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Assessing the Theoretical Strength within the Literature Review Process: a Tool for Doctoral Researchers

Abstract. Making a theoretical contribution can be viewed as one of the most important and confusing objectives for a doctoral researcher. Focusing on the literature review process, this paper highlights the need to develop a tool that will enable doctoral researchers to assess the theoretical strength of the literature they survey. Through synthesizing theory development literature, from both a general research and IS perspective, we propose a tool to aid 'new' doctoral researchers in understanding the theoretical landscape within a domain. We then discuss how the tool can be utilized in the wider doctoral research process to combat the issues of rigor and relevance that have permeated the fabric of Information Systems (IS) research, through aiding in a two step literature review process of [1] categorizing the literature and [2] developing a theoretical framework to guide making a theoretical contribution.

Keywords. theory, literature review, theory-development, doctoral research, contribution.

Introduction and Motivation

Like all new researchers, doctoral researchers strive to master the practicalities of carrying out research while also contending with the 'big puzzle' of how to make a theoretical contribution to the scientific body of knowledge. In addition, Information Systems (IS) researchers contend with the well documented but elusive balance of rigor and relevance characterized by the trade-off between intellectual quality and practical applicability of their research outputs (Applegate, 1999; Applegate and King, 1999; King and Lyytinen, 2006; Rosemann and Vessey, 2008). Galliers and Land (1987) believed that the measure of success of research in IS (which they defined as an applied discipline and not a pure science) relates to whether our knowledge has been improved to the extent that this improved knowledge can be applied in practice. As a result, Galliers and Land (1987, p.901) proposed that *"if the fruits of our research fail to be applicable in the real world, then our endeavors are relegated to the point of being irrelevant"*. This is made more difficult within the IS domain as a lack of central theories does not give doctoral researchers a starting point from which they can begin to develop a theoretical contribution (King and Lyytinen, 2006), for example, the community is still trying to get to grips with theorising the IT artifact (Benbasat and Zmud, 2003; Agarwal and Lucas, 2005; Weber, 2006; Markus and Silver, 2008).

If we embrace the arguments of Webster and Watson (2002) we can draw some parallels between a new doctoral researcher and the IS field itself. They argued that the theoretical progress of the IS field has been impeded by the *youth* of the field and the lack of published *review articles*. This assessment of the IS field in terms of youth and lack of published review articles (by more established senior IS scholars) can translate

metaphorically to the youth of a new doctoral researcher who has a lack of practical experience or 'talent' (c.f. DiMaggio, 1995) in, and exposure to, crafting and writing a literature review. The challenges remain the same in both cases! Indeed, Webster and Watson (2002) and Schwarz *et al*. (2007) have suggested that 'assembling' a review or framework article in an interdisciplinary field (like IS) is a complex and challenging process where there is a need to draw on theories from various fields. In fact, Schwarz *et al*. (2007) argue that there is a lack of publication outlets within IS for these types of review and framework articles. Schwarz *et al*. (2007) further suggest that these articles can serve an important role in developing consensus on research efforts in the IS discipline while helping the field become more paradigmatically developed; however, not only senior scholars, but all colleagues, should be engaged in the production of these types of articles as a priority. Nevertheless, while the literature review represents the foundation of research in IS (c.f. Webster and Watson, 2002), new doctoral researchers have to contend with the status quo, relying mainly on empirical research articles where the literature review is 'much more narrowly focused' (c.f. Schwarz *et al*., 2007, p.43).

This paper focuses on the centrality of the literature review in the doctoral research process and argues that the lack of practical experience among new doctoral researchers can lead to a failure on their behalf to identify and internalize the theoretical strength of the literature they survey. This results in a less than stable foundation (theoretical framework) from which a theoretical contribution can be developed. As a result, we call for the development of a tool that caters for the IS domain's specific characteristics; for instance, enabling doctoral researchers to better balance the rigor and relevance trade-off (that dominates the IS domain) and guide their decision making during their literature survey.

1. The Doctoral Research Process

The role of the doctoral researcher is to undertake academic research which requires the researcher to investigate a research question, systematically and methodologically, with a view to generating scientific knowledge (Collis and Hussey, 2009). Central to this generation of new knowledge (the contribution) is the application of theory. Therefore, the doctoral researcher's research project follows a *process*, with a *purpose* and *logic*, the *outcome* of which is a contribution to the existing body of scientific knowledge. Indeed, Remenyi and Williams (1995) stated that the prerequisite for conducting sound academic research is to understand the research process. While research is an iterative process, it can be conceptualized as consisting of fundamental stages/phases (Stahl *et al.*, 2008; Collis and Hussey, 2009). The first of these stages/phases is that of 'project definition' which involves reviewing the literature and defining the research problem/questions (Stahl *et al.*, 2008; Collis and Hussey, 2009).

The role of theory is central if not more central to the 'project definition' stage than any other stage throughout the entire research process (Stahl *et al.*, 2008). As humorised by Agnew (Agnew and Pyke, 1969) at the beginning of the journey around the *island of research* the researcher starts out at the 'bay of literature' just off the 'sea of theory'! Their appearance at the outset of the journey and their proximity to each other reiterates the importance of theory and its place in literature for the doctoral researcher. As a result, while theory is a central issue in research, it has particular relevance to new researchers, such as doctoral researchers, who are under a 'strong

expectation' to be 'conversant with theoretical issues in their field of study'(Stahl *et al.*, 2008). However, every doctoral researcher is 'unique in his or her attitude and ability' and the process of developing into a competent candidate is 'highly idiosyncratic for every student' (Grover, 2007). Therefore, new doctoral researchers 'must embody a minimum threshold of motivation and competence' in order to successfully engage in the 'unstructured and often frustrating process of knowledge creation' and participate at a 'higher level of learning' which ultimately leads to the 'creation of a quality knowledge product' (Grover, 2007), the starting point of which is the literature review. As a result, we argue that there is a need for a tool to assist new doctoral researchers to evaluate the theoretical strength of the literature they review and put themselves in a stronger position to develop a theoretical framework to structure their thoughts which will further guide them in how best they can make a contribution to the scientific body of knowledge (make a theoretical contribution).

1.1. Literature Reviews

A review of prior, relevant literature is an essential feature of an academic research project; furthermore, if completed effectively, a thorough literature review lays the foundation for advancing knowledge (Webster and Watson, 2002) and it can help researchers avoid 'reinventing the wheel' by enabling them to synthesize and build on what others have done (Rowley and Slack, 2004; Zorn and Campbell, 2006). One of the purposes of the literature review is to identify theory/theories to provide a theoretical framework for a research study. This theoretical framework is a fundamental part of the research study and underpins the research questions (Rowley and Slack, 2004; Collis and Hussey, 2009). However, for the new doctoral researcher *"one of the most intimidating aspects of a literature review is encountering the messy nature of knowledge, due to the fact that concepts transcend disciplinary boundaries, and literature can be found in a wide range of different kinds of sources"* (Rowley and Slack, 2004).

Webster and Watson (2002) provided researchers with an approach to reviewing literature and writing a literature review and suggested that researchers should 'go backward' and 'go forward' using citations of the 'major contributions' in 'leading journals'. Initially, according to Webster and Watson (2002) a source of these major contributions will be from one of the several journal databases available, where the 'relevant articles' will be returned by the 'keyword sieve'. However, all too often a doctoral researcher's *naïve* search may focus on the 'wrong sources' (e.g. textbooks and popular press) at the expense of 'scholarly sources' (e.g. academic journals) (Zorn and Campbell, 2006). Therefore, an evaluation of these sources is a 'very real problem'; as Rowley and Slack (2004, p.32) suggest *"both* [sources] *may have a role in the identification of a research theme, but the academic literature contains a firmer theoretical basis with more critical treatment of concepts and models. Articles in scholarly and research journals should form the core of the literature review"*. As a result, how can the doctoral researcher appreciate what a theoretical framework is and how it should be structured if the literature they have reviewed does not communicate the true essence of a theoretical framework and its purpose?

Of course this lack of theory within the body of literature can be due to a number of factors, other than simply focusing on the wrong sources, (e.g. word count restrictions forcing publishing authors to make a judgment call on what to include/exclude as the core value of the manuscript; poor quality publications where, in

essence, it may be easier to publish ones research without having to worry about theory; or indeed, a well respected publication with poor reviewing practices). In fact, Sutton and Staw (1995) highlighted this point by commenting that *"even though journals may boldly espouse the goal of theory building, the review process usually works the other way. In practice, it is much easier for a set of reviewers and editors to agree on a carefully crafted empirical piece that has little or no theory than it is for them to go along with a weak test of a new theoretical idea"*. Given these issues, what alternative does a new doctoral researcher have if the majority of literature deemed critical to the subject area under investigation fails to present any real reference to underlying theory or theoretical foundation for their conceptual or causal argument, other than references and past empirical data? Moreover, with such debate about the role of theory and the absence or otherwise of a theoretical framework in the literature; even greater challenges are posed for the new doctoral researcher as to what it means to make a 'theoretical contribution' especially when undertaking empirical research (Colquitt and Zapata-Phelan, 2007).

2. Importance of Theory and Theoretical Contributions

It is difficult to overstate the importance of theory to the scientific endeavor (Colquitt and Zapata-Phelan, 2007). Theory allows scientists to understand and predict outcomes of interest, even if only probabilistically (Kerlinger and Lee, 2000; Colquitt and Zapata-Phelan, 2007). Theory also allows scientists to describe and explain a process or sequence of events (Mohr, 1982; DiMaggio, 1995; Colquitt and Zapata-Phelan, 2007). It is argued that theory prevents scholars from being dazzled by the complexity of the empirical world by providing a linguistic tool for organizing it (Hall and Lindzey, 1957; Dubin, 1976; Bacharach, 1989). In fact, theory is important, not as a substitute for data, but as a framework to guide the collection and interpretation of data; and data is important, not as a substitute for theory, but as the substance, with which theoretical ideas can be induced, tested and revised (McGrath, 1979). The theories we hold, whether explicit or implicit, form a language that we use to understand the world and communicate with others (Kuhn, 1996).

However, there is an ongoing debate as to what constitutes *strong* or *weak* theory which raises a number of issues relating to 'what actually is' and 'what is not' theory. According to Sutton and Staw (1995) in their essay in Administrative Science Quarterly *"there is little agreement about what constitutes strong versus weak theory in the social sciences, but there is more consensus that references, data, variables, diagrams, and hypotheses are not theory. Despite this consensus, however, authors routinely use the five elements in lieu of theory"*. Unfortunately, Sutton and Staw (1995) do not have 'magic ideas' about how to construct theory nor do they present a set of algorithms of logical steps for building strong theory. However, they provide an explanation of how each of the five elements mentioned can be 'confused' with theory and how to avoid such confusion. Therefore, in light of this disagreement with regard to what is and is not a theory, the question has to be posed; *how can a doctoral researcher appreciate what theory is and ensure that the literature that they review and build their own conceptualizations and frameworks on is theoretically strong?*

2.1. Information Systems Theory

According to Stahl *et al*. (2008) "*theory is difficult to grasp when made an explicit object of reflection*". From the perspective of the IS field, Lyytinen (1987) suggested that the academic community does not have any framework for relating IS theories to each other, which makes the selection and combined use of theories difficult. Therefore, the task of a new doctoral researcher within the IS domain is particularly difficult and the continuing high level discussions of what theory is and how it can be used in the IS discipline, which lacks a long history or strong institutional standing (Gregor, 2006; Truex *et al.*, 2006; Stahl *et al.*, 2008), may be futile and appear fruitless to date. We can appreciate that confusion around what theory is and the role it plays in research can be a common defining characteristic of a new doctoral researcher's experiences at the early stages of the doctoral research process, especially when surveying and reviewing the literature. For example, Sutton & Staw (1995) warned that *"… the literature on theory building can leave a reader more rather than less confused about how to write a paper that contains strong theory"*. However, more recently and specifically related to the IS domain, Metcalfe (2004) argued that *"the word 'theory' has so many interpretations that the research drivers intended to be communicated are being blocked for new researchers"*. Indeed, Metcalfe (2004) suggests that we need an alternative language and it is misguided to call for more improved theory in IS until we are sure what theory is! In support of this call by Metcalfe we hope that we can deliver a comprehensive but parsimonious solution for new doctoral researchers that will enable them to assess the theoretical strength of the literature they survey.

Doctoral research that produces 'strong results' that make a contribution to theory and practice demands long periods of sustained effort. However, while theory is not the final game in itself it is essential to the *outcome* of the doctoral research project and has a role in the production of strong results (c.f. Lyytinen and King, 2004). Therefore, theory is an input to the research process of getting strong results, not an outcome (King and Lyytinen, 2004). In the context of the doctoral research process, progress is incremental 'pushing forward the frontier of the known, a bit at a time' (King and Lyytinen, 2004) and to produce strong results (make a theoretical contribution) there is a need to adhere to high standards with respect to knowledge claims made from the literature reviewed and the ways in which those claims are proposed (operationalising a theoretical framework).

2.2. Developing a Theoretical Contribution in IS

All research requires a craft or creative leap fueled by the imagination of the researcher (Weick, 1989; Langley, 1999). Indeed, Schmenner *et al.* (2009), when commenting on the operations menegement field, suggest that *"there is a need to teach our doctoral students differently and we need to review one anothers papers with less of an eye to methodology and more of an eye to creativity, insight, and understanding"*. It cannot but be argued that there is craft in the development of a bounded thesis from abundant and diverse data that is available in the world (Daft, 1983; Bryman, 1992). Yet, this craft is only but one part of the doctoral research process. However, guidance for new doctoral researchers often points them towards developing such a nebulous craft or capability that comes from experience. Noted by Hart (1998), this involves developing an "*understanding of the interrelationship between theory, method and research design, practical skills and particular methods, the knowledge base of the subject and*

methodological foundations". However, with very little guidelines, new researchers are expected to adopt a trial and error approach as they figure out the intricacies of adding to the body of knowledge (the core aspect of doctoral research).

From a wide perspective authors such as Weick (1989), Whetten (1989) and Sutton and Staw (1995) provide good foundations for new researchers on how to develop strong theoretical contributions. In particular, Colquitt and Zapata-Phelan (2007) surveyed a large sample of Academy of Management articles, which resulted in the development of a taxonomy of theoretical contributions. As well as providing a useful guide into different types of contributions, the taxonomy is also split into low and high level contributions. This is important for a number of reasons:

- enables researchers to appreciate the wide variety of theoretical contributions that can be made, and
- highlights the varying strength of contributions within domains, which can ultimately categorize the domain (Arnott and Pervan, 2008).

To a limited degree the Colquitt and Zapata-Phelan (2007) taxonomy of theoretical contributions provides a useful guide to new researchers. However, we argue that they do not examine the theoretical strength of the papers directly nor do they suggest a method of how to do so. Therefore, embracing the thinking of Colquitt & Zapata-Phelan (2007), the question must be raised: *what exactly does it mean for empirical research to make a theoretical contribution?*

3. Theoretical Strength Assessment Tool

While there will always be a number of theories, concepts and models to draw on, which can be discovered during the literature review of a chosen topic, we argue that a new doctoral researcher's maturity of understanding of what is being argued in this literature and the theoretical strength of the argument will be low. Therefore, the fact that the theoretical strength of the literature a doctoral researcher reviews may be questionable, may leave the new researcher in no greater a position to better understand the role of theory in the research process, or indeed, how to develop a theoretical framework for their own research project. It is worth reiterating that the *outcome* of the doctoral research process translates as the new researcher's ability to generate new scientific knowledge in their chosen field! Therefore, irrespective of the prevailing paradigm (e.g. positivist/interpretive) and associated perspective on the role and use of theory (Colquitt and Zapata-Phelan, 2007), the task of developing a theoretical framework, through critiquing existing literature, and making a theoretical contribution is still confusing for a new doctoral researcher (Collis and Hussey, 2009) with very little guidance available (Zorn and Campbell, 2006).

To summarize our perspective, we argue that it is now time for more established (senior) IS scholars to offer some guidance to the newer (junior) generation of doctoral researchers. This guidance should ensure that the literature review process remains the critical starting point for IS research, from which the theoretical framework emerges, where this framework then guides the doctoral researcher toward making a theoretical contribution. In the next section we present our theoretical strength assessment tool which we believe serves as a starting point in supporting new doctoral research students appreciate the theoretical strength of the literature they review.

Before proposing our tool, the purpose of which is to assess the theoretical strength of research literature, a definition of 'good' theory must be detailed. For the purposes

	Whetten (1989)	**Bacharach (1989)**	**Doty and Glick (1994)**	**Wacker (1998, 2008)**	**Gregor (2006)**	**Lewis (2005)**	**Walls (1992)**
Factors/ Constructs	What - which factors (concepts, variables, constructs).	Constructs/variables/ units	Constructs	Conceptual Definitions	Constructs	General components of meaning	Units
Relationships	How are the factors related	Relationships among these statements	Relationships among constructs	Relationship Building	Statements of relationship		Laws of interaction
Graphical representation/ Model	Domain - What and how together in a framework				Means of representation	Domain - description that is representation of the concept of interest	Meta-Design
Theoretical underpinning	Why - theoretical glue, underlying logic and assumptions	Theoretical values that form the boundary of the theory		Relationship Building		Abstraction level contains the theoretical parts of the domain	Kernel Theories
Scope/ Boundary/ Domain	Who, Where and When - boundaries of generalisation	Spatial and Temporal boundaries that restrict generalizability		Domain Limitations	Scope	Constraints, level of analysis	Boundaries, System State
Falsifiability			Hypothesised predictions must be testable and subject to disconfirmation	Predictions	Prescriptive statements, Causal explanations, Testable Propositions		Propositions, hypotheses

Table 1. Synthesis of the components of theory

of this paper the authors use a base definition of theory supported by the work of Blalock (1969), Dubin (1976), Bacharach (1989), Whetten (1989) and Doty and Glick (1994), in that, theory is defined as *'a series of logical arguments that specifies a set of relationships among concepts, constructs, or variables'*. However, beyond this there has been no general agreement between theory-development authorities (Dubin, 1978; Whetten, 1989; Wacker, 1998) concerning the relative importance of the virtues of 'good' theory. Nonetheless a synthesis of current theory-development literature in both general management and IS fields has highlight six common features. Detailed in Table 1, these include: (i) factors/constructs, (ii) relationships, (iii) graphical representations/models, (iv) theoretical underpinning, (v) scope/boundary/domain, and (vi) falsifiability.

3.1. Concepts/Factors

One of the first key features of 'good' theory highlighted by all authors in the synthesis is that of the definition of concepts/factors. It is argued that a literature review should be crafted in a 'concept-centric' fashion for better synthesis of the literature, where the concepts determine the 'organizing framework of a review' (Webster and Watson, 2002; Rowley and Slack, 2004). Not only is this a vital aspect in developing 'good' theory but it also makes it easier for authors to highlight their contribution by first providing working definitions of key constructs which shape the theoretical framework within a paper/article (Webster and Watson, 2002). More specifically, factors/constructs are integral to any explanation developed by researchers (Whetten, 1989), as they provide (i) the first reference to the phenomena of interest (Gregor, 2006) (ii) the units whose interactions we are most interested in (Walls *et al.*, 1992), and (iii) the units from which theoretical statements can be built (Bacharach, 1989) .

3.2. Relationships

From a high-level perspective the relationship feature of 'good' theory outlines how the factors/constructs interact and are related (Bacharach, 1989; Whetten, 1989; Walls *et al.*, 1992). These relationships maybe associative, compositional, unidirectional, bidirectional, conditional, or causal, depending on the type of theory being developed (Gregor, 2006). Even though, in some instances it may not be possible to develop a satisfactory test for these relationships, it has been noted that this does not detract from the intrinsic casual nature of theory (Whetten, 1989).

3.3. Graphical Representation/ Model

Building on the relationships and constructs/factors of a paper/article, another indicator of theoretical strength is a means of representing the theory being developed. While there is an argument that a representation/model on its own is not theory (c.f. Sutton and Staw, 1995), others openly equate models to theory (Dubin, 1978) and are quite strong in stating that a theory must be physically represented in some way (Gregor, 2006). Notwithstanding these differing opinions, theoretical representations have been noted as a benefit by further *"highlighting the discrepancy between what we know and what we need to know"* through conceptual roadmaps (Webster and Watson, 2002). Moreover, Sutton and Staw (1995) believe that diagrams can be helpful by providing a concrete model to present 'obfuscation of specious or inconsistent

arguments' respectively. However, they are clear that 'good' theory is often representational and verbal. For instance, theoretical arguments should be clear enough that they can be represented in graphical form, but also be rich enough that processes have to be described so as to express the developed logic behind a causal arrow (Sutton and Staw, 1995). From another perspective a graphical representation can easily demonstrate the 'parsimonious' and 'comprehensiveness' criteria in picking the right factors/constructs in the first instance

3.4. Theoretical Underpinning

In terms of theoretical contribution a body of work needs to fully describe the logical argument underpinning theoretical output. All too often new researchers can fall into a trap, believing that reporting certain findings from past research in the literature reviewed may infer similar or differing patterns to be expected from the data in their own research study. This approach can be found guilty of not explaining the logical reason '*why*' particular findings occurred in the past and therefore '*why*' certain empirical relationships are anticipated in the future. According to Sutton and Staw (1995) this can be termed 'brute empiricism', where hypotheses are motivated by prior data rather than theory. This required theoretical underpinning has been described in a number of ways, such as: the theorists implicit values from their creative assumptions that form the boundary of the theory (Bacharach, 1989), or the theoretical glue, underlying logic and assumptions of the contribution (Whetten, 1989). This is primarily achieved by providing pertinent logic from past theoretical work or kernel theories used to support the theoretical contribution (Walls *et al.*, 1992; Sutton and Staw, 1995). However, a theoretical underpinning should not be confused with referencing techniques that call on past theoretical contributions while lacking the intrinsic argument of the authors (Sutton and Staw, 1995). An example of good theoretical underpinning can be clearly seen in Barney (1991) and (Wernerfelt, 1984) as they develop the Resource-based view of the firm (RBV - a theory now widely used in IS to show how IS/IT enables a firm to create a competitive advantage). While developing RBV they primarily draw on the Theory of Firm Growth (c.f. Penrose, 1959), which brings to the fore that firms are made up of a broader set of resources other than just land, labor and capital.

3.5. Scope/boundary/domain

Another indication of 'good' and 'strong' theory is its ability to discern the conditions in which the theory is most and least likely to hold true (Sutton and Staw, 1995). These conditions are the spatial and temporal boundaries that detail and scope the generalizability of the contribution (Doty and Glick, 1994). They are the domain limitations often signified by modal qualifiers such as "some," "many," "all," and "never" (Wacker, 1998; Gregor, 2006). Whetten (1989) succinctly wraps the scope of a contribution into Who? Where? and When? questions. These are important aspects that are often forgotten as researchers overlook circumstances outside their own time point and surroundings (Whetten, 1989). Yet, without these details it is difficult to grasp the overall impact of a theoretical contribution.

3.6. Falsifiability

The ability to test a theory or theoretical contribution is another key feature. Depending on the type of theory, the ability to falsify or test a theory is embodied in prescriptive statements, causal explanations, or testable propositions (Gregor, 2006). It has already been noted that relationships between constructs do not necessarily have to have propositions or hypotheses in support. However, 'good' theory has been long described as something that is risky and tested by falsification (Popper, 1963). From this it cannot but be included as a key attribute of 'good' theory or theoretical contribution.

Leveraging the above synthesis, a tool consisting of six questions is derived to enable a new doctoral researcher to quickly assess the theoretical strength of the literature they survey. In particular, the simplicity of the tool is to ensure that there is minimal additional overhead placed on the researcher with regard to their understanding and also enables them to easily map out the theoretical landscape of what they read.

Component of Theory	**Theoretical Strength Assessment Questions**	**Yes/No**
Factors/ Constructs	Are there defined factors/constructs?	
Relationships	Are there defined relationships between the factors/constructions?	
Graphical representation/ Model	Is there a graphical representation of the proposed theory/contribution?	
Theoretical underpinning	Is there an underlying logic/theory that explains the relationships?	
Scope/ Boundary/ Domain	Is the scope/boundary/domain of the theory/contribution defined?	
Falsifiability	Are there testable hypotheses/propositions detailed?	
TOTAL (number of 'yes' answers)		__ out of 6

Table 2. Tool for assessing the theoretical strength of literature.

As the doctoral researcher progresses through their review of the literature they use the tool to assess each article/paper they read (in the first instance). This will provide them with a score out of six for each piece of literature reviewed, allowing them to categorize the literature. Following on from this first step the new doctoral researcher can leverage the results to focus on building theoretical strength into their own arguments as they proceed; for example, developing the theoretical framework to guide making a theoretical contribution. As their maturity of understanding increases, so too will their ability to appreciate the role theory will play in their research, leveraging theoretical gaps, to shape the *outcome* of their research process, producing a theoretical contribution (strong results). Therefore, through the use of the tool proposed here, we are conceptualizing the literature review process as a two step activity, which a doctoral researcher will undertake early in their doctoral research project.

Discussion and Conclusion

All research and in particular doctoral research needs to be informed by existing knowledge in a subject area. As we have suggested earlier in this paper the literature review identifies and organizes the concepts in relevant literature (Webster and Watson, 2002; Rowley and Slack, 2004) and doctoral researchers are typically expected to undertake a literature review at an early stage in their research project (Collis and Hussey, 2009). As doctoral researchers build the required expertise of the phenomenon under investigation they need to seek out highly relevant material from whatever source is available. Utilizing the tool developed in this article they will quickly map the theoretical strength of what they read and ultimately that of the domain. It is not unusual for new researchers to be drawn to highly relevant work with little or no theoretical value. However, a problem arises when doctoral researchers use this highly relevant research as the basis or core of their theoretical contribution. Nevertheless, utilizing the tool presented in Table 2 will aid doctoral researchers better decide on the basis of a theoretical foundation from which the theoretical framework for their chosen area of research can be developed. Moreover, by identifying the theoretical components that are lacking from the highly relevant literature they can highlight potential opportunities from which they can develop a strong theoretical contribution. Thus, this enables a new doctoral researcher to immerse themselves in relevant literature while also keeping an eye on the theoretical rigor needed for a contribution. This should go some way in solving the balancing act that doctoral researchers deal with during the literature review process.

Embracing the arguments of Schwarz *et al*. (2007) while we believe our work to be of a reasonable effort, we do not yet see it as complete. This paper has been crafted from the experiences and sense-making efforts of the authors, while also trying to being as much rigor as possible to its design and argument. We now see our efforts as the starting point for our IS colleagues to build on our approach and for new doctoral researchers, in particular, to operationalise our tool on their journey around the *island of research*, specifically during their literature review process. We believe that our attempts, if improved and extended within IS research, could move our field forward.

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