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Unraveling the Alignment Paradox: How Does Business—IT Alignment Shape Organizational Agility?

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Abstract. Contradictory views exist regarding whether business–information technology (IT) alignment enhances or reduces organizational agility, and no consensus has been achieved. To disentangle this puzzle, this study takes both the intellectual and social dimensions of IT alignment into account and investigates how they influence agility in opposite directions through distinct mechanisms. Based on survey data from 429 dyads of business and IT executives, we uncover that intellectual alignment impedes agility by increasing organizational inertia, while social alignment facilitates agility by enhancing emergent business–IT coordination. We also find that social alignment weakens the effect of intellectual alignment on organizational inertia. This paper fills a gap in the information systems (IS) literature by providing a theory-driven explanation of the alignment paradox, which makes a significant contribution to both IS research and practice.

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Introduction

Business–information technology (IT) alignment reflects the degree of fit and integration among business strategy, IT strategy, business infrastructure, and IT infrastructure (Henderson and Venkatraman 1993). This has been one of the top 10 concerns for business and IT executives during the past three decades (Kappelman et al. 2013). The latest Society for Information Management (SIM) survey shows that IT alignment continues to be one of the top priorities for chief information officers (CIOs; Forrest 2016). Recent research reveals that agility, defined as a firmwide capability to sense and respond effectively to market opportunities and threats (Sambamurthy et al. 2003), is a central mediator between IT alignment and firm performance (Tallon and Pinsonneault 2011). Firms with a high level of IT alignment are found to be able to effectively leverage IT resources to enhance firm agility, adapt to external changes, and eventually improve performance (Tallon and Pinsonneault 2011).

Yet, disagreement still exists on whether IT alignment improves or impedes firm performance. Most prior research asserts that IT alignment has a positive effect on firm performance (Gerow et al. 2014). However, some have found the existence of an alignment paradox; i.e., increased IT alignment in some firms is associated with no or reduced performance (Arvidsson et al. 2014, Palmer and Markus 2000, Tallon 2003). Scholars argue that alignment could lead to a rigidity trap such that firms suffer from declined strategic flexibility and an inability to quickly respond to changing market conditions (Benbya and McKelvey 2006, Chen et al. 2010, Shpilberg et al. 2007). Although a meta-analysis (Gerow et al. 2014) finds that the alignment–performance relationship is generally positive across studies, it also shows that IT alignment might reduce firm productivity in some situations. According to Van de Ven (2007, p. 38), our understanding of the real world is limited, and "robust knowledge is a product of both theoretical and methodological triangulation where evidence is not necessarily convergent but might also be inconsistent or even contradictory." Therefore, the inductive evidence based on existing empirical findings seems inconclusive and cannot completely dismiss the existence of IT alignment's negative outcomes. The alignment paradox should be scrutinized by integrating both theoretical and empirical evidence.

The purpose of this study is to unravel the alignment paradox, both theoretically and empirically, by investigating how IT alignment influences agility. Following

Reich and Benbasat (1996, 2000), we first submit that IT alignment has two dimensions: intellectual and social. We then integrate two theories to develop a coherent explanation for the paradoxical effects of IT alignment. First, drawing from organizational inertia theory (Gilbert 2005, Sydow et al. 2009), we argue that intellectual alignment could increase firms' inertia by creating resource and routine rigidities, thus impeding agility. Second, drawing from coordination theory (Faraj and Xiao 2006, Okhuysena and Bechky 2009), we contend that social alignment facilitates emergent coordination between business and IT when sudden changes occur, thus enhancing agility. The central message we intend to send is this: intellectual alignment, or the formal alignment between business and IT strategies, can possibly fall behind the rapid environmental change and put various constraints on firms' choices of response, whereas social alignment, or the shared understanding between business and IT executives, can help firms swiftly respond to external changes by coordinating business and IT functions in fashions that are ad hoc, flexible, and improvisational. These two mechanisms can occur simultaneously and even interact with each other. Their joint effect will determine how IT alignment affects agility.

This study contributes to information systems (IS) research in three aspects. First, by integrating organizational inertia theory and coordination theory with the dimensional view of IT alignment, we offer a compelling theoretical explanation for the alignment paradox. Specifically, we articulate the possible mediational mechanisms through which intellectual and social alignment generate distinct organizational impacts. Second, based on the survey data from 429 pairs of business and IT executives, we empirically confirm the existence of the alignment paradox by showing that intellectual and social alignment have opposite effects on agility. The former impedes agility by increasing inertia, while the latter enhances agility by facilitating emergent coordination. Third, we demonstrate that intellectual and social alignment interact with each other when they influence inertia. Social alignment can mitigate the negative influence of intellectual alignment so that the shaping of inertia is reduced. To our knowledge, this is the first paper that presents both theoretical rationale and empirical evidence for the coexistence of positive and negative outcomes of IT alignment. Although we do not expect it to completely reconcile the alignment paradox, we believe it complements our current understanding of IT alignment and makes a significant contribution to IT alignment research and practice.

Theoretical Background

Alignment Paradox

Despite cumulated empirical evidence for IT alignment's positive influence on firm performance (Gerow et al. 2014), researchers occasionally report the existence of an alignment paradox. For instance, Palmer and Markus (2000) find that there is no linkage between IT alignment and firm performance in the retailing industry. Arvidsson et al. (2014) observe that a successfully implemented IS aligned with organizational strategies failed to produce expected strategic effects. Tallon (2003) reports that 30% of the firms with increasing IT alignment have no improvement, or even a decline in performance. Shpilberg et al. (2007) show that 11% of the 452 companies they surveyed are snared in the alignment trap with high IT alignment but negative growth. In addition, Chan et al. (2006) and Sabherwal and Chan (2001) find that firms focusing on cost and operational excellence do not benefit from high IT alignment. The alignment paradox is difficult to reconcile and has drawn extensive attention (Chan and Reich 2007, Coltman et al. 2015, Gerow et al. 2014, Tallon and Pinsonneault 2011). Researchers generally agree that the alignment paradox is due to IT alignment's failure to enable firms to respond to external changes in a timely manner; that is, their agility is impeded (Tallon and Pinsonneault 2011). Thus, the key to unraveling the alignment paradox is to examine how agility is enhanced or reduced.

There are conflicting opinions regarding how IT alignment influences agility. Some assert that IT alignment facilitates agility. Tallon and Pinsonneault (2011) suggest that shared understanding allows critical changes in the business domain to be detected by IT executives, and the IT's potential to enable new business strategies or business models to be easily communicated to business executives. The close relationship between IT and business executives will improve the firm's ability to sense and respond to changes happening within and outside the firm (Lu and Ramamurthy 2011). In addition, at a high level of IT alignment, IT is embedded into business processes and bundled with other organizational resources, which facilitates innovation, adaptation, and response to change (Tallon 2008). The direct impact of IT alignment on agility is empirically validated (Tallon and Pinsonneault 2011), and many studies implicitly assume agility as a mediator between IT alignment and firm performance (Gerow et al. 2014).

The opposing view is that IT alignment impedes agility. First, IT alignment pursues internal fit, which competes for resources against external fit with the environment. Miller (1992) shows that firms with strong internal fit usually have weak external fit. Internal fit tends to foster myopia, as business and IT executives pay close attention to internal events that sustain and protect IT alignment but lose sight of the long-term need for external fit between strategy, structure, and processes, and the changing environments (Miller 1992, Tallon and Pinsonneault 2011). Second,

IT alignment often leads to early success, which entices firms to believe that they are on the right track and further align business and IT along the same trajectory, thus creating a tunnel vision that limits firms' willingness to innovate (Leonard-Barton 1992). Short-term success of IT alignment lures firms to focus on a limited set of core activities, which can prevent business and IT executives from sensing the environmental changes outside their responsibilities (Tallon 2007). Third, competence traps can result from IT alignment to stifle agility. While IT embedded in business processes can support core competency, the tightly bundled resources will be difficult to mobilize when external environments call for a change (Leonard-Barton 1992). Furthermore, IT alignment favors exploitation of existing resources, but "when an organization engages in too much exploitation, it focuses on short-term outcomes rather than long-term viability, and suffers from rigidities in core competences and established resources" (Vessey and Ward 2013, p. 293).

To date, only two studies (Bradley et al. 2012, Tallon and Pinsonneault 2011) have explicitly examined IT alignment's impact on agility, and both found the impact to be positive. Although IT alignment in these studies refers to an umbrella concept, the measures indicate that it is the alignment between business and IT strategies (i.e., intellectual alignment). However, the theoretical discussion in these studies draws on the social element of alignment, which is different from intellectual alignment (Reich and Benbasat 1996). A major argument used by Tallon and Pinsonneault (2011) is that shared understanding and knowledge sharing between IT and business executives help them reach consensus about how best to respond to market opportunities or threats. Similarly, Bradley et al. (2012) state that agility is higher when there is a mutual understanding of and a commitment to IT and business strategies. Because of the mixed conceptualization, it is difficult to precisely determine how IT alignment influences agility. Yet, it suggests that if the dimensional view of IT alignment is taken, a better understanding of the IT alignment–agility relationship might be achieved.

Dimensions of IT Alignment

IS researchers have proposed two major ways to dimensionalize IT alignment. One was developed by Reich and Benbasat (1996, 2000), suggesting two dimensions: intellectual and social alignment. The other is based on Henderson and Venkatraman's (1993) strategic alignment model, including six dimensions. In this study we follow Reich and Benbasat's (1996, 2000) classification because it is theoretically concise, has been widely applied (Kearns and Lederer 2003, Preston and Karahanna 2009, Wu et al. 2015), and encompasses both strategy artifacts and human actors.

According to Reich and Benbasat (2000), intellectual alignment refers to the state in which a set of interrelated IT and business strategies exists, while social alignment is the state in which business and IT executives mutually understand and are jointly committed to each other's mission, objectives, and plans. Intellectual and social alignment differ in focus, cause, and effect. Intellectual alignment suggests that the methodologies for formulating and implementing strategies determine the degree to which IT and business missions, objectives, and strategies are internally consistent and externally valid. Social alignment considers how factors such as characteristics of actors, decision making, and communication used in strategy formulation and implementation lead to a mutual understanding of these strategies. The effect of intellectual alignment is explicit, manifested in artifacts such as strategic plans that are ontologically objective, while the effect of social alignment is tacit, manifested in mutual understanding that is ontologically subjective.

IS scholars subscribe to the view of the strategic management literature that "top executives influence organizational outcomes through the formulation and implementation of strategies" (Karahanna and Preston 2013, p. 25). Thus, executives are responsible for not only strategy formulation but also strategy implementation. According to Reich and Benbasat (1996), the relationship between social and intellectual alignment differ during these two phases. During strategy formulation, social alignment can affect intellectual alignment. Researchers have shown that social alignment is an antecedent of intellectual alignment and its effect on firm performance is fully mediated by intellectual alignment (Preston and Karahanna 2009). During strategy implementation, both social and intellectual alignment can affect implementation outcomes separately. As Reich and Benbasat (1996, p. 57) articulated: "Potentially promising strategies and plans may be poorly executed or even subverted because organizational actors are not aware of or are not committed to do them (i.e., a low level of the social dimension of linkage). On the other hand, perfect implementation of a flawed plan (e.g., a low level of the intellectual dimension of linkage) may create suboptimal results." Recent research supports this viewpoint by showing social alignment's direct effect on firms' operational performance without having intellectual alignment as a mediator (Wagner et al. 2014). In reality, the phases for strategy formulation and implementation usually unfold together and cannot be separated or forced to follow a sequential order. Hence, social and intellectual alignment can correlate with each other and simultaneously have distinct effects on firm performance.

Given that intellectual and social alignment may generate different organizational impacts (Reich and

Benbasat 2000), it is necessary to explicitly study them in tandem so that their impacts can be differentiated. Surprisingly, little research has examined the direct effect of social alignment on agility or organizational performance. The notion that social alignment is only an antecedent of intellectual alignment seems to be deeply rooted in the collective cognition of the IS research community. Most prior research focuses on only intellectual alignment's influence on organizational outcomes. Even if social alignment is considered, it is treated as an antecedent of intellectual alignment (Karahanna and Preston 2013) or a contextual factor (Gerow et al. 2014). An implicit assumption embedded in this literature is that social alignment only takes effect in strategy formulation and its effect in strategy implementation is completely ignored. This is perplexing because researchers admit social alignment's important role in strategy implementation. For example, Tallon and Pinsonneault (2011) and Bradley et al. (2012) acknowledge that social alignment partially contributes to firms' agility. Tallon (2008) adopts the view of emergent strategy that emphasizes the emergent nature of strategy implementation. Since what firms are actually doing often differs from what they plan to do, social alignment will be essential in coordinating emergent activities between business and IT functions. Because of the mixed-up argumentation and negligence of social alignment's role in strategy implementation, it is difficult from a theoretical standpoint to conclude exactly which dimension contributes to the positive IT alignment–agility relationship. Although existing empirical evidence mostly points to intellectual alignment's positive effects (Gerow et al. 2014), the existence of the alignment paradox and the theoretical vagueness around the effects of intellectual alignment require further effort to shed light on this issue. To better understand IT alignment, we follow Reich and Benbasat's (2000) recommendation and submit that both intellectual and social dimensions should be explicitly considered.

Theory and Research Model Development

According to their original conceptualization (Reich and Benbasat 1996), intellectual and social alignment may generate different impacts on agility. Intellectual alignment represents the artifactual alignment between business and IT strategies, which is formalized in organizations through hierarchical control, structural design, incentive systems, and resource allocation. These organizational designs are most effective when they fit the current environment. If a disruptive environmental change occurs, they are likely to create obstacles that prevent firms from easily making adjustments. By contrast, social alignment represents a shared understanding between business and IT executives that does not take the form of an explicit artifact. Its effects are realized through fueling other activities such as communication and collaboration between business and IT executives during strategy formulation and implementation, which help them coordinate efforts to recognize and respond to change. Therefore, the two-dimensional view of IT alignment offers an opportunity to conceptually disentangle the paradoxical IT alignment–agility relationship—intellectual alignment reduces agility, whereas social alignment enhances agility. Drawing from organizational inertia theory (Gilbert 2005) and coordination theory (Okhuysena and Bechky 2009), we develop a research model (Figure 1) that depicts how intellectual and social alignment independently and interactively influence agility by going through the mediation of inertia and emergent coordination. The definitions of the five central constructs are provided in Table 1. Next we discuss in detail organizational inertia theory and coordination theory and develop hypotheses.

Organizational Inertia Theory

Organizational inertia refers to firms' tendency to maintain stability of their organizational arrangements such as strategy and structure in spite of environmental change (Hannan and Freeman 1984). Gilbert (2005)

Figure 1. The Research Model

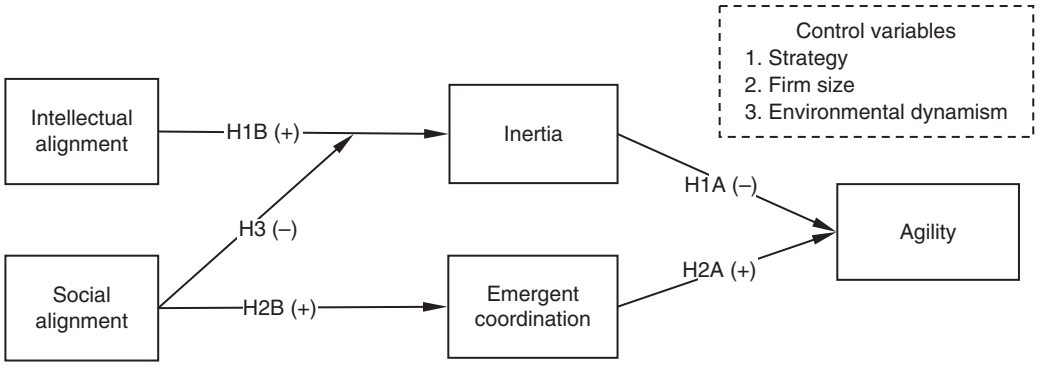


Table 1. Definitions of Central Constructs in the Research Model

Construct	Definition	Source
Intellectual alignment	The state in which a set of interrelated IT and business strategies exists	Reich and Benbasat (2000)
Social alignment	The state in which business and IT executives within an organizational unit mutually understand and are jointly committed to each other's mission, objectives, and plans	Reich and Benbasat (2000)
Inertia	Firms' tendency to maintain stability of their organizational arrangements such as strategy and structure in spite of environmental change	Hannan and Freeman (1984)
Emergent coordination	The contextualized process of input regulation and interaction articulation to realize a collective performance based on informal communication and mechanisms	Faraj and Xiao (2006), Okhuysena and Bechky (2009)
Agility	A firmwide capability to sense and respond effectively to market opportunities and threats	Sambamurthy et al. (2003)

suggests that inertia consists of two aspects: resource rigidity and routine rigidity. The former is concerned with failure to change resource investment patterns, while the latter refers to failure to change organizational processes and business models that use those resources (Gilbert 2005). The extant management and IS literature suggests that inertia encompasses three types of resource rigidities: resource dependency, resource bundling, and sunk costs. Resource dependency refers to the extent to which firms' decisions and behaviors are controlled by external organizations (Pfeffer and Salancik 2003). For example, a firm cannot switch to a new IS because a powerful customer requires it to use the existing system. Resource bundling is defined as how resources are bundled together by organizations to develop capabilities (Sirmon et al. 2007). For example, in many firms, IT is an integral part of their complex business processes and services, and updating the IT involves changes to many non-IT resources. Sunk costs refer to the resources already spent, which induce firms to continue following the previously selected course of action (Keil et al. 1994). For example, a firm spending millions of dollars on an Enterprise Resource Planning (ERP) system would not easily switch to another system.

The other aspect of inertia is routine rigidity. Firms develop routines to execute organizational tasks for efficiency (Melville and Ramirez 2008). Routines refer to "repeated patterns of response involving interdependent activities that become reinforced through structural embeddedness and repeated use" (Gilbert 2005, p. 742). Previous studies have consistently shown routines to be a source of inertia (Sydow et al. 2009). Synthesizing past organization research, we identify two types of routine rigidities: path dependence and cognitive inertia. Path dependence is defined as "a rigidified, potentially inefficient action pattern built up by the unintended consequences of former decisions and positive feedback processes" (Sydow et al. 2009, p. 696). For example, firms that have achieved success from initial IT alignment tend to follow the same strategic path until they finally fall into a lock-in. Cognitive inertia refers to the extent to which individuals rely on fixed cognitive maps or mental models in problem solving and decision making (Gilbert 2005). For example, a CIO may refuse to adopt cloud computing because she is used to having complete control over system and data access.

Although inertia and agility seem to be inverse to one another, they are conceptually distinct. While inertia is a state or attribute shaped by historical organizational practices (Gilbert 2005), agility is a type of dynamic capability that can be developed by a firm (Tallon and Pinsonneault 2011). They cannot be viewed as two opposite ends of a continuum because the presence of one does not automatically mean the absence of the other. For example, new firms have no inertia because they do not have a long enough history to develop inertia. Yet this does not necessary mean that all new firms will have high agility. Instead, inertia should be seen as an antecedent of agility, as explained next.

With rigidifying resources and routines, inertia poses many barriers to agility (Gilbert 2005). When there is resource dependence, resource bundling, and sunk costs, firms often find it difficult to respond to environmental change if their response requires divesture or update of existing resources. Significant time, efforts, and costs are usually associated with the response. Therefore, firms will be loath to make adjustments and prefer to exploit existing resources. As Vessey and Ward (2013) suggest, rigidities from established resources will likely reduce organizational agility. The literature has also repeatedly revealed the persistence and inflexibility of routines (He and Wong 2004, Sabherwal and Chan 2001). If routines self-reinforce over time and induce cognitive inertia, they can become impediments when the firm needs to be adaptive (Siggelkow 2002). Routines are often tightly aligned with one environment and can be difficult to adjust, because they are not built to adapt to external changes (Siggelkow 2001). When organizational members are cognitively locked in the current way of doing business, they are unlikely to sense, let alone respond to, external changes. Overall, because of inertia related to resources and routines,

firms are either unable (constrained by structure and cost) or unwilling (constrained by collective cognition) to implement internal changes in response to external changes. As a result, firm agility will be undermined.

Hypothesis 1A (H1A). *Inertia is negatively associated with agility.*

Intellectual alignment may connive inertia. All three types of resource rigidities—resource dependency, resource bundling, and sunk costs—can result from intellectual alignment. First, the modern networked economy requires firms to collaborate with business partners and adopt information systems such as Supply Chain Management (SCM), Electronic Data Interchange (EDI), and Customer Relationship Management (CRM) to leverage external resources from suppliers and clients (Rai and Tang 2010, Tafti et al. 2013). Although such IT resources are aligned with firms' business strategies to support collaborations, the alignment in turn constrains the firms' choice of IT resources. Because the focal firm relies on the specific system to access valuable resources in its partner firms, the resource dependency creates a coercive pressure that forces the focal firm to stick with the partner and the system even if it wants to switch (Liang et al. 2007). Looking from the outside, this appears as inertia to change.

Second, intellectual alignment directs firms to create and sustain competitive advantages by bundling IT resources and other organizational resources to develop IT-enabled core competency (Wang et al. 2012). The generality of such core competency is limited and can only be used to support specific competitive strategies (Leonard-Barton 1992). Competing in dynamic environments, a firm has to change its competitive strategy to respond to instantaneous opportunities and emerging threats (Winter 2003). Once the competitive strategy is changed, IT-enabled core competency designed to support the past competitive strategy is no longer relevant and needs to be updated (Bharadwaj 2000, Leonard-Barton 1992). However, the technical complexity associated with the tight resource bundling makes it difficult for firms to understand what to do, and they may choose to keep the status quo (Rettig 2007).

Third, sunk costs result from intellectual alignment after firms have invested heavily on IT resources, making it costly to divest existing resources and replace them with new resources (Moliterno and Wiersema 2007). The nurturing of IT-enabled core competency such as structuring IT resource portfolios and bundling IT resources to building IT capabilities is time consuming and expensive (Sirmon et al. 2007). With high sunk costs, firms would prefer to reap immediate benefits from these resources rather than seek new investments with uncertain returns (Gupta et al. 2006).

Moreover, intellectual alignment also leads to routine rigidity. Both path dependence and cognitive inertia can be engendered by intellectual alignment. First, some routines developed under a specific intellectual alignment can evolve over time, outperform alternative options, reinforce themselves through repetitive use, and then become the dominant pattern for organizational actions. These action patterns are extremely difficult to change because they are deeply embedded in organizational practices and become institutionalized (Sydow et al. 2009). During the period when intellectual alignment is improving firm performance, routines associated with the IT alignment are very likely to become self-reinforcing and lead to path dependence. For instance, many firms that are accustomed to TV advertising are reluctant to adopt Internet advertising, although the two approaches are equally effective (Draganska et al. 2014).

Second, routines not only create path dependence that leads to structural inertia but also deeply ingrain their underlying logic within organizational cognitions and thus increase cognitive inertia (Gilbert 2005). Organizational actors often rely on a learned pattern of response that is structurally and cognitively reinforced by following routines instead of seeking innovative ways to respond to changes. For instance, many firms mandate employees to comply with specific policies when using enterprise systems, and the enforced compliance limits the choices of how the system is used (Liang et al. 2013, Xue et al. 2011). Such collective cognition creates organizational norms about what should be done to solve problems and discourages organizational members from exploring new options (Kaplan and Henderson 2005). When facing external changes, firms may be reluctant to unlearn and abandon known ways of doing business and learn new ways that they are not familiar with (Tallon and Pinsonneault 2011). Thus, at a high level of intellectual alignment, when IT capabilities are effectively leveraged to support organizational routines, specific beliefs such as how the IT infrastructure should be configured and what business functions should be supported by what software may be established as part of the firm's collective cognition that persists over time and causes inertia.

In summary, since intellectual alignment specifies both business and IT strategies as well as how the two are aligned, it calls for resource allocation and routine creation to achieve the strategic goals. While this arrangement can at times improve performance, it also inevitably leads to unintended inertia.

Hypothesis 1B (H1B). *Intellectual alignment is positively associated with inertia.*

Coordination Theory

Coordination, "a temporally unfolding and contextualized process of input regulation and interaction articulation to realize a collective performance"

(Faraj and Xiao 2006, p. 1157), is a central purpose of organizations in which heterogeneous actions must be orchestrated to achieve common goals (Okhuysena and Bechky 2009). Coordination orchestrates the sequence and timing of interdependent actions within an organization (Marks et al. 2001). This includes the management of simultaneous activities, information exchange, and mutual adjustment of actions. While coordination can be either formal structural arrangements or informal emergent processes, coordination research suggests that as environment volatility and task uncertainty increase, formal mechanisms often fail to account for what actually occurs in organizations, and coordination is more reliant on informal mechanisms (Okhuysena and Bechky 2009). Given that it is unrealistic to assume that the environment can be adequately predicted so that formal coordination mechanisms can be designed beforehand (Faraj and Xiao 2006), the latest conceptualization of coordination posits that in dynamic and time-constrained environments, coordination needs to be informal and emergent to allow for rapid response to external changes (Okhuysena and Bechky 2009). Prior research on coordination has consistently shown that formal structures, standard procedures, and planned responses are too slow, disconnected, and insufficient to deal with ever-changing conditions, and emergent coordination is needed to match the speed and volatility of change (Faraj and Xiao 2006, Majchrzak et al. 2007). Therefore, this paper focuses on informal and emergent coordination actions. Specifically, we define emergent coordination as the contextualized process of input regulation and interaction articulation to realize a collective performance based on informal communication and mechanisms (Faraj and Xiao 2006).

Abundant empirical evidence shows that coordination is the essence of effective teamwork (LePine et al. 2008). For the top management team, coordination between business and IT executives plays an important role in improving leadership performance, and subsequently agility and firm performance (Sambamurthy et al. 2003). Emergent coordination based on communication and information exchange enables firms to sense changes in the external environment. For example, coordination between the chief marketing officer and the CIO can help a firm analyze customer demands and detect covert trends by means of data analytics. Moreover, emergent coordination between business and IT executives can facilitate them working together to bring forward IT-enabled solutions or business models on a timely basis to gain a competitive advantage (Rai and Tang 2013). These activities cannot be predefined because the emergence of new technology and market change is unpredictable. In addition, to sense and respond to external changes requires orchestrated collaborating efforts from multiple functional units of a firm, and the integration of these interdependent tasks can be facilitated by the emergent coordination among executives; that is, the emergent coordination at the executive level will have a ripple effect to drive timely cross-functional coordination throughout the entire organization, thus enhancing organizational agility. The importance of emergent coordination has been implied in prior IS research, although the exact term "emergent coordination" is not used. For example, improvisational capabilities have been found to fully dominate in urgent, unpredictable, and novel environmental situations through spontaneously reconfiguring existing resources (Pavlou and El Sawy 2010). Similarly, Vessey and Ward (2013) posit that self-organization is preferred for organizations to respond to emergent, complex situations in the environment by allowing groups of people to autonomously solve problems without formal planning or intervention from the management hierarchy. Hence, we propose that emergent coordination translates IT alignment into collaborating actions to enhance agility.

Hypothesis 2A (H2A). *Emergent coordination is positively associated with agility.*

Social alignment typically encompasses shared understanding (Preston and Karahanna 2009), shared cognition (Tan and Gallupe 2006), or cognitive social capital (Karahanna and Preston 2013) between business and IT executives. It pertains to the joint quality of business and IT executives that can potentially improve firm performance (Reich and Benbasat 1996, 2000), and requires coordinative actions to substantiate this potential; that is, the shared understanding and cognition will stay tacit and silent unless they are translated into coordination activities to generate explicit effects. Social alignment is abstract and unable to cause changes to the objective environment, whereas coordination is concrete, actionable, and able to alter the objective environment. To achieve IT value creation, interdependent tasks require business and IT executives to work closely with one another and coordinate the activities in their charge dynamically. Social alignment establishes a cognitive frame about how this can be done and enables such coordination under uncertainties in an emergent fashion (Okhuysena and Bechky 2009).

Social alignment's influence on emergent coordination is predicated on its facilitation of interpersonal communication. Emergent coordination is an ongoing dynamic process in which both internal and external changes are closely monitored and dealt with (Okhuysena and Bechky 2009). Informal interpersonal communication is relied on to fuel this process because

it is flexible and timely, which can get around the slow-responding formal organizational mechanisms (Faraj and Xiao 2006, Majchrzak et al. 2007). For example, a conversation at lunch or on the golf course between a chief executive officer (CEO) and a CIO may lead to a new customer retention initiative based on social media. At a high level of social alignment, shared language, shared knowledge, and shared understanding between business and IT executives can abolish obstacles, reduce costs, and create opportunities for emergent coordination. As Okhuysena and Bechky (2009, p. 483) stated, "to successfully accomplish emergent coordination, people needed to be aware of and understand how their work fit with the work of others in the organization." First, shared language helps to remove the communication barrier between business and IT executives. Communication barriers among executives are caused by their inability to articulate their knowledge and logic in a way that is understandable to their peers. By standardizing the language between business and IT executives, social alignment can eliminate language barriers that might cause confusion and delay or impede coordination (Preston and Karahanna 2009). Second, shared knowledge enables IT and business executives to understand, appreciate, and contribute to each other's key processes. It can help business executives realize the importance of IT and let IT executives learn more about the business requirements, which is helpful to minimize conflicts and reduce the cost of business–IT coordination (Chan et al. 2006, Reich and Benbasat 2000). Third, with shared understanding, business and IT executives have a common view about the role of IT within the organization. It creates opportunities for executives to communicate with each other to solve emergent problems by mobilizing resources between business and IT functions (Preston and Karahanna 2009). Research has found that social alignment is essential for the business and IT functions of a firm to effectively and efficiently cooperate with one another (Schlosser et al. 2015). Based on the above logic, we propose that social alignment can facilitate emergent coordination between business and IT executives.

Hypothesis 2B (H2B). *Social alignment is positively associated with emergent coordination.*

Interaction Between Intellectual and Social Alignment

Drawing from the management literature on path dependence and inertia (Sydow et al. 2009), we propose that social alignment can mitigate the rigidifying effect of intellectual alignment. Specifically, social alignment plays a negative moderating role such that the relationship between intellectual alignment and inertia is weaker when social alignment is stronger. Intellectual alignment leads to inertia by increasing both resource and routine rigidities (Gilbert 2005). While it is easy for a firm to fall prey to the success trap and myopic view when resources are deeply embedded and path dependence is entrenched as a result of established intellectual alignment, this problem can be mitigated if the top management is mindful and well informed. Adoption research suggests that mindful users have a high level of awareness of local contexts and can make better adoption decisions (Sun et al. 2016). Extending this logic to the organizational level, it still makes sense. A firm's strategic IT decisions are influenced by many contextual factors, and IT executives do not always have input or approval rights (Xue et al. 2008). At a high level of social alignment, business and IT executives share their unique knowledge and perspectives with each other and develop a common understanding of the strategic goals (Preston and Karahanna 2009). The integration of diverse perspectives into strategic decision making contributes to mindful decisions that are less likely to incur resource rigidities. For example, when implementing enterprise IT infrastructure, flexibility can be set as an important feature as a result of the CIO's recommendation. A flexible infrastructure allows easy updating and reconfiguration to meet shifting business requirements, thus reducing resource rigidity. If the CIO underestimates the importance of flexibility because of a lack of business knowledge or the CEO chooses functionality and cost over flexibility because of a lack of IT knowledge, a less flexible infrastructure will be implemented, and the firm's agility will be constrained.

Moreover, one reason that firms become inertial is that they are locked in a narrow path that has been repeatedly proven successful in history. According to Sydow et al. (2009), the path can be deliberately broken if key organizational members can identify and predict the possible path dependence, reflect on it and understand how it begins and evolves, and design managerial interventions to break it. Taking these steps requires extensive cross-domain knowledge and strong social relationships. Inertia arising from intellectual alignment is difficult to identify because it requires deep knowledge of both business and IT and it is difficult to be critical of the status quo when the firm is apparently doing well. If social alignment is high, business and IT executives' knowledge sharing and information exchange can help them stay alert to the formation of strategic inertia and take measures to unlock path dependence. For example, business and IT executives can make emergent arrangements to accommodate environmental changes as long as they serve the long-term goals. Employees can be encouraged to explore new ways of IT use to accomplish their job (Liang et al. 2015). Consequently, business and IT tasks frequently deviate from predefined routines, and the

Table 2. Measures of Constructs

Construct	Items	Source
Agility	Sensing 1. We continuously pay close attention to actions of our competitors. 2. We always try to forecast consumer preference changes. 3. We are alert to economic shift. Responding 4. We implement rapidly new competitive strategies with regard to actions of our competitors. 5. We quickly react to fundamental changes with regard to our customers. 6. We are fast to respond to changes in economic shift.	Overby et al. (2006), Roberts and Grover (2012)
Inertia	Facing economic shift and market changes, 1. . . . we are reluctant to seek new development directions. 2. . . . we are reluctant to change our current business model. 3. . . . we are reluctant to change our investment patterns. 4. . . . we are not able to seek new development directions. 5. . . . we are not able to change our current business model. 6. . . . we are not able to change our investment patterns.	Self-developed based on Gilbert (2005)
Emergent coordination	When we (business executives) work with CIOs to cope with external changes, 1. . . . we work together in a well-coordinated fashion. 2. . . . we effectively eliminate misunderstandings about what to do. 3. . . . we need to backtrack and start over a lot. (R) 4. . . . we accomplish the task smoothly and efficiently. 5. . . . there is much confusion about how we would accomplish the task. (R)	Lewis (2003), Summers et al. (2012)
Environmental dynamism	1. Market activities of your key competitors (1, have become far more predictable; 4, no change; 7, have become far less predictable). 2. The tastes and preferences of your customers in your principal industry (1, have become far more stable and predictable; 4, no change; 7, have become much harder to forecast). 3. Rate of innovation of new operating processes and new products or services in your principal industry (1, has fallen dramatically; 4, no change; 7, has dramatically increased).	Karimi et al. (2004), Wang et al. (2012)
Intellectual alignment	1. The IS strategy is congruent with the corporate business strategy in our organization. 2. Decisions in IS planning are tightly linked to the organization's strategic plan. 3. Our business strategy and IS strategy are closely aligned. 4. Our IS plan reflects the business plan mission. 5. Our IS plan reflects the business plan goal. 6. Our IS plan supports the business strategies.	Preston and Karahanna (2009), Tan and Gallupe (2006)
Social alignment	1. IS managers are kept informed about key business initiatives and plans. 2. Top management is involved in IT developments. 3. The CIO and TMT have a shared view and understanding about the role of IS within the organization. 4. The CIO and TMT have a shared view of the role of IS as a competitive weapon for our organization. 5. The CIO and TMT have a shared understanding of how IS can be used to increase the productivity of our organization's operations. 6. The CIO and TMT have a common view about the prioritization of IT investments.	Chan et al. (2006), Preston and Karahanna (2009), Tan and Gallupe (2006)

Notes. A seven-point Likert scale was used if not noted otherwise (1, strongly disagree; 4, neutral; 7, strongly agree). Responses on intellectual alignment and social alignment were collected from CIOs and IT executives. Responses on all other constructs were collected from CEOs and business executives. R, Reverse coded; TMT, top management team.

likelihood of generating path dependence and inertia will decline because of less reinforcement (Sydow et al. 2009).

Hypothesis 3 (H3). *Social alignment weakens the relationship between intellectual alignment and inertia.*

Methodology

Construct Operationalization

Except inertia, the measures of all of the constructs were adapted from the literature. All measures and their sources are provided in Table 2. Modifications were made to align the measures with our research context. An expert panel of three IS professors, two CIOs, and three senior business managers approved the face validity of the items.

Given that there are no existing scales for inertia, we self-developed six items to measure this construct. We measure the firm's reluctance and inability to change investment patterns, existing development directions, and business model when facing external changes to capture both resource rigidity and routine rigidity, the

two components of inertia (Gilbert 2005). In addition, we control for the effects of firm size (Ravichandran and Lertwongsatien 2005), firm strategy (Yayla and Hu 2012), and environmental dynamism (Karimi et al. 2004) on all dependent variables. The natural logarithm of the number of full-time employees is used as a measure of firm size. Firm strategy is determined by following Yayla and Hu (2012). Environmental dynamism is measured using items from Karimi et al. (2004) that indicate the rate of change and innovation in production and service technologies, as well as the uncertainty or unpredictability of customer taste and actions of the firm's principal industries.

Data Collection

The formal data collection was conducted in the Chinese shipbuilding industry. We selected a single industry to prevent cross-industry confounds. Industry effects have long been confirmed by economists (Schmalensee 1985), and including multiple industries into a study without control could introduce aggregation bias. Using single-industry data is the "purest form of control" that can completely eliminate industry confounds (Sharp et al. 2013, p. 60) and is a common practice in the strategic management field. A recent review study reveals that "nearly half of the most impactful empirical articles published in strategy over the previous decade were conducted in a single-industry setting" (Sharp et al. 2013, p. 48). Hence, we apply a single-industry approach to remove biases and generate more accurate findings.

China has become the world's largest shipbuilder since 2009 (Jiang et al. 2013). At the time of this study, the shipbuilding market was experiencing abrupt changes. Influenced by the international financial crisis, the continual downturn of international carriage put great pressure on the Chinese shipbuilding industry. While many Chinese shipyards stuck to their old strategies and struggled, some shipyards pursued new development paths to respond to the financial crisis and entered the high-value-added ship and non-marine product markets. According to Clarkson Research Studies (UNCTAD 2013), some Chinese shipyards broke the monopoly of South Korea and secured new orders of high-value-added ships, such as liquefied natural gas carriers, large container vessels, and ocean engineering equipment. Similar to the shipyards, a large number of supporting firms that supply ship-related materials, equipment, and devices were influenced by the environment change and had to adjust their strategies. The Chinese shipbuilding industry has a long history of using IT. Most firms used Computer-Aided Design and Computer-Aided Manufacturing (CAD/CAM) to support ship design and production design. While small- to medium-sized firms mostly self-develop systems for planning, logistics, and cost management, many large firms implemented enterprise systems such as SCM, CRM, and ERP to align with their business strategies. The different levels of agility and IT usage shown by firms in the Chinese shipbuilding industry in the dynamic environment characterized by the financial crisis and market uncertainty offered a suitable context to test our research model.

A matched-pair survey was used to collect data from business and IT executive dyads. Two questionnaires were developed: the first targeted senior IT executives, while the second targeted CEOs or other senior business executives. Intellectual alignment and social alignment were measured by the IT executive questionnaire, whereas agility, inertia, and emergent coordination were measured by the business executive questionnaire. Both questionnaires were pilot tested before the formal data collection. The sample for this study comprised 2,500 firms, randomly selected from a list of 12,086 firms in the Chinese shipbuilding industry[1] obtained from the Chinese Shipbuilding Industry Association. We identified the CEO and CIO of each firm in the sample and compiled a mailing list. Data were collected between October 2013 and March 2014. Surveys were independently mailed to the CIO and CEO offices, requesting responses from the CIOs and CEOs. After three rounds of follow-up reminders, 429 matched responses were received, yielding a 17.16% response rate, which is on par with matched surveys found elsewhere in the IT alignment literature (Sabherwal and Chan 2001). Online Appendix A presents our sample characteristics.

We assessed nonresponse bias by following Armstrong and Overton (1977). *T*-tests were used to compare the earliest 107 respondents (25%) and the last 107 respondents on two demographic variables: revenue and number of employees. No significant differences were found, suggesting that nonresponse bias is not a serious concern. In addition, we compared the locations of the sampled firms and the 2,500 firms. The firms are located in 18 provinces, and a chi-square test shows no significant difference between the 429 firms and the 2,500 firms (see Online Appendix B).

Validation of IT Alignment Measures

We took extra caution to validate both intellectual and social alignment so that the measures are free from biases. First, since IT executives tend to overestimate intellectual alignment, their reports could be positively biased. To validate this measure, we contacted the 429 business executives who returned our survey and asked them to rate their firms' intellectual alignment by using the same six questions answered by the IT executives. A total of 124 business executives (28.9%) responded to our request. The correlation between the new data and CIO-reported intellectual alignment is

highly significant ($r = 0.846$, $p < 0.001$). A principal component analysis of the new data from business executives and old data from IT executives produced a single factor, indicating that the scores are convergent and cannot be discriminated from each other. The evidence suggests that the IT executives' original assessments of intellectual alignment are consistent with the business executives' assessments and have a high level of validity. Therefore, we used the intellectual alignment data from IT executives in the data analysis.

Second, in addition to the IT executives' self-reports, we included shared domain knowledge (SDK) between the business and IT executives for each firm as an indicator of social alignment. This indicator was measured by aggregating the actual amount of IT experience of the business executives and the actual amount of business experience of the IT executives. We followed Reich and Benbasat's (2000) approach to calculate SDK by comparing the data for business knowledge collected from IT executives and the data for IT knowledge collected from business executives (see Online Appendix C for details). A principal component analysis shows that SDK can be treated as an indicator of social alignment with a factor loading of 0.898. Given that SDK is a composite measure that incorporates data collected from both business and IT executives, it is unlikely to be affected by common method bias. The inclusion of this indicator improves the validity of the social alignment measure.

Results

Measurement Evaluation

We first evaluated the validity and reliability of the measures. Following Gefen et al. (2011), the validity of the measures was tested using two procedures. First, as Table 3 shows, the square root of each construct's average variance extracted (AVE) is much greater than the construct's correlations with any other construct, suggesting sufficient discriminant validity (Fornell and Larcker 1981). Second, factor loadings and cross loadings were calculated for all of the constructs. The loading of each item on its substantive construct is over 0.80, suggesting sufficient convergent validity (see Online Appendix D). In addition, each item's factor loading is much higher than its cross loadings on other constructs, confirming the sufficiency of discriminant validity (Hair et al. 1998). The reliability of the measurements was examined by computing composite reliability and Cronbach's alpha coefficients. As Table 3 shows, all reliability scores exceed Nunnally's (1978) recommended cutoff of 0.70.

Common Method Variance Analysis

Although we collected paired data from different respondents, a single method, paper-based survey was used and could lead to common method variance (CMV) problems. We conducted two tests to evaluate CMV. First, in a Harmon's one factor test (Podsakoff et al. 2003), we entered the items of the five theoretical constructs into a principal component analysis. Five factors were identified, and the first factor of the unrotated solution explains only 30.10% of the total variance, showing no indication of CMV. Second, we employed the correlational marker variable technique to assess CMV. Following Lindell and Whitney (2001), the second smallest positive correlation among measurement items ($r = 0.002$) was selected as a conservative estimate of CMV. All of the between-item correlations were adjusted by partialling out the CMV estimate. Results revealed that the correlations had only a slight change in magnitude and no change in significance, suggesting that CMV is unlikely to be a concern.

Hypothesis Testing

Following Cohen et al. (2003), we employed hierarchical regression to test the hypotheses by using SPSS 22. Three regression models were estimated with inertia, coordination, and agility as the dependent variables, respectively. The results are presented in Table 4. Taking inertia as the dependent variable, Model 1 is estimated in three steps. In Step 1, three control variables are entered: firm size, firm strategy (defender, analyzer, or prospector), and environmental dynamism.

Table 3. Interconstruct Correlations

Constructs	Mean (SD)	CA	AVE	1	2	3	4	5	6	7	8
1. *Firm size*	3,642 (3,945)	1	1	**1**							
2. *Strategy*	1.90 (0.95)	1	1	0.040	**1**						
3. *Env. dynamism*	3.94 (1.89)	0.931	0.825	−0.118*	−0.085	**0.908**					
4. *Intellectual alignment*	3.84 (1.16)	0.961	0.797	−0.041	−0.060	0.030	**0.893**				
5. *Social alignment*	4.25 (1.05)	0.971	0.795	−0.054	−0.019	−0.019	0.324**	**0.892**			
6. *Inertia*	4.06 (1.05)	0.952	0.780	0.012	−0.131**	0.037	0.275**	0.019	**0.883**		
7. *Coordination*	3.85 (0.95)	0.948	0.739	−0.079	−0.002	0.059	0.140**	0.477**	−0.016	**0.860**	
8. *Agility*	3.76 (1.02)	0.963	0.812	−0.018	0.024	0.064	0.018	0.190**	−0.275**	0.333**	**0.901**

Notes. CA, Cronbach's alpha. Diagonal bold numbers are the square roots of AVE. Firm strategy is coded as 1, defender; 2, analyzer; 3, prospector.
*$p < 0.05$; **$p < 0.01$.

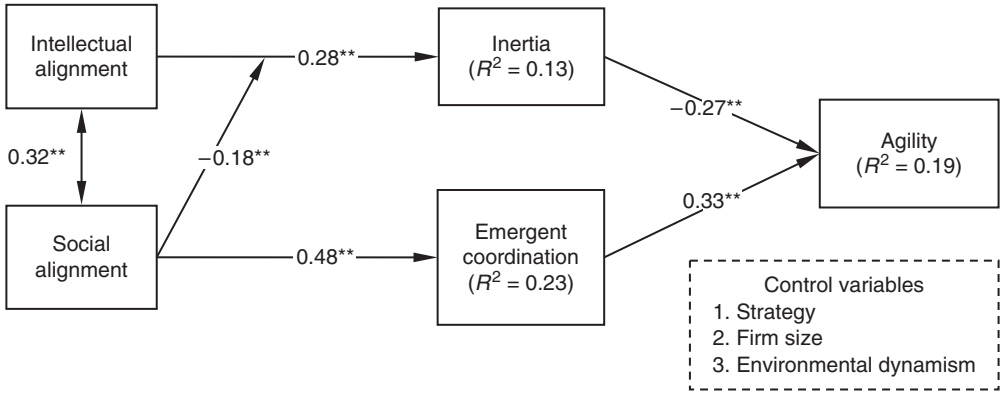
Table 4. Hierarchical Regression Results

	Model 1 (DV: *Inertia*)			Model 2 (DV: *Coordination*)		Model 3 (DV: *Agility*)	
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 1	Step 2
Control variable							
Firm size	0.021	0.027	0.041	−0.073	−0.0476	−0.011	0.021
Strategy	−0.158**	−0.114*	−0.120**	0.006	0.015	0.030	−0.005
Env. dynamism	0.028	0.020	−0.002	0.051	0.064	0.066	0.059
Independent variable							
Intellectual alignment (*IA*)		0.293**	0.304**				0.040
Social alignment (*SA*)		−0.076	−0.064		0.476**		0.041
Inertia							−0.285**
Coordination							0.301**
Interaction							
IA × *SA*			−0.173**				
R^2	0.018	0.095	0.124	0.009	0.235	0.005	0.190
ΔR^2	0.018*	0.077**	0.029**	0.009	0.226**	0.005	0.185**
$\Delta F_{df1, df2}$	$2.62_{3,425}$	$17.99_{2,423}$	$13.90_{1,422}$	$1.26_{3,425}$	$62.46_{2,423}$	$0.73_{3,425}$	$24.03_{4,421}$

*$p < 0.05$; **$p < 0.01$.

In Step 2, two independent variables, intellectual alignment and social alignment, are entered. Finally, the interaction effect between intellectual and social alignment, which is calculated as the product of mean-centered values of intellectual and social alignment (Aiken and West 1991), is included. The results show that firm strategy has a negative effect on inertia, suggesting that prospectors are less likely to develop inertia than defenders. Intellectual alignment has a positive effect on inertia, while social alignment is not significantly related to inertia. In addition, the interaction term has a negative effect on inertia, suggesting that social alignment can weaken the relationship between intellectual alignment and inertia so that the relationship is weaker when social alignment is high. Hence, H1B and H3 are supported. Model 2 takes coordination as the dependent variable and is estimated by taking two steps. In Step 1, no control variables are found to be significant. In Step 2, social alignment has a positive effect on coordination, supporting H2B. Model 3 takes agility as the dependent variable and is estimated in two steps. Step 1 assesses the three control variables, and Step 2 includes four independent variables: intellectual alignment, social alignment, inertia, and coordination. It is found that only inertia and emergent coordination have significant relationships with agility. While inertia reduces agility, emergent coordination increases agility. Therefore, both H1A and H2A are supported. To cross-validate the results, we also tested the complete model using the covariance-based structural equation modeling technique (AMOS 22). As illustrated in Figure 2, the AMOS results are highly consistent with the regression

Figure 2. Research Model Testing Results Using AMOS



Notes. In the AMOS model, we correlated intellectual and social alignment. The model with them freely correlated (χ^2 = 33.74, df = 21, GFI = 0.98, CFI = 0.96, RMSEA = 0.04) has a much better fit than the model that keeps them orthogonal (χ^2 = 81.17, df = 22, GFI = 0.96, CFI = 0.81, RMSEA = 0.08). This confirms our assumption that the two types of alignment are correlated, but still have different effects on agility. We also found that agility is positively associated with both respondents' self-reported firm performance (β = 0.443, $p < 0.01$) and objective firm performance comprising four indicators from secondary data sources: net margin, operating income to asset ratio, return on assets, and return on sales (β = 0.254, $p < 0.01$). It partially supports the validity of the agility measure. Double-arrowed paths indicate correlations.

**$p < 0.01$.

results. The high fit indexes confirm that our model fits the data well (goodness of fit index (GFI) = 0.98, comparative fit index (CFI) = 0.96, root mean square error of approximation (RMSEA) = 0.04).

Following Preacher and Hayes (2008), we tested the mediating roles of inertia and coordination based on bootstrapping (n = 1,000). The results reveal that intellectual alignment's effect on agility is completely mediated by inertia and its indirect effect through inertia is negative ($\beta = -0.084$, $p < 0.001$). However, its total effect on agility is not significant ($\beta = -0.05$, $p = 0.329$). As shown in Model 3, the direct effect of intellectual alignment is actually positive, though not significant. This positive direct effect cancels off some of the negative indirect effect and makes the total effect insignificant. By contrast, while social alignment's effect on agility is completely mediated by coordination, both its indirect effect through coordination ($\beta = 0.164$, $p < 0.001$) and total effect ($\beta = 0.219$, $p < 0.001$) are significant.

Since inertia mediates between intellectual alignment and agility and social alignment moderates the effect of intellectual alignment on inertia, there is a possible moderated mediation effect. We tested this effect using bootstrapping (Preacher and Hayes 2008). The result shows that the moderated mediation index is significant (index = 0.055, $p < 0.01$), confirming the existence of a positive moderated mediation effect. The interpretation is that as the level of social alignment increases, the negative indirect effect of intellectual alignment (via inertia) will decline.

Discussion

This study produces three key findings. First, we find IT alignment's dual effects: intellectual alignment impedes agility, while social alignment facilitates agility. Second, we empirically show that inertia mediates between the intellectual alignment–agility link and emergent coordination mediates between the social alignment–agility link. Finally, we uncover the moderating role of social alignment on the relationship between intellectual alignment and inertia; that is, social alignment can prevent intellectual alignment from creating organizational inertia. These findings have important implications for both IS research and practice.

Implications for Research

This study makes several contributions to IS research. First, we theoretically hypothesize and empirically confirm that intellectual and social alignment have opposite effects on agility. Specifically, intellectual alignment impedes agility, while social alignment improves agility; that is, IT alignment can have both positive and negative effects simultaneously, and a strong alignment between IT and business strategies does not always improve firms' agility, especially in dynamic environments. These findings break the stereotypical view of the impact of IT alignment and provide an alternative picture of the phenomenon. Although our findings differ from those of prior research (Bradley et al. 2012, Tallon and Pinsonneault 2011), we believe that they complement the literature by taking a novel perspective to unravel the alignment paradox. Our research suggests that IT alignment is a complex phenomenon, and it is difficult to draw a clear-cut conclusion regarding its impact on firm agility. It resonates with the ideology of Van de Ven (2007), who asserts that there is no absolute truth in social science research, and researchers should try to approach the truth as much as possible. Taking a paradoxical view of IT alignment, our research is in line with the recent development in management research showing that executives often embed paradoxes in strategic decision making (Smith 2014). The prerequisite for effective management of strategic paradoxes is awareness of the paradoxes. The alignment literature seems to downplay the existence of the alignment paradox, which could lead to an error of omission. By confirming the alignment paradox, this paper raises awareness of the alignment paradox and lays the groundwork for further research in this area.

Second, decomposing IT alignment into intellectual and social dimensions, we propose that IT alignment influences agility through two distinct underlying mechanisms. Although the notion of multidimensional IT alignment has been advocated, it has not received due attention from IS researchers (McLaren et al. 2011). Moreover, the underlying mechanisms through which IT alignment influences firm-level outcomes are understudied. We go one step further than Tallon and Pinsonneault (2011) by showing that intellectual and social alignment influence agility via different mechanisms. Based on organizational inertia theory and coordination theory, we integrate different research streams to come up with a coherent theoretical explanation of the alignment paradox. The theoretical integration allows us to articulate how inertia can result from intellectual alignment and how emergent coordination is enhanced by social alignment. Prior alignment research has implicitly considered that IT alignment requires coordinative efforts (Gerow et al. 2014), but it has not studied coordination as an explicit construct and its relationship with IT alignment. Social alignment has never been related to emergent coordination in the literature conceptually and empirically. In fact, prior research assumes that social alignment is only an antecedent of intellectual alignment and its influence on organizational outcomes is fully mediated by intellectual alignment (Preston and Karahanna 2009). In this research, we not only demonstrate that social alignment can influence agility by itself but also clarify how it does so by enhancing emergent coordination. On the other

hand, although inertia has been known as a possible consequence of intellectual alignment (Chen et al. 2010, Tallon and Pinsonneault 2011), it has stayed at a conceptual level and has never been empirically studied. The findings that intellectual alignment has no or negative effects were often obtained in previous studies as surprises, and therefore explained only in an ad hoc manner without systemic theoretical rationales (Palmer and Markus 2000, Sabherwal and Chan 2001, Tallon 2003). Hence, our integration of inertia and coordination into alignment research is novel and creates opportunities for theory advancement on IT alignment.

Finally, this paper corroborates the dynamic nature of IT alignment, which could explain why prior research finds that intellectual alignment facilitates agility, while we find the opposite. Ciborra (1996) believes that IT alignment is analogous to building a bridge between two drifting piers because both business and IT will be constantly changing. Researchers increasingly view IT alignment as a dynamic, nondeterministic process that evolves over time (Chan and Reich 2007, Wang et al. 2011). Sustainable IT alignment cannot be achieved unless an organization and its IS coevolve to maintain a mutual fit. Under this logic, any existing formal alignment between a given business strategy and a given IT strategy (i.e., intellectual alignment) can keep its viability only temporarily. When environmental change calls for a new business strategy, the balance will be broken, leading to misalignment. To reach a new state of alignment, the IT strategy needs to be adjusted to match the new business strategy. However, the previous alignment is likely to cause inertia that hinders the new alignment's shaping. Consequently, the firm's agility will be reduced. The insight offered by this paper is that IT alignment cannot be completely dynamic without any costs. This is consistent with the literature that recognizes the difficulty of achieving dynamic IT alignment (Vessey and Ward 2013). Although the dynamic nature of IT alignment draws much attention, the literature is mute on why IT alignment cannot freely switch from one state to another. We contend that whenever intellectual alignment is established, formal organizational arrangements are set up to support it, and when this state of intellectual alignment becomes obsolete and a new state of IT alignment is needed, the former organizational arrangements will become a liability and cause inertia.

Following this line of thinking, we do not deny that intellectual alignment can increase firm performance when its external fit is high. We find a negative effect on agility possibly because the shipbuilding industry was experiencing abrupt market changes at the time of this study. Before these changes, the shipbuilding market had been relatively stable for a long time. Because of the change, the positive effect of the previous intellectual alignment disappeared and its inertial effect surfaced. The tighter the previous intellectual alignment, the stronger the inertia. Our research suggests that the effect of intellectual alignment is sensitive to the timing of disruptive environmental change. In the period during which the fit between the business strategy and the environment is high, intellectual alignment exhibits positive effects, whereas in the disruption period during which the fit is lost, intellectual alignment may have no, or even negative, effects. Hence, combining the dynamic view of IT alignment and environmental dynamism, it seems there are boundaries confining the positive effects of intellectual alignment. The literature mostly finds positive effects of intellectual alignment probably because the sampled firms' business strategies are in fit with the environment so that the aligned IT organization can help them achieve better performance. If the firms' business strategies lose external fit because of sudden environmental change, the tightly aligned IT organization still supports the old business strategy and can make it harder for the firms to make strategic adjustments. This boundary condition offers a reasonable explanation for the alignment paradox. Yet, it needs to be further validated in future research. Particular attention should be paid to market transition periods when major changes are occurring and companies are adjusting strategies to stay competitive.

Implications for Practice

For management and IT practitioners concerned with IT alignment and agility, our study offers several insights. First, the different mechanisms of IT alignment impacting on agility suggest that firms should carefully implement IT alignment to achieve value creation. Firms, especially those in dynamic environments, should heed strong intellectual alignment that overly emphasizes formal alignment between business and IT strategies, because its associated organizational arrangements such as resource allocation, structures, and routines could contribute to inertia that impedes agility and firm performance. One way to counter the negative effect of intellectual alignment is to foster social alignment that is informal, flexible, and does not put structural restrictions on the organization. Social alignment increases real-time information exchange, informal communication, and personal interaction between business and IT executives and enhances their common understanding regarding how business and IT should align. With a high level of social alignment, business and IT executives are more likely to coordinate with each other to solve unpredictable problems at the top level and also empower their subordinates to engage in cross-functional coordination. Our finding that social alignment can weaken the effect of intellectual alignment on inertia suggests that strategic flexibility (Zhou and Wu 2010) can be increased by social alignment so that firms can deviate from their institutionalized processes and adjust resource allocation to explore new alternatives.

Moreover, firms should foster informal mechanisms to enable CIOs and other executives to coordinate with each other. This is in line with our finding that emergent coordination fully mediates between social alignment and agility. Firms must understand that shared understanding alone cannot lead to agility unless effective coordination occurs. It is imperative to build appropriate communication channels and structural systems of knowing for business and IT executives to freely exchange information and opinions related to the external changes as well as what the firm can do to cope with these changes. Agility is achieved in the process of timely sensing and responding to external changes, and emergent coordination between business and IT executives is essential to streamlining this process.

Although we find that intellectual alignment leads to inertia, it is possibly due to our research context. As discussed earlier, intellectual alignment's effect could vary temporally: it is negative when it is based on the outdated business strategy facing environmental change, and positive when it is based on the updated business strategy that fits the current environment. Therefore, we recommend firms value both intellectual and social alignment and find a balance between the two so that the benefits of aligned business and IT strategies are reaped without loss of agility. It is desirable to adopt a dynamic strategic decision-making approach (Smith 2014) that accepts the existence of paradoxes. "Consistently inconsistent" decisions can be made to determine when to emphasize predefined formal strategic plans and when to emphasize emergent informal coordination based on specific strategic domains and evolving requirements.

Limitations and Future Research Directions

While we strived to increase the rigor of this study, limitations are inevitable. First, we collected data in the Chinese shipbuilding industry. The sample from a single industry in a specific country, despite its advantage in eliminating industry confounds, will possibly limit the generalizability of our findings (Sharp et al. 2013). The shipbuilding industry might have unique characteristics, and Chinese executives' decision making might be influenced by cultural values and institutional pressures (Liang et al. 2007). Although it is beyond the scope of this study to examine these specific influences, future research should test our research model in other contexts with these considerations.

Second, attaining IT alignment and realizing agility are typical organizational goals with associated ongoing processes (Sambamurthy et al. 2003, Tallon and Pinsonneault 2011). The cross-sectional research design in the current study is limited in addressing process-oriented issues or causal relationships. Even though causal relationships between the constructs in our research model can be inferred based on theory, a longitudinal design would be desirable to empirically reveal the causal dynamics between IT alignment and agility in the future.

Third, social alignment could lead to cognitive inertia, because when business and IT executives have highly similar cognitive frames, groupthink can take place, and innovative thoughts will be stifled (Tallon and Pinsonneault 2011). We did not include this effect in our research model because there is a counterargument that social alignment could reduce inertia. The professional expertise, knowledge, and experience possessed by business and IT executives are fundamentally different (Harrison and Klein 2007), and such diversity facilitates innovative decision making and problem solving (Dahlin et al. 2005). Our statistical analysis shows that the relationship between social alignment and inertia is not significant. Future research can be conducted to look into this issue further.

Finally, the variance of inertia explained by our model is a bit low (12.4%), suggesting that there are other factors influencing inertia. For example, the duration of a firm's established intellectual alignment might be a significant antecedent, because inertia takes time to develop. It will be interesting for future research to construct a more comprehensive model to examine how inertia is shaped under intellectual alignment.

Conclusions

In this paper, we unravel the alignment paradox by clarifying how intellectual alignment impedes and social alignment facilitates agility through distinct mechanisms. Through the lens of inertia and emergent coordination, we offer unprecedented insights to deepen the current knowledge of IT alignment. Our findings challenge the stereotypical view that IT alignment always has positive effects and create a new direction to advance theory development of IT alignment. Future research in this direction will revolutionize our understanding of IT alignment and generate significant ramifications for IT strategy research and practice.

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Endnote

[1] These firms include not only shipyards, which manufacture whole ships but also a large number of supporting firms that focus on manufacturing ship-related products such as coatings, power equipment, outfitting, interior outfitting, communication and navigation devices, deck machinery, electrical appliances, ironware, valves and fittings, and research and design.

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