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Alignment's nomological network: Theory and evaluation

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ABSTRACT

While the importance of IT-business alignment is rarely questioned, a strong theoretical foundation of alignment's nomological network has not been developed or tested. This has generated a debate on why tighter alignment may or may not lead to higher levels of firm performance. To further understand the alignment-performance relationship, we used meta-analytic structural equation modeling techniques to probe the inter-relationships found in 78 independent data sets drawn from the literature. We find intellectual alignment influences operational alignment, identify a more nuanced understanding of the performance constructs, and offer insight into how governance structure and social alignment influence intellectual and operational alignment.

1. Introduction

Information technology (IT) executives have considered IT–business alignment (hereafter referred to as alignment) a top priority for over 30 years [1]. Responding to the concerns of practitioners, scholars have extensively studied the relationship between alignment and firm performance to try capturing the value that IT generates for firms [2]. Despite the research effort for over 30 years, a strong theoretical foundation that explains and predicts when and how alignment leads to increased performance (e.g., profitability) [3] or decreased performance (e.g., inflexibility) is absent [4]. A recent meta-analysis suggests a need to acquire a more nuanced understanding of the alignment paradox [5]. With high corrected population correlation point estimates between alignment types and overlapping credibility intervals for many alignment–performance relationships, Gerow et al. [5] called for the development of systematic, theory-based explanations for if, when, and why unique relationships exist between alignment and performance. Given alignment's potential positive outcomes for firms [6], ongoing practitioner interest in the topic [1], and the uncertainty of the unique relationships between alignment and performance [5], our broad objective is *to present theoretical arguments that offer a more nuanced understanding of the alignment–performance relationship*. Therefore, we address the following series of research questions:

1) How should we represent or conceptualize alignment? Although alignment has been studied extensively, one possible source of contradictory findings is that scholars use inconsistent definitions of alignment [7]. For example, some indicate "alignment" as the link between IT and business strategies [8], while others define it as the fit between IT and business infrastructures and processes [9]. The existing empirical alignment research does not always specify the alignment dimension; rendering it difficult to aggregate findings across studies. As the meta-analysis by Gerow et al. [5] indicates that the existing research can be mapped to specific alignment dimensions, which may be unique, this study extends the alignment literature by evaluating empirical evidence for the importance of uniquely defining and examining the alignment types.

2) What is the effect of alignment on firm performance? Firm performance is a broadly used term and therefore is not often consistently operationalized across studies [10]. Could different alignment dimensions relate to different types of firm performance? If alignment is key to firms getting the most out of their IT investments [11], it is important for us to understand the nuances of how alignment's dimensions relate to firm performance. As the meta-analysis by Gerow et al. [5] provides evidence that direct relationships between each alignment–performance relationship can be examined individually and could be unique in some instances (e.g., customer benefit with intellectual and operational alignment), we extend their work by evaluating whether indirect relationships exist between alignment and performance, offering a more nuanced configuration of the performance constructs and empirically examining the unique relationships between the alignment and performance types.

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3) Do other factors help explain the relationship between alignment and firm performance? Empirical studies have been conducted regarding how different factors facilitate alignment [2]. However, scant research has systematically examined the larger nomological network surrounding alignment and firm performance or examined contingencies that shape the strength of those relationships [7]. While the Gerow et al. [5] meta-analysis offers a comprehensive overview of the commonly studied alignment model variables, we extend their work by studying governance structure and social alignment as drivers of alignment.

Precisely, this study investigates the Gerow et al. [5] meta-analysis by developing theoretical explanations for the relationships between alignment, performance, and alignment's antecedents. Thus, it contributes to alignment research in three ways. First, we propose and empirically validate that intellectual and operational alignment should be addressed uniquely and simultaneously, as the former influences the latter. Second, we argue and find that intellectual and operational alignment are uniquely related to the different types of firm performance and that the alignment–financial performance relationship is mediated by customer benefit. Third, we propose understanding the social-operational alignment relationship is as important as understanding the social–intellectual alignment relationship.

In order to address our research questions, we evaluate the alignment literature in two steps. In the first step, we conduct a *narrative review* of the alignment literature. In particular, we discuss key theories used in the IT literature to define and understand alignment. On the basis of our review, we propose a model of alignment's nomological network. In the second step, we conduct a *meta-analytic structural equation modeling (MASEM) analysis* of the literature. We describe our MASEM procedure and evaluate the magnitude of the relationships between alignment and other constructs in our model. We conclude this study with a discussion of the findings of our narrative review and MASEM, present their implications for research and practice, and highlight opportunities for future research.

2. Narrative review and theoretical development

We broadly review alignment research as a means to extract a literature-based nomological network of relationships that connects alignment to its antecedents and consequences. First, we offer a narrative review of the literature that identifies alignment's dimensions, defines the most frequently investigated forms of firm performance, and explains the relationships between these constructs. Then, we discuss major theoretical perspectives that inform our understanding of alignment's nomological network as a means to develop a testable structural equation model that connects alignment to firm performance.

2.1. Alignment and its dimensions

We address our first research question, *How should we represent or conceptualize alignment?*, by defining alignment as the fit[1] between the needs, demands, goals, objectives, and/or structures of business strategy, IT strategy, business infrastructure and processes, and/or IT infrastructure and processes such that management of business and IT remain in harmony [15,16]. More specifically, there are two main types of alignment commonly discussed in the literature: intellectual and operational. Intellectual alignment is "the degree to which the mission, objectives, and plans contained in the business strategy are shared and supported by the IS strategy" [17 pp. 27]. Operational alignment is "the link between organizational infrastructure and processes and I/S infrastructure and processes" [15 pp. 476]. The evolution of intellectual and operational alignments is described below.

2.2. Intellectual alignment

In the 1970s, King's [18] seminal work directed attention to examining consistencies between the strategic, *external* levels of business and IT. He defined alignment as the link of "the organization's 'strategy set' to an MIS 'strategy set'" (pp. 27). In other words, King focused on a one-way link such that IT strategy should support the business strategy. In the following decades, researchers further refined this definition of "strategy sets" by including "missions, objectives, and strategies" [19 pp. 3], plans/planning [8,20], and orientation [21,22]. Some researchers also emphasized a two-way link between IT and business strategies such that IT strategy may change business strategy, particularly through IT-based strategic initiatives [23,24], or should be fused with business strategy to create differential value [25]. By these later definitions, alignment is considered a goal to pursue/achieve rather than a by-product of good IT strategic creation or implementation [6,20].

Not unlike the definition, terminology that describes the "link" introduced by King [18] has grown more nuanced since the 1970s. More recently, terms such as "alignment" [20,21,26], "interrelated" [8], and "harmony" [22] describe this link [27 pp. 51]. These terms have been used to describe how firms bring their IT and business strategies (i.e., missions, objectives, plans, or orientations) into agreement (i.e., linking, aligning, interrelating, or harmonizing). Therefore, this type of alignment is referred to as strategic or *intellectual alignment* [2,28,29], which is "the degree to which the mission, objectives, and plans contained in the business strategy are shared and supported by the IS strategy" [17 pp. 27].

2.3. Operational alignment

In the early 1990s, IT strategy researchers expanded their focus to also consider the "corresponding *internal* domains" of alignment [15 pp. 476]. Among the first to do so, Lee and Leifer [30] considered alignment between the business and IT infrastructures [similar terminology has been used by 9, 31, 32]. Such "infrastructures" refer to the internal design of the business or IT including policies (e.g., employee hiring or security), procedures (e.g., customer service or scheduling), personnel (e.g., existing employees), systems (e.g., hardware and software), and structure (e.g., centralization vs. decentralization) [15]. Researchers expanded this conceptualization to also include internal activities and processes [33,34] such as work flow, product/IT development, customer service, or data center operations [15]. Rather than aligning distinct sets of strategies, this study suggests that this type of alignment depends on management's ability to integrate the infrastructures and processes of the business operations and IT.

Refinements of Lee and Leifer's [30] reference to alignment occurred in the 2010s. Examples include terms such as "coordinating" [33], "fit" [9,31], "integration" [35], and "extent of adoption" [34]. Similarly to intellectual alignment researchers, operational alignment researchers suggest business and IT infrastructures and processes should be integrated such that alignment is a goal to be achieved rather than a by-product of good IT implementation [9]. Across studies, theories and terms

[1] We acknowledge that both "fit" and "alignment" have been well researched in the organizational theory literature [12–14]. Fit is broadly defined as the "the match between two or more factors" [12 pp. 537] and alignment is broadly defined as "the degree to which the needs, demands, goals, objectives, and/or structures of one component are consistent with the needs, demands, goals, objectives, and/or structures of another component" [14 pp. 119]. For the purposes of this research, we adopt the narrow definition of alignment from Henderson and Venkatraman [15] and use fit as one of the many synonyms of alignment.