 December 2015*: 1-32.
Hsu, P.-F., Ray, S., & Li-Hsieh, Y.-Y. 2014. Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International journal of information management, 34(4)*: 474-488.
Huber, J. 1990. Macro-micro links in gender stratification: 1989 presidential address. *American Sociological Review, 55(1)*: 1-10.
Hung, S.-Y., Hung, W.-H., Tsai, C.-A., & Jiang, S.-C. 2010. Critical factors of hospital adoption on CRM system: Organizational and information system perspectives. *Decision Support Systems, 48(4)*: 592-603.
Hunter, J. E., & Schmidt, F. L. 2004. *Methods of meta-analysis: Correcting error and bias in research findings*. New York: Sage.
Hussin, H., Nor, R. M., & Suhaimi, M. A. 2008. Perceived attributes of e-commerce and the adoption decision: The case of Malaysian SMEs. *Jurnal Teknologi Maklumat & Multimedia, 5*: 107-125.
Jackson, E. L. 2008. *Behavioural determinants of the adoption of forward contracts by Western Australian wool producers.*, Curtin University of Technology, Curtin.
Jarrett, S. M. 2003. *Factors affecting the adoption of e-business in the aerospace industry*, Nova Southeastern University, Nova.
Jeon, B. N., Han, K. S., & Lee, M. J. 2006. Determining factors for the adoption of e-business: the case of SMEs in Korea. *Applied Economics, 38(16)*: 1905-1916.
Jeyaraj, A., Rottman, J. W., & Lacity, M. C. 2006. A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology, 21(1)*: 1-23.
Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. 2014a. Innovation adoption attributes: a review and synthesis of research findings. *European Journal of Innovation Management, 17(3)*: 327-348.
Kapoor, K. K., Dwivedi, Y. K., & Williams, M. D. 2014b. Rogers' innovation adoption attributes: a systematic review and synthesis of existing research. *Information Systems Management, 31(1)*: 74-91.
Kets de Vries, M., & Miller, D. 1984. *The neurotic organization*. San Francisco: Jossey-Bass.
Keupp, M. M., Palmié, M., & Gassmann, O. 2012. The strategic management of innovation: A systematic review and paths for future research. *International Journal of Management Reviews, 14(4)*: 367-390.

Kiesler, S., & Sproull, L. 1982. Managerial response to changing environments: Perspectives on problem sensing from social cognition. *Administrative Science Quarterly, 27(4)*: 548-570.
Kimberly, J. R. 1976. Organizational size and the structuralist perspective: A review, critique, and proposal. *Administrative Science Quarterly, 21(4)*: 571-597.
Kimberly, J. R., & Evanisko, M. R. 1981. Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of management journal, 24(4)*: 689-713.
King, W. R., & He, J. 2006. A meta-analysis of the technology acceptance model. *Information & Management, 43(6)*: 740-755.
Kurnia, S., Choudrie, J., Mahbubur, R. M., & Alzougool, B. 2015. E-commerce technology adoption: A Malaysian grocery SME retail sector study. *Journal of Business Research, 68(9)*: 1906-1918.
Kwon, T., & Zmud, R. 1987. Unifying the fragmented models of information systems implementation In H. R. Boland RJ (Ed.), *Critical issues in information systems research*: 227-262: Wiley, New York.
Lant, T. K., Milliken, F. J., & Batra, B. 1992. The role of managerial learning and interpretation in strategic persistence and reorientation: An empirical exploration. *Strategic Management Journal, 13(8)*: 585-608.
Larsen, K. R. T. 2003. A taxonomy of antecedents of information systems success: Variable analysis studies. *Journal of management information systems, 20(2)*: 169-246.
Larsson, R. 1993. Case survey methodology: Quantitative analysis of patterns across case studies. *Academy of management journal, 36(6)*: 1515-1546.
Lau, R. R., Sigelman, L., Heldman, C., & Babbitt, P. 1999. The effects of negative political advertisements: A meta-analytic assessment. *American Political Science Review, 93(4)*: 851-875.
Lee, Y., & Larsen, K. R. T. 2009. Threat or coping appraisal: Determinants of SMB executives' decision to adopt anti-malware software. *European Journal of Information Systems, 18(2)*: 177-187.
Lefebvre, L. A., Lefebvre, E., & Harvey, J. 1996. Intangible assets as determinants of advanced manufacturing technology adoption in SME' s: Toward an evolutionary model. *IEEE Transactions on Engineering Management, 43(3)*: 307-322.
Leung, M. t. 2005. *Determinants of the adoption of technological innovations in organizations*, Hong Kong Polythechnic University, Hong Kong.
Li, X., Troutt, M. D., Brandyberry, A., & Wang, T. 2011. Decision factors for the adoption and continued use of online direct sales channels among SMEs. *Journal of the Association for Information Systems, 12(1)*: 1-31.
Limthongchai, P., & Speece, M. 2003. The effect of perceived characteristics of innovation on e-commerce adoption by SMEs in Thailand. *Proceedings of the Seventh International Conference on Global Business and Economic Development, Bangkok, Thailand*.
Lin, C.-H., Lin, I.-C., Roan, J.-S., & Yeh, J.-S. 2012. Critical factors influencing hospitals' adoption of HL7 version 2 standards: An empirical investigation. *Journal of Medical Systems, 36(3)*: 1183-1192.

Lin, C.-Y., & Ho, Y.-H. 2011. Determinants of green practice adoption for logistics companies in China. *Journal of Business Ethics, 98(1)*: 67-83.
Lipsey, M. W., & Wilson, D. B. 2001. *Practical meta-analysis*. Thousand Oaks, CA: SAGE Publications.
Luqman, A., & Abdullah, N. K. 2011. E-business adoption amongst SMEs: A structural equation modeling approach. *Journal of Internet Banking and Commerce, 16(2)*: 99-112.
Mahmood, M. A., Hall, L., & Swanberg, D. L. 2001. Factors affecting information technology usage: A meta-analysis of the empirical literature. *Journal of Organizational Computing & Electronic Commerce, 11(2)*: 107-130.
Malhotra, N. K., Kim, S. S., & Patil, A. 2006. Common method variance in IS research: A comparison of alternative approaches and a reanalysis of past research. *Management Science, 52(12)*: 1865-1883.
Marcati, A., Guido, G., & Peluso, A. M. 2008. The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations. *Research Policy, 37(9)*: 1579-1590.
March, J. G., & Simon, H. A. 1958. *Organizations*. New York: Wiley.
March, J. G., & Sutton, R. I. 1997. Organizational performance as dependent variable. *Organization Science, 8*: 698–706.
Martinez-Garcıa, C. G., Dorward, P., & Rehman, T. 2013. Factors influencing adoption of improved grassland management by small-scale dairy farmers in central Mexico and the implications for future research on small holder adoption in developing countries. *Livestock Science, 152(2-3)*: 228-238.
Messerschmidt, C. M., & Hinz, O. 2013. Explaining the adoption of grid computing: An integrated institutional theory and organizational capability approach. *The Journal of Strategic Information Systems, 22(2)*: 137-156.
Miller, D., & Droge, C. 1986. Psychological and traditional determinants of structure. *Administrative Science Quarterly, 31(4)*: 539-560.
Miller, D., & Friesen, P. H. 1982. Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal, 3(1)*: 1-25.
Miller, D., Manfred, F. R. K. D. V., & Toulouse, J.-M. 1982. Top executive locus of control and its relationship to strategy-making, structure, and environment. *Academy of management journal, 25(2)*: 237-253.
Mitchell, T. R. 1985. An evaluation of the validity of correlational research conducted in organizations. *Academy of Management Review, 10(2)*: 192-205.
Montazemi, A. R., & Qahri-Saremi, H. 2015. Factors affecting adoption of online banking: A meta-analytic structural equation modeling study. *Information & Management, 52(2)*: 210-226.
Moore, G. C., & Benbasat, I. 1991. Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2(3)*: 192-222.
Mowday, R. T., & Sutton, R. I. 1993. Organizational behavior: Linking individuals and groups to organizational contexts. *Annual Review of Psychology, 44(1)*: 195.

Mueller, V., Rosenbusch, N., & Bausch, A. 2013. Success patterns of exploratory and exploitative innovation: A meta-analysis of the influence of institutional factors. *Journal of Management, 39(6)*: 1606-1636.
Nasco, S. A., Toledo, E. G., & Mykytyn, P. P. 2008. Predicting electronic commerce adoption in Chilean SMEs. *Journal of Business Research, 61(6)*: 697-705.
OECD. 1998. SMEs and e-commerce, ministerial conference on e-commerce. Ottawa: OECD.
Oliveira, T., Thomas, M., & Espadanal, M. 2014. Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management, 51(5)*: 497-510.
Oliver, R. L., & Bearden, W. O. 1985. Crossover effects in the theory of reasoned action: A moderating influence attempt. *Journal of Consumer Research, 12(3)*: 324-340.
Ostrom, T. M., Bond, C. F., Knosnick, J. A., & Sedikides, C. 1994. Attitude scale: How we measure the unmeasurable. In S. Shavitt and T. C. Brock (Eds.), *Persuasion: Psychological insights and perspectives.* Boston, MA: Allyn and Bacon.
Pavlou, P. A., & Fygenson, M. 2006. Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *MIS Quarterly, 30(1)*: 115-143.
Perrow, C. 1994. Accidents in high-risk systems. *Technology Studies, 1(1)*: 1-20.
Pierce, J. L., & Delbecq, A. L. 1977. Organization structure, individual attitudes and innovation. *Academy of Management Review, 2(1)*: 27-37.
Plouffe, C. R., Vandenbosch, M., & Hulland, J. S. 2001. Intermediating technologies and multi-group adoption: A comparison of consumer and merchant adoption intentions toward a new electronic payment system. *Journal of Product Innovation Management, 18(2)*: 65-81.
Pontikakis, D., Lin, Y., & Demirbas, D. 2006. History matters in Greece: The adoption of Internet-enabled computers by small and medium sized enterprises. *Information Economics and Policy, 18(3)*: 332-358.
Porter, B. E. 2005. Time and implementing change. *British Journal of Educational Technology, 36(6)*: 1063-1065.
Premkumar, G. 2003. A meta-analysis of research on information technology implementation in small business. *Journal of Organizational Computing & Electronic Commerce, 13(2)*: 91-121.
Premkumar, G., Ramamurthy, K., & Crum, M. 1997. Determinants of EDI adoption in the transportation industry. *European Journal of Information Systems, 6(2)*: 107-121.
Premkumar, G., & Roberts, M. 1999. Adoption of new information technologies in rural small businesses. *Omega, 27(4)*: 467-484.
Quaddus, M., & Hofmeyer, G. 2007. An investigation into the factors influencing the adoption of B2B trading exchanges in small businesses. *European Journal of Information Systems, 16(3)*: 202-215.
Ramdani, B., Chevers, D., & Williams, D. A. 2013. SMEs' adoption of enterprise applications: A technology-organisation-environment model. *Journal of Small Business and Enterprise Development, 20(4)*: 735-753.

Ramdani, B., Kawalek, P., & Lorenzo, O. 2009. Predicting SMEs' adoption of enterprise systems. *Journal of Enterprise Information Management, 22(1/2)*: 10-24.
Reed, R., & DeFillippi, R. J. 1990. Causal ambiguity, barriers to imitation, and sustainable competitive advantage. *Academy of Management Review, 15(1)*: 88-102.
Riemenschneider, C. K., Harrison, D. A., & Mykytyn, P. P. 2003. Understanding IT adoption decisions in small business: integrating current theories. *Information & Management, 40(4)*: 269-285.
Riemenschneider, C. K., & McKinney, V. R. 2001/2002. Assessing belief differences in small business adopters and non-adopters of web-based e-commerce. *Journal of Computer Information Systems, 42(2)*: 101-107.
Robertson, T. S., & Gatignon, H. 1986. Competitive effects on technology diffusion. *Journal of Marketing, 50(3)*: 1-12.
Rogers, E. M. 1983. *Diffusion of innovations*. New York: The Free Press.
Rosenbusch, N., Brinckmann, J., & Bausch, A. 2011. Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of Business Venturing, 26(4)*: 441-457.
Rosenthal, R. 1979. The "file drawer problem" and tolerance for null results. *Psychological Bulletin, 86(3)*: 638-641.
Rosenthal, R. 1991. *Meta-analytical procedures for social research*. Newbury Park, CA: Sage.
Ross, L. 1977. The intuitive psychologist and his short-comings. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*: 173-220. New York: Academic Press.
Ryan, M. J. 1982. Behavioral intention formation: The interdependency of attitudinal and social influence variables. *Journal of Consumer Research, 9(3)*: 263-278.
Sabherwal, R., Jeyaraj, A., & Chowa, C. 2006. Information system success: Individual and organizational determinants. *Management Science, 52(12)*: 1849-1864.
Saltzer, E. B. 1981. Cognitive moderators of the relationship between behavioral intentions and behavior. *Journal of Personality and Social Psychology, 41(2)*: 260-271.
Schepers, J., & Wetzels, M. 2007. A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information & Management, 44(1)*: 90-103.
Schumpeter, J. A. 1934. *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, Mass: Harvard University Press.
Scupola, A. 2003. The adoption of Internet commerce by SMEs in the south of Italy: An environmental, technological and organizational perspective. *Journal of Global Information Technology Management, 6(1)*: 52-71.
Segaar, D., Bolman, C., Willemsen, M. C., & de Vries, H. 2006. Determinants of adoption of cognitive behavioral interventions in a hospital setting: Example of a minimal-contact smoking cessation intervention for cardiology wards. *Patient Education and Counseling, 61(2)*: 262-271.
Seyal, A. H., & Rahman, M. N. A. 2003. A preliminary investigation of e-commerce adoption in small & medium enterprises in Brunei. *Journal of Global Information Technology Management, 6(2)*: 6-26.

Shadish, W. R. 1996. Meta-analysis and the exploration of causal mediating processes: A primer of examples, methods, and issues. *Psychological Methods, 1(1)*: 47-65.
Sheppard, B. H., Hartwick, J., & Warshaw, P. R. 1988. The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research, 15(3)*: 325-343.
Shimp, T. A., & Kavas, A. 1984. The theory of reasoned action applied to coupon usage. *Journal of Consumer Research, 11(3)*: 795-809.
Sobel, M. E. 1982. Asymptotic intervals for indirect effects in structural equations models. In S. Leinhart (Ed.), *Sociological methodology*: 290-312. San Francisco: Jossey-Bass.
Sophonthummapharn, K. 2009. The adoption of techno-relationship innovations. A framework for electronic customer relationship management. *Marketing Intelligence & Planning, 27(3)*: 380-412.
Srite, M., & Karahanna, E. 2006. The role of espoused national cultural values in technology acceptance. *MIS Quarterly, 30(3)*: 679-704.
Staw, B. M. 1991. Dressing up like an organization: When psychological theories can explain organizational action. *Journal of Management, 17(4)*: 805.
Stumpf, S. A., & Dunbar, R. L. M. 1991. The effects of personality type on choices made in strategic decision situations. *Decision Sciences, 22(4)*: 1047-1072.
Sultan, F., Farley, J. U., & Lehmann, D. R. 1990. A meta-analysis of applications of diffusion models. *Journal of Marketing Research, 27(1)*: 70-77.
Sutton, S. 1998. Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology, 28(15)*: 1317-1338.
Tabachnick, B. G., & Fidell, L. S. 1996. *Using multivariate statistics*. New York: Harper & Collins.
Tashkandi, A. N., & Al-Jabri, I. M. 2015. Cloud computing adoption by higher education institutions in Saudi Arabia: an exploratory study. *Cluster Computing, 18(4)*: 1527-1537.
Taylor, S., & Todd, P. 1995a. Decomposition and crossover effects in the theory of planned behavior: A study of consumer adoption intentions. *International Journal of Research in Marketing, 12(2)*: 137-155.
Taylor, S., & Todd, P. A. 1995b. Understanding information technology usage: A test of competing models. *Information Systems Research, 6(2)*: 144-176.
Thompson, J. D. 1967. *Organizations in action*. New York: McGraw-Hill.
Thompson, S. H. T., Sijie, L., & Kee-hung, L. 2009. Adopters and non-adopters of e-procurement in Singapore: An empirical study. *Omega, 37(5)*: 972-987.
Thong, J. Y. 1999. An integrated model of information systems adoption in small businesses. *Journal of management information systems, 15(4)*: 187-214.
Thong, J. Y. 2001. Resource constraints and information systems implementation in Singaporean small businesses. *Omega, 29(2)*: 143-156.
Thong, J. Y., & Yap, C.-S. 1995. CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega, 23(4)*: 429-442.
Tidd, J. 2001. Innovation management in context: Environment, organization and performance. *International Journal of Management Reviews, 3(3)*.

Tornatzky, L. G., & Klein, K. J. 1982. Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management, 29(1)*: 28-43.
Triandis, H. C. 1979. Values, attitudes, and interpersonal behavior,. *Nebraska Symposium on Motivation: Beliefs, attitudes, and values*: 195-259. Lincoln, NE: University of Nebraska Press.
Tung, L. L., & Rieck, O. 2005. Adoption of electronic government services among business organizations in Singapore. *Journal of Strategic Information Systems, 14(4)*: 417-440.
Unsworth, K. L., Sawang, S., Murray, J., & Sorbello, T. 2009. Developing an integrative model for understanding innovation adoption. *Academy of Management Proceedings*: 1-6: Academy of Management.
Uzoka, F.-M. E., & Ndzinge, T. 2009. Empirical analysis of biometric technology adoption and acceptance in Botswana. *Journal of Systems and Software, 82(9)*: 1550-1564.
Van de Vrande, V., De Jong, J. P., Vanhaverbeke, W., & De Rochemont, M. 2009. Open innovation in SMEs: Trends, motives and management challenges. *Technovation, 29(6)*: 423-437.
Viswesvaran, C., & Ones, D. S. 1995. Theory testing: Combining psychometric meta-analysis and strucutural equations modeling. *Personnel Psychology, 48(4)*: 865.
Vroom, V. H. 1864. *Work and motivation*. New York: John Wiley & Sons.
Wagner, J. A., & Gooding, R. Z. 1987. Effects of societal trends on participation research. *Administrative Science Quarterly, 32(3)*: 241-262.
Wang, M. C., & Bushman, B. J. 1999. *Integrating results through meta-analytic review using SAS software*. Cary, NC: SAS Institute Inc.
Wanyoike, D. M., Mukulu, E., & Waititu, A. G. 2012. ICT Attributes as determinants of e-commerce adoption by formal small enterprises in urban Kenya. *International Journal of Business and Social Science, 3(23)*: 65-74.
Warshaw, P. R., & Davis, F. D. 1985. Disentangling behavioral intention and behavioral expectation. *Journal of Experimental Social Psychology, 21(3)*: 213-228.
Weigel, F. K., Hazen, B. T., Cegielski, C. G., & Hall, D. J. 2014. Diffusion of innovations and the theory of planned behavior in information systems research: A meta-analysis. *Communications of the Association for Information Systems, 34(1)*: 31-43.
Welsh, J. A., & White, J. F. 1981. A small business is not a little big business. *Harvard Business Review, 59(4)*: 18-27.
Weng, M.-H., & Lin, C.-Y. 2011. Determinants of green innovation adoption for small and medium-size enterprises (SMES). *African Journal of Business Management, 5(22)*: 9154-9163.
Wolfe, R. A. 1994. Organizational innovation: Review, critique and suggested research. *Journal of Management Studies, 31(3)*: 405-431.
Wu, I.-L., & Chuang, C.-H. 2010. Examining the diffusion of electronic supply chain management with external antecedents and firm performance: A multi-stage analysis. *Decision Support Systems, 50(1)*: 103-115.
Xu, J., & Quaddus, M. 2012. Examining a model of knowledge management systems adoption and diffusion: A Partial Least Square approach. *Knowledge-Based Systems, 27(1)*: 18-28.

Zaltman, G., Duncan, R., & Holbek, J. 1973. *Innovations and organizations*. New York: John Wiley & Sons, Inc.

Figure 1. Mediator-Moderator Meta-Analytic Framework

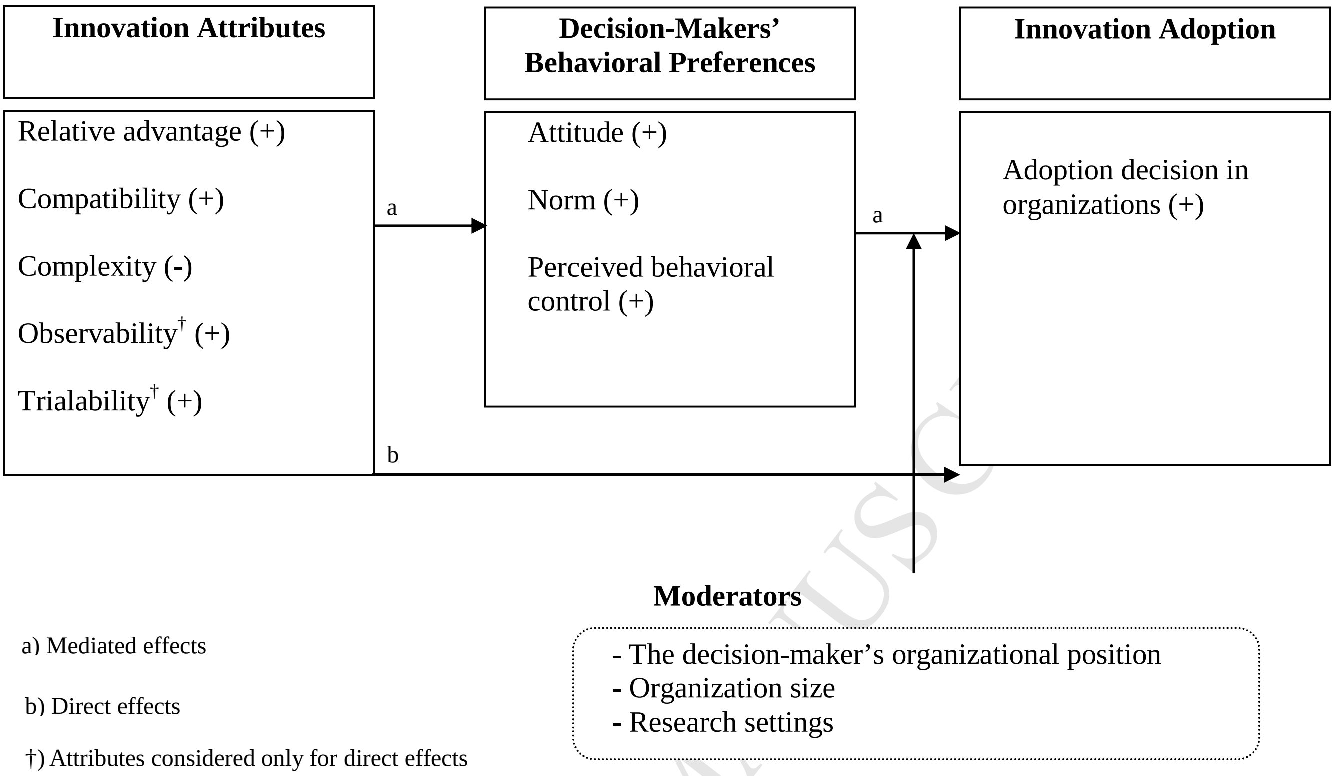

Table 1. Description of Key Constructs

Key Construct	Definitions	Sample measures
Attributes of innovations		
1. Relative advantage	The degree to which an innovation is perceived as being better than the idea it supersedes (Rogers, 1983: p.213)	Relative advantage (Gu, Cao & Duan, 2012; Jarrett, 2003; Seyal & Rahman, 2003) Perceived usefulness (Daryanto, Khan, Matlay & Chakrabarti, 2013; Gamal Aboelmaged, 2010; Heyder, Theuvsen & Hollmann-Hespos, 2012) Perceived benefits (Ghobakhloo & Tang, 2013; Kurnia et al., 2015; Quaddus & Hofmeyer, 2007)
2. Compatibility	The degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 1983: p.226).	Compatibility (He, Duan, Fu & Li, 2006; Henderson, Sheetz & Trinkle, 2012; Lin & Ho, 2011) Technological compatibility (Uzoka & Ndzinge, 2009; Weng & Lin, 2011)
3. Complexity	The degree to which an innovation is perceived as relatively difficult to understand and use (Rogers, 1983: p.231).	Complexity (Gu et al., 2012; Hsing Wu et al., 2013; Hung, Hung, Tsai & Jiang, 2010) Ease of use (reverse coded) (Arpaci, 2013; Jarrett, 2003; Li, Troutt, Brandyberry & Wang, 2011)
4. Observability	The degree to which the results of an innovation are visible to others (Rogers, 1983: p.232).	Observability (Hussin et al., 2008; Leung, 2005; Sophonthummapharn, 2009) Demonstrability (Askarany, Brierley & Yazdifar, 2012; Plouffe, Vandenbosch & Hulland, 2001)
5.Trialability	The degree to which an innovation may be experimented with on a limited basis (Rogers, 1983: p.231).	Trialability(Hsu & Lin, 2015; Limthongchai & Speece, 2003; Ramdani, Chevers & Williams, 2013)
Preferences of managers		
6. Attitude	Refers to the degree to which an individual has a favorable or unfavorable evaluation or appraisal of the behavior under examination (Ajzen, 1991: p. 188).	Attitude (Gamal Aboelmaged, 2010; Harrison et al., 1997; Riemenschneider et al., 2003) Top management attitude (Lin, Lin, Roan & Yeh, 2012; Thompson, Sijie & Kee-hung, 2009)
7. Norm	Reflects perceived social pressure to perform or not to perform the behavior under examination (Ajzen, 1991: p. 188).	Subjective norm (Harrison et al., 1997; Riemenschneider et al., 2003 ; Xu & Quaddus, 2012) External pressures (Alam & Noor, 2009; Hossain & Quaddus, 2015; Tung & Rieck, 2005)
8. Behavioral control	Refers to the availability of requisite opportunities and resources (e.g., time, money, skills, cooperation of others) to staff the behavior under examination (Ajzen, 1991: p. 182).	Perceived behavioral control (Harrison et al., 1997; Hsu et al., 2014; Riemenschneider et al., 2003) Self-efficacy (Jackson, 2008; Lee & Larsen, 2009; Segaar, Bolman, Willemsen & de Vries, 2006) Facilitating conditions (Leung, 2005; Messerschmidt & Hinz, 2013)
Innovation adoption		
9. Adoption	It is a decision to make full use of an innovation as the best course of action available (Rogers, 1983:p. 20)	Adoption (Jeon et al., 2006; Leung, 2005; Thong, 1999) Intention to adopt (Daryanto et al., 2013; Martinez-Garcıa, Dorward & Rehman, 2013; Quaddus & Hofmeyer, 2007) Expectation to adopt (Hussin et al., 2008; Lee & Larsen, 2009; Marcati et al., 2008)

Table 2. Average Reliability-Adjusted Intercorrelations among Constructs in the Meta-Analytic Model

	1	2	3	4	5	6	7	8	9
1. Relative advantage	[.87]								
SD of correlations	--								
Number of correlations	--								
Sample size	--								
2. Compatibility	.47*	[.86]							
SD of correlations	.04	--							
Number of correlations	32	--							
Sample size	6,034	--							
3. Complexity	-.37*	-.35*	[.85]						
SD of correlations	.05	.08	--						
Number of correlations	51	26	--						
Sample size	10,187	4,914	--						
4. Observability	.39*	.41*	-.31*	[.80]					
SD of correlations	.02	.03	.04	--					
Number of correlations	12	10	10	--					
Sample size	2,297	1,958	1,958	--					
5. Trialability	.29*	.30*	-.21*	.42*	[.85]				
SD of correlations	.01	.03	.04	.02	--				
Number of correlations	11	10	11	9	--				
Sample size	2,290	2,157	2,290	1,719	--				
6. Attitude	.50*	.45*	-.38*	.39*[a]	.27*	[.89]			
SD of correlations	.04	.07	.04	.01	.01	--			
Number of correlations	20	6	12	1	3	--			
Sample size	3,955	1,433	2,503	95	666	--			
7. Norms	.41*	.30*	-.26*	.42*	.22*[a]	.56*	[.83]		
SD of correlations	.04	.02	.04	.01	.01	.02	--		
Number of correlations	47	12	19	4	3	13	--		
Sample size	7,991	1,920	3,467	793	453	2,605	--		
8. Behavioral control	.35*	.36*	-.39*	.36*	.18*[a]	.42*	.37*	[.83]	
SD of correlations	.03	.03	.03	.03	.01	.04	.03	--	
Number of correlations	40	15	20	2	3	9	29	--	
Sample size	7,300	3,051	3,898	313	751	1,550	4,670	--	
9. Adoption	.39*	.36*	-.33*	.30*	.11*	.54*	.38*	.40*	[.89]
SD of correlations	.04	.03	.04	.02	.02	.03	.04	.03	--
Number of correlations	153	68	90	22	20	33	86	74	--
Sample size	30,414	14,301	19,685	4,605	4,328	6,559	15,819	14,273	--

Notes: Entries on the diagonal in brackets are weighted mean-Cronbach's alpha coefficients.

[a] Means that the coefficient is cross-situationally consistent according to the chi-squared homogeneity test.

* $p < 0.05$.

Table 3. Descriptive Statistics and Influences of Innovation Attributes and Decision-Maker-Level Mediators on Adoption Decisions

	Number of raw effects	Total sample size	Mean correlation coefficients	Weighted mean correlation coefficients [Beta]	Corrected mean correlation coefficients	Observed variance correlation coefficients [S.E.]	T-value(d.f.) [z-values]	Explained variance (in %)	95% credibility interval	File Drawer N (Using Two-Tailed Test)	X2 homogeneity test (d.f.)
Attributes of innovations → Adoption											
Relative advantage → Adoption	153	30,414	.34*	.34*	.39*	.04	22.59 (152)	.16	.42	184,144	1205.23 (152)
Compatibility→ Adoption	68	14,301	.31*	.31*	.36*	.03	14.07 (67)	.16	.42	29,941	524.23 (67)
Complexity→ Adoption	90	19,685	-.26*	-.28*	-.33*	.04	14.24 (89)	.15	-.43	40,600	757.31 (89)
Observability→ Adoption	22	4,605	.25*	.25*	.30*	.02	7.87 (21)	.22	.33	2,009	110.33 (21)
Trialability → Adoption	20	4,328	.14*	.10*	.11*	.02	3.25 (19)	.27	.23	518	74.90 (19)
Attributes[b] → Adoption	--	1,365	--	[.92*]	--	[.03]	[28.75]	--	--	--	--
Attributes of innovations → Mediators											
Relative advantage → Attitude	20	3,955	.47*	.44*	.50*	.04	9.41 (19)	.15	.49	6,292	215.84 (19)
Compatibility → Attitude	6	1,433	.42*	.38*	.45*	.07	3.48 (5)	.07	.71	531	124.48 (5)
Complexity → Attitude	12	2,503	-.35*	-.34*	-.38*	.04	5.7 (11)	.12	.46	1,269	120.61 (11)
Relative advantage → Norm	47	7,991	.36*	.35*	.41*	.04	12.11 (46)	.16	.47	17,638	363.58 (46)
Compatibility → Norm	12	1,920	.24*	.25*	.30*	.02	5.54 (11)	.25	.33	439	51.17 (11)
Complexity → Norm	19	3,467	-.18*	-.22*	-.26*	.04	4.66 (18)	.13	.48	1,099	156.26 (18)
Complexity → Behavioral control	20	3,898	-.32*	-.34*	-.39*	.03	7.86 (19)	.16	-.46	3,065	158.7 (19)
Attributes[b] → Mediators	--	1,365	--	[.88*]	--	[.02]	[29.84]	--	--	--	--
Mediators → Adoption											
Attitude → Adoption	33	6,559	.49*	.48*	.54*	.03	15.12 (32)	.19	.40	19,183	286.28 (32)
Norm → Adoption	86	15,819	.34*	.32*	.38*	.04	14.07 (85)	.14	.51	46,896	775.23 (85)
Behavioral control → Adoption	74	14,273	.34*	.35*	.40*	.03	17.05 (73)	.19	.39	40,930	488.10 (73)
Mediators → Adoption	--	1,365	--	[.94*]	--	[.02]	[34.44]	--	--	--	--

Note: The harmonic mean of the total sample size and standardized beta coefficients are reported for the structural equation model. All Ns greatly exceed the critical N, calculated as Ncrit = 5 x N + 10 (Rosenthal, 1991). The model associated with the attribute-adoption linkages has the following indexes: $\chi^2(4) = 16.49$, RMSEA = 0.04, $p < 0.01$, and CFI = 0.99. The model associated with the attribute-mediator linkages has the following indexes: $\chi2(8) = 186.86$, RMSEA = 0.12, $p < 0.01$, and CFI = 0.89. The model associated with the mediator-adoption linkages has the following indexes: $\chi2(4) = 38.96$, RMSEA = 0.08, $p < 0.01$, and CFI = 0.98.

[a] Means that the correlation coefficient is cross-situationally consistent according to the chi-squared homogeneity test. [b] Only salient variables (i.e., relative advantage, compatibility, and complexity) are included under the attributes label.

* $p < 0.05$.

Table 4. Relationships between Innovation Attributes and Adoption Decisions after Controlling for Decision-Makers' Behavioral Preferences

	Attitude		Norm		Behavioral control	
	Corrected mean partial correlation coefficients	Total unstandardized mediation effect (SE)	Corrected mean partial correlation coefficients	Total unstandardized mediation effect (SE)	Corrected mean partial correlation coefficients	Total unstandardized mediation effect (SE)
Relative advantage → Adoption	.16*(6,846)	.23*(.01)	.29*(13,560)	.11*(.01)	--	--
Compatibility→ Adoption	.15*(3,260)	.22*(.01)	.27*(4,587)	.09*(.01)	--	--
Complexity→ Adoption	-.14*(4,977)	-.19*(.01)	-.25*(7,454)	-.08*(.01)	-.19*(8,706)	-.13*(.01)

Note. Note that the significance of partial correlations was evaluated against the harmonic mean of sample sizes (in parentheses).

* $p < 0.05$.

Table 5a

Influence of Organizational Contexts on Decision-Makers' Behavioral Preferences-Adoption Decision Linkage

	Hierarchical position				Organizational size			
	Higher	Lower	*t-test*	*Beta (t-value)*	Larger	Smaller	*t-test*	*Beta (t-value)*
Mediators → Adoption decision								
Attitude → Adoption	.57 (15)	.50[a] (9)	.87	.32	.62 (10)	.58 (14)	.36	.09
	3,205	1,863		(1.53)	1,695	2,737		(.74)
Norm → Adoption	.46 (28)	.40 (32)	.52	.01	.43 (36)	.38 (28)	.74	.02
	4,372	5,444		(.04)	5,721	5,608		(.50)
Behavioral control → Adoption	.43 (34)	.30 (18)	2.66*	.28*	.41 (25)	.40 (26)	.42	.01
	6,053	4,038		(2.69)	5,460	4,891		(.01)

Note: The number of correlations is reported in parentheses. Sample size is reported under correlation coefficients. Differences in sample sizes depend on the availability of data for moderators.

[a] Means that the correlation coefficient is cross-situationally consistent according to the chi-squared homogeneity test.

* $p < 0.05$.

Table 5b

Influence of Research Settings on Decision-Makers' Behavioral Preferences-Adoption Decision Linkage

	Adoption measures				Adoption measures				Measures of dependent/Independent			
	Intention	Expectation	*t-test*	*Beta (t-value)*	Intention/ expectation	Adoption	*t-test*	*Beta (t-value)*	Same format	Different format	*t-test*	*Beta (t-value)*
Mediators → Adoption decision												
Attitude → Adoption	.71 (8)	.45[a] (8)	2.55*	.57*	.53 (12)	.55 (20)	.29	-.09	.61 (21)	.46[a] (12)	2.34*	.31*
	1,213	1,506		(2.65)	2,850	3,576		(.58)	3,671	2,888		(1.98)
Norm → Adoption	.55[a] (13)	.34 (24)	2.79*	.33*	.35 (33)	.38 (39)	.65	-.16	.43 (45)	.32 (40)	2.36*	.31*
	1876	3,485		(2.36)	7,379	6,781		(1.42)	8,238	7,432		(2.69)
Behavioral control → Adoption	.42[a] (4)	.38 (26)	0.29	.17	.41 (34)	.4 (29)	.04	-.09	.44 (32)	.39 (42)	1.20	.14
	544	4,839		(0.79)	7,240	5,140		(.74)	5,795	8,478		(1.21)

Note: The number of correlations is reported in parentheses. Sample size is reported under correlation coefficients. Differences in sample sizes depend on the availability of data for moderators.

[a] Means that the correlation coefficient is cross-situationally consistent according to the chi-squared homogeneity test.

* $p < 0.05$.