IOS Resources, Electronic Cooperation and Performance: A Conceptual Model

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Abstract
In today’s rapidly changing and highly competitive operating contexts, businesses are increasingly seeking cooperative, long-term inter-organizational relationships. Inter-organizational systems (IOS) are major enablers of inter-organizational cooperation. Drawing upon transaction costs economics theory and resource-based view as the theoretical frames, this study presents electronic cooperation value model, suggesting electronic cooperation as an intermediary/mediator between IOS resources and competitive advantage. In this study, technological and human IOS resources are investigated as predictors of electronic cooperation. Examined are four key dimensions of electronic cooperation including information sharing, action simplicity, joint action, and continuity. Electronic cooperation value model would be useful to both research and practice since the model explains how and why IOS resources contribute to electronic cooperation, which in turn, leads to competitive advantage.

1. Introduction

Inter-organizational relationship (IOR) has been a topic of key interest in supply chain management research stream in the past decades. Inherently, IOR requires a minimum level of cooperation [67]. Previous research has identified several predictors (e.g. asset specificity, environmental uncertainty, trust, power, dependence, reciprocal investment, etc.) of inter-organizational cooperative relationship [1, 8, 9, 26, 35, 68, 71, 77]. The use of inter-organizational systems (IOS) is one reflection of inter-organizational cooperation [9]. Tightly coupled long-term inter-organizational relationship enabled by IOS is called as electronic cooperation [c.f. 61, 76]. Although inter-organizational cooperation has existed and has been examined in various disciplines long before introduction of IOS, IOS makes possible richer, faster, and more tightly coupled cooperative relationships [37]. Furthermore, firms may continue to engage in cooperation regardless of the type of IOS that they use to interconnect [65, 73].

Transaction cost economics (TCE) and resource based view (RBV) are the two most widely used theories in explaining inter-organizational cooperation. TCE suggests that firms make efforts to economize on transaction cost by adopting various forms of hybrid arrangement that are between the two extremes of markets and hierarchies [75]. In this paradigm, electronic cooperation lies between the continuum of electronic markets and electronic hierarchies [18]. In RBV, firms can cooperate to maximize value by utilizing important resources that are valuable, rare, inimitable, and non-/imperfectly-substitutable—VRIN [6]. IOS-enabled cooperative relationship itself (e.g. Wal-Mart and its suppliers; Dell and its suppliers) can be viewed to be a key (VRIN) resource and, thus, a source of sustained competitive advantage.

Although IOS use, regardless of IOS types, facilitates electronic cooperation, a theoretical lacuna exists in considering such cooperation as a resource of sustainable competitive advantage. For instance, when a buyer and suppliers have cooperative relationship using IOS, other competing firms also can imitate such relationship using IOS. Contemporary IOS may even become standardized due to standard format and standard data (e.g., XML supported), implying that cooperation itself cannot be viewed as a rare, inimitable resource. To address the theoretical lacuna, our study examines IOS resources-enabled cooperation rather than IOS usage-enabled cooperation.

Cooperation is a multidimensional construct. Previous researchers have examined cooperative relationship with regard to information sharing [42, 54, 58], contract duration [39], joint decision making [68], joint action [9, 78], reciprocity/acquiescence/simplicity [43, 44], continuity [9, 35], and commitment [1]. While some scholars have studied multiple dimensions of IOR and supply chain integration [14, 35, 43, 44, 58], little research on multiple dimensions of electronic cooperation has been conducted in IOS research. In general, IOS research has focused on how IOS
influences cooperation or how cooperation improves firm performance and not much on various aspects of electronic cooperation.

Given the importance of electronic cooperation to contemporary business context and inadequate previous research on electronic cooperation enabled by IOS resources, the focus of this study is to address the following research questions:

RQ1: What are some of the key dimensions of electronic cooperation?

RQ2: What aspects of IOS resources influence electronic cooperation?

RQ3: How can IOS and electronic cooperation enable competitive advantage?

In trying to address the above research questions, the study draws upon TCE and RBV theoretical frames to: 1) identify four relevant dimensions of electronic cooperation, and 2) posit the relationship among IOS resources, electronic cooperation, and competitive advantage. The remainder of this study is organized as follows. In the next section, we briefly discuss the theoretical backgrounds (TCE and RBV) of this study. The electronic cooperation value model and propositions are presented in section 3. The study concludes with implications for research and practice, future research, and limitations.

2. Theoretical background

2.1. Transaction cost economics (TCE)

Williamson [75], a pioneer in TCE, suggested two extreme forms of organizational governance: market (multiple suppliers) and hierarchy (a few suppliers and in the extreme case, completely vertically integrated where everything is done within the firm). In general, TCE regards inter-organizational cooperation as reflecting a move from arm’s length, market based exchanges toward closer, long-term cooperative nonmarket governance [37, 75]. Based on TCE, Malone et al. [46] conceptualized electronic market and electronic hierarchy, suggesting that IOS would lead firms to electronic market because they can significantly reduce transaction costs. Gurbaxani and Whang [30] qualified and extended the view of electronic market by suggesting that both markets and hierarchies are possible effects of IT. However, Clemons et al. [18] argued that IOS would most likely enforce a “Move to the Middle” from both markets and hierarchies. In an empirical study, Holland and Locket [37] demonstrated a continuum of governance structures ranging from extreme form of hierarchies to extreme form of markets.

Williamson [75] identified three types of asset specificity: 1) site specificity, 2) physical asset specificity, and 3) human asset specificity, suggesting that asset specificity determines governance structure such as hybrid forms (e.g., joint ventures, alliances, and partnerships) and associated levels of inter-organizational cooperation. In addition, Choudhury and Sampier [16] proposed information specificity (knowledge and time) to parallel the idea of asset specificity.

In this study, technological IOS resources and human IOS resources that we consider later are consistent, respectively, with physical asset specificity and human asset specificity. Prior research has raised the importance of contextual aspects (site specificity) as a determinant of inter-organizational relationships. However, this contextual aspect is not included in the electronic cooperation value model because this study emphasizes electronic, not general inter-organizational, cooperation, for which site specificity is irrelevant. In addition, electronic cooperation is IOS-enabled tightly coupled long-term relationship, and thus this study focuses more on the resource aspects of IOS by identifying technological and human IOS resources.

2.2. Resource based view of the firm (RBV)

Firms want to maximize value by utilizing essential resources. In RBV, the source of sustained competitive advantage are resources that are valuable, rare, difficult to imitate, and difficult to substitute—VRIN [6, 55, 74]. Some studies argue that access to other firms’ resources is a major reason for several types of cooperation such as joint venture, joint R&D, and alliance [20, 27, 70]. In fact, resource complementarity is a key factor while pursuing alliance and partnership [22]. According to Glaister and Buckley [27], access to complementary resources is the main reason for cooperation and triggers the motivation to cooperate with partners. Teece [70] argued that access to external complementary resources is important for a firm to generate successful innovation. Therefore, firms cooperate to utilize other firms’ resources and to retain and to develop one’s own resources by incorporating them with others’ resources [20].

Cooperation is also regarded as an attempt to augment resource utilization and value via higher level of explicit coordination of economic activities, and/or integration of operation [18]. In the same vein, inter-organizational cooperation facilitates coordination, even fosters collaboration, and provides competitive advantage [67].

The resources could include production techniques, product designs, brand equity, decision making technique, complex network, IT infrastructure, human resources, among others [48, 63]. Moreover, inter-organizational relationship, electronically mediated or not, can be a source of competitive advantage [22].
3. Conceptual model

Many IS researchers agree that firms derive benefits and superior performance from IT via its impact on intermediate business process [49, 52, 58, 60]. For example, Melville et al. [49] proposed an IT business value model that includes IT and Organizational Resources - Business Processes - Business Process Performance - Organizational Performance. This can be applied to an IOS context as well [49, 58]. Rai et al. [58] empirically tested the framework of IT Integration Capability - Process Integration Capability - Performance. Consistent with previous studies, our conceptual model is presented in Figure 1.

4. Constructs

In this section, we examine each construct related to IOS resources, electronic cooperation, and competitive advantage. The definitions of the study constructs and relevant literature are summarized in Table 1.

<table>
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<th>Table 1. Study Constructs and their Definitions</th>
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<td>Constructs</td>
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<td>IOS Resources</td>
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<td>Technological IOS Resources: Comprise the IOS infrastructure and I-O business application</td>
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<td>IOS Infrastructure:</td>
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<td>Shared technology and technology services between firms</td>
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<td>I-O Business Application:</td>
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<td>Applications which utilize the IOS infrastructure</td>
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| Human IOS Resources: Refer to the various technical and managerial skills |
| Technical Skills: | The ability to design, develop, or outsource and use effective information systems such as programming, systems integration, and database development. |
| Managerial Skills: | The ability to provide leadership for the IS function, manage IT project, evaluate technology options, manage change, and envision creative and feasible technical solutions to business problems |
| Electronic Cooperation |
| Information Sharing: | The extent to which strategic and tactical information/knowledge is shared between firms and in as close-to-real-time as possible through IOS |
| Action Simplicity: | The extent to which firms adopt IOS dominant business activities with partners |
| Joint Action: | The degree to which focal activities between firms are carried out jointly through IOS |
| Continuity: | The expectation/realization of repeated relationship using IOS |

| Competitive Advantage |
| Effectiveness: | The degree to which firms achieve desired goals and resolve targeted problems with partners |
| Efficiency: | The degree to which firms do business in an economical way with partners |

4.1. IOS resources

Melville et al. [49] proposed an IT business value model and suggested two key IT resources: technological IT resources (infrastructure and business applications) and human IT resources (technical skills and managerial skills). Similarly, Piccoli and Ives [56] highlighted IT resources barrier: IT assets (IT infrastructure and information repositories) and IT capabilities (technical skills, IT management skills, and relationship asset). Based on these two recent studies, this study introduces technological IOS resources (TIR) and human IOS (HIR) resources as predictors of electronic cooperation.

4.1.1. Technological IOS resources (TIR). TIR are comprised of the IOS infrastructure and inter-organizational (I-O) business applications [49]. IOS Infrastructure is the shared technology and technology services between firms; and I-O business applications utilize this infrastructure [12]. In other words, IOS infrastructure provides the base for the delivery of I-O business applications and services [12]. TIR varies in reach (the extent of the connectivity between firms), and range (the scope of services which it can support).
As reach and range increase, the resources enabled by IOS infrastructure and the capabilities to support a broad range of strategic initiative increase [13].

4.1.2. Human IOS resources (HIR). Organizational human resources generally encompass training, experience, knowledge, expertise, relationships, and other less tangible aspects [6, 29]. Human IOS resources denote technical and managerial knowledge/skills [10, 49, 56]. Technical skills are defined as the ability to design and develop or outsource and use effective information systems [56]. They include experience with application development, database development, system integration, maintenance of existing system, knowledge of programming languages, and an understanding of communication protocols and products [48, 49]. These skills could also involve effective and efficient management and use of various IT applications/services. Furthermore, technical skills make it possible for firms to effectively manage the various technical risks related to investing in IT [48]. Managerial skills refer to “the ability to provide leadership for the IS function, manage IT project, evaluate technology options, manage change, and envision creative and feasible technical solutions to business problems” [56, p.756]. Managerial skills include project planning and collaboration with business units and external organizations (outsourcing) as well [49]. Managerial skills, unlike technical skills, are often developed over longer periods of time through the accumulation of experience and learning via trial and error [40]. Managerial IT skills are expected to notably reduce the costs and lead time related to IT development [10].

4.2. Electronic cooperation

As noted earlier, electronic cooperation is a multidimensional construct. This study examines four dimensions of electronic cooperation: information sharing, action simplicity, joint action, and continuity. In the next section, we examine these dimensions.

4.2.1. Information sharing. A firm prefers to have a tightly coupled relationship with its partner to facilitate easy information sharing [57]. Prior studies have examined information exchange [14], communication [2, 3], information flow [54, 58], knowledge flow [15], knowledge sharing [22], and strategic information sharing [42]. This study defines information sharing as the extent to which strategic and tactical information/knowledge is shared between firms and in as close-to-real-time as possible through IOS. Quality of information generally includes several aspects such as accuracy, diversity, timeliness, relevance, frequency, and proprietary nature. IOS enables firms to share higher quality of information in almost real time. Information sharing implies firms’ expectation of open sharing of information [14]. Shared information could be operational, tactical, and strategic in nature (e.g. delivery schedule, original cost of components, CAD design, production plan, marketing and advertising, strategies and plans, new product features and designs, etc) as well as basic data interchanges (e.g. order and inventory data), which are currently facilitated by information technology. With greater, continuous, and real-time information sharing using IOS, firms can predict and analyze their partners’ intentions and future actions. Frequent and intensive information sharing enabled by IOS suggests further trustful behavior [2]. This can be exemplified that firms allow partners to access their database or send new product designs via IOS. More open information sharing suggests firms’ intention to share important, proprietary information in a timely fashion [14] and thus not only reduce costs and cycle time but enable firms to anticipate and respond flexibly to changes in their operating contexts.

4.2.2. Action simplicity. Action simplicity refers to the extent to which firms adopt IOS dominant business activities with partners. Action simplicity implies firms’ tendency to focus on carrying out a narrow range of action types, as opposed to a broad range of action types [51]. These scholars argued that action simplicity is manifested in three related aspects of competitive repertoires: (1) range – the total number of types of actions taken between firms, (2) concentration – the degree to which repertoires tend to be focused on a few key types of actions, and (3) dominance – the extent to which firms depend on their single most common type of action (p.420). Action simplicity in electronic cooperation leads to a small range of actions and center on a few types of specialized actions, enabled by IOS [25, 51]. For example, buyer-suppliers can select various types of transaction tools/media such as IOS, telephone, fax, face-to-face request, traditional mail, and others. Action simplicity enables firm to focus on using IOS and to reduce other types of transaction tools/media. Furthermore, IOS can reduce unnecessary actions between firms and using IOS becomes a type of business routine. Firms want to develop unique, hard-to-copy relationships and thus focus their attention and efforts for competitive advantages [6, 31]. Within RBV, we would posit that action simplicity permits firms to concentrate on what they do best, they are economical, and they sharpen organizational skills and develop distinctive competencies [6]. Firms will also find it easy to communicate and solve problems when they face some problems in a similar way and often reach similar solutions [43]. Thus, electronic cooperation would
motivate firms to focus on a smaller set of specialized action repertoires that could be best handled via their IOS.

4.2.3. Joint action. Joint action is most frequently cited as a proxy of cooperation. Previous studies examined joint action [9, 77, 78], joint effort [2], joint decision making [68], and negotiation and conflict resolution [53]. This study defines joint action as the degree to which focal activities between firms are carried out jointly through IOS [9]. Heide and John [35] stated that joint action is “the interpenetration of organizational boundaries” (p.25). In addition, Baker and O’Brien [4] noted that the extent of I-O cooperation is a function of its boundary permeability. IOS enables firms to extend and interpenetrate their boundaries by conducting various activities together. The areas of joint action vary as in long range planning, product planning, product engineering, process engineering, technical assistance, training, joint marketing campaigns, and others [9, 63]; and these activities could be supported among other through video conferencing, CAD-to-CAD links, and other technological platform.

4.2.4. Continuity. Cooperation itself implies a long-term perspective and relationship. In examining inter-organizational relationship, researchers have investigated continuity [1, 9, 33, 35] and contract duration [39]. Continuity in electronic cooperation refers to the expectation and realization of repeated relationships via the use of IOS [33]. Cooperative relationships tend to be continuous or open-ended while traditional arm’s length relationships are based on short-term transactions [36]. According to Stern and Reve [67], buyer-supplier relationships ordered by long-term contracts reflect basic cooperation.

4.3. Competitive advantage

Rooted in the logic of value creation and distribution, competitive advantage would occur when the value that is generated in an economic exchange in which the firm participates is greater than the value that could be created were the firm not to partake in the exchange [11, 56]. Mata et al. [48] noted that sustained competitive advantage accrues when competitors “face significant challenges in acquiring, developing, and using a resource or capability” (p.495).

As pointed out in past research firms excel in specific initiatives and/or business processes while they are sometimes at a disadvantage in others; thus, aggregate outcome variables are not well suited for analysis [60]. The example of Wyndham International is illustrative. It had been very innovative with its customer relationship management initiative—Wyndham ByRequest— and had enjoyed positive results (e.g., brand recognition, customer loyalty). Yet, because of its legacy debt position, the firm remained in deep financial trouble (a measure of enterprise level competitive advantage) and had recently been forced to restructure. Thus, a research focus on the immediate outcomes of IT-dependent strategic initiatives as the unit of analysis, such as the one proposed in our study, helps mitigate these difficulties [56].

Much prior literature was interested in profit related performance [e.g. 7, 42, 52, 58, 69, 73], referring to firm’s superior performance relative to its competitors. Electronic cooperation is conceptualized at an inter-organizational level between the focal firm and its selective set of suppliers and, thus, its impact is best evaluated at this level rather than as competitive advantage that is usually at an entire enterprise level. Also, given that a firm may have numerous suppliers and may choose to have close electronic cooperation with and operate only with a selective subset, but not all, of these suppliers on a long-term, partnership basis it would be inappropriate to evaluate performance at an entire firm level. Therefore, although we use the label competitive advantage in our research model the effects are best evaluated at a more immediate inter-organizational and not at the enterprise level. Thus, this study examines performance as a proxy of competitive advantage.

Typical profit-related performance can be broadly visualized as effectiveness- and efficiency-oriented. Thus, this study examines these two aspects of performance: effectiveness (e.g., flexibility/agility/ responsiveness, quality of resources exchanged, and operational excellence) and efficiency (e.g., cost and time advantage, revenue growth) as impacts of electronic cooperation.

Effectiveness refers to the degree to which firms achieve desired goals and resolve targeted problems with partners. Effectiveness aspects such as quality of resources exchanged and the flexibility to adapt and quickly respond to meet unanticipated changes in the operating context are often even more important in today’s dynamic environments [62]. In addition, operational excellence refers to “the degree to which a firm is better than its competitors in its responsiveness and generation of productivity improvement” [58, p.229].

Efficiency refers to the degree to which firms do business in an economical way with partners. The typical example of efficiency is “good input to output ratio”. Prior scholars have examined efficiency in terms of cost advantage and time benefits. Cost advantage is defined as the extent to which the focal firm’s cost performance is reduced relative to that of its competitors [73]. Cycle time reduction reflects such aspects as elimination of wait-time, make-span time,
time-to-market, and could be measured with six indicators drawn from Hult et al. [38]. Revenue growth reflects the degree to which the focal firm’s improvement in revenue from current and future products and markets is more than its competitors [58] arising from its electronic cooperation with its partners/suppliers.

5. Propositions

5.1. IOS resources and electronic cooperation

The first proposition deals with the relationship between IOS resources and electronic cooperation.

First, it should be noted that technological IOS resources (TIR) is a distinct construct from electronic cooperation. Although electronic cooperation partly implies IOS usage, IOS usage does not necessarily mean electronic cooperation if the usage is mandated and if it relates to basic transactional information. Prior scholars have assessed IOS usage by using scope of use [8, 9], intensity of use [8], and volume and diversity [34]. In particular, Bensaou [9] examined EDI use and cooperation as distinct constructs. Electronic cooperation proposed here is more close to strategic in type and quality information beyond transactional information. TIR provides diversified applications and infrastructure for strategic and tactical information access (e.g. accessing cost structure data of partnering firms), and electronic cooperation implies sharing such information. Therefore, we propose that TIR is a determinant of electronic cooperation.

TIR can be shared across firm boundaries and enable better electronic cooperation. In particular, IOS infrastructure and I-O business applications can increase interconnectivity and information processing capabilities. In other words, information sharing is facilitated by TIR (e.g., EDI, Open EDI, Web-based, e-Hubs, etc). For instance, EDI provides a channel for large volume and a variety of structured information sharing between firms [47].

As TIR provides the digital platform to share information, firms will more actively share their information if they seek/maintain a cooperative relationship [54]. In addition, for example, EDI promotes long-term relationship among firms due to time to recoup investment, learning curve effect, and incentives [18]. TIR involves significant investments in terms of hardware, software, network, and training for utilizing technologies. More extensive TIR supports various functions which make possible intensive information sharing and joint action. Business application (e.g. a variety of data types and business transaction format) will help firms share a diverse set of information (beyond mere transactional information that is almost a by-product of using the IOS).

Bensaou [9] noted that EDI applications provide greater information capability. In addition, Ramamurthy and Premkumar [59] argued that IOS increases standardization between firms. Transactional application could become more standardized allowing firms to pursue action simplicity. Therefore, overall, TIR would positively influence electronic cooperation relating to information sharing, action simplicity, joint action, and continuity.

Human IOS resources (HIR) also facilitate electronic cooperation. Some firms are in a better position than their competitors when using and managing certain technologies because HIR enable firms to plan and utilize IT more effectively than their competitors [10, 21, 48, 72]. Managerial skills play an important role in linking different firms to generate IOS based competitive advantages via strategic alliances [48].

A high level of HIR translates into “knowledge of who knows what, who can help with what problem, or who can exploit new information” [23, p.275]. Additionally, focal firms can provide partners with technology education services. For example, a buyer company can train its suppliers on IOS related skills and integrate business processes for effective IOS use. Such an investment would generate more tightly coupled IOR through IOS.

Based on the foregoing, we have the following propositions related to IOS resources and electronic cooperation:

P1: IOS resources influence electronic cooperation.
P1a: IOS resources increase information sharing.
P1b: IOS resources increase action simplicity.
P1c: IOS resources increase joint action.
P1d: IOS resources increase continuity.

5.2. Electronic cooperation and competitive advantage

The second proposition suggests that greater electronic cooperation would enhance I-O performance.

Prior scholars have found that more open information sharing leads to jointly optimal outcome [19], improves product quality [24], and facilitates new product development [45], which in turn helps firms increase their revenue. Moreover, accurate and timely information sharing reduces inventory costs, enhances capital and cash flow utilization, and improves cycle times [38, 58].

Action simplicity facilitated by IOS between firms can help streamline/improve procurement and operations/production process. The improvement can
lead to better performance such as improved quality, reduced production cost, and reduced cycle time [64]. When particular actions have proved to be valuable, firms focus on those actions, which in turn reduce the resource requirement [44]. Also, when firms specialize in specific actions based on their expertise and capability, their behaviors are likely to be more predictable to their partners [44]. This prediction capability would be helpful to reduce cost, enhance responsiveness, and improve mutual benefits.

Heide and John [35] argued that joint activities enhance the degree of participative management of all firms in the inter-organizational relationship. In RBV, joint activities allow firms to improve resource utilization and maximize performance. According to Anderson and Narus [2], joint effort leads to higher performances that exceed what a firm can achieve if it acted solely in its own best interests. Effective joint action (e.g., coordination in design and manufacturing) can improve quality [17].

When buyer and supplier engineers jointly develop relation-specific knowledge and have extensive experience working together, they are less likely to misinterpret information [17] and may, thus, be more flexible and responsive. Moreover, Zaheer et al. [78] found that higher level of joint action increases performance regarding competitive pricing, timeliness of delivery, and high quality supply. In the same vein, joint activities reduce costs of production, transportation, warehousing, and logistics, and collapse cycle time [28].

Finally, high level of continuity is also expected to guarantee transaction volumes, repeat business, reduce uncertainty, and make greater sharing of firm’s resources [9]. As firms intend to engage in and sustain a long-term relationship, they develop dedicated linkages that improve the performance from engaging in cooperation [22] and better hone in the ability to predict each other’s needs. Therefore, continuity would reduce cost, time, and improve quality of the exchanged resources, and flexibility/responsiveness. Based on the above arguments, we posit that:

P2: Electronic cooperation influences competitive advantage.
P2a: Electronic cooperation increases effectiveness-related performance.
P2b: Electronic cooperation increases efficiency-related performance.

6. Conclusion

6.1. Implications for research and practice

As evident this is a conceptual study, yet, it has a number of contributions for both research and practice. For the researchers’ perspective, this study identified four key dimensions of electronic cooperation. Although these dimensions have existed, they have been examined separately in prior literature. We combined them and considered them as an integrated set focusing specifically on the context of electronic cooperation enabled by IOS technology and resources.

Although information sharing, joint action, and continuity have been quite widely studied, action simplicity has hardly been examined in IS literature. In a cooperative relationship, action simplicity reflects specialized actions proven to be useful, enables partners’ action to be more predictable, and facilitates effective and consistent interaction [44, 50]. As Miller [50] suggested “organizational information systems reinforce the uniformity of perceptions and the complacency that feed cultural and strategic simplicity” (p.126), IOS can facilitate inter-organizational actions to be made simple. Relying on the importance of the effect of IT on action simplicity, this study introduced action simplicity in electronic cooperation. Researchers can examine action simplicity with respect to the level of technological and human IOS resources to assess the degree of electronic cooperation.

This study proposed IOS resources as a predictor of electronic cooperation. While IOS usage-based cooperation has been widely examined in the prior literature, this study attempted to examine the relationship between IOS resources and electronic cooperation rooted in resource based view. Moreover, this study implies that electronic cooperation itself can be viewed as sustainable competitive advantage which other parties cannot easily imitate as well as a factor which influences competitive performance.

From practitioners’ perspective, this study provides some guidelines for managers. Growth in electronic cooperation is likely to be facilitated by firms with a stated purpose to obtain competitive advantage through improved productivity, reduced costs, increased revenue, and enhanced product quality [61]. In addition, firms’ competitive advantage increasingly depends on how they manage their relationship with partners. Long-term cooperative relationships with partners usually cannot be legally enforced and hence needs to be appropriately managed to avoid unexpected disengagement by partners [32]. The research model proposed in this study facilitates the idea that gaining competitive advantage requires managers to actively manage IOS resources and their cooperative interactions with partners.

In particular, IT managers should pay special attention to both technological and human IOS resources to facilitate electronic cooperation with
partners. As Banker et al. [5] indicate firms should be aware of IT impacts when they plan to invest and develop IT. In particular, when inter-organizational business applications are developed by a focal firm, the firm should consider partners’ needs for more intensive interaction. Moreover, having relationship with partners possessing highly specialized and diversified IOS resources would be helpful for long-term cooperation.

This study implies that no more would transaction based basic information sharing and traditional short-term relationship guarantee competitive advantage. Managers need to share strategic and tactical information such as new technology development, product design, marketing strategy/plans, and quality information beyond transaction data for long-term relationship and competitiveness [42].

6.2. Future research and limitation

At this stage, as noted, this paper is conceptual. Assuming that the proposed research model is empirically validated, this study has much potential for future research.

Although the research model proposed is quite complex the four dimensions of electronic cooperation have been treated to be independent of each other, which may not be true. This was done for illustrative simplicity. For instance, it is possible that there could be both a conceptual and empirical relationship between information sharing and action simplicity and between joint action and continuity. Bensaou [9] called for future research on whether joint action can be used “to reduce uncertainty and better understand the dynamic process leading to a partnership climate” (p.121). Thus, it can be suggested that firms actively carry out joint actions to reduce environmental and technological uncertainty and support as well as sustain long-term relationships. Possible recursive relationship could be argued for and identified. We plan to include these sophisticated refinements in actual test of the model.

Second, beyond testing the validity of the model, longitudinal study should be considered. This study is restricted to one time period from IOS resources to electronic cooperation to competitive advantage. How electronic cooperation and performance reinforce firms’ new and continued investment of IOS resources could be examined in the longitudinal study.

Finally, based on extant literature and from the perspective of parsimony, this study considered four dimensions of electronic cooperation; there could be a few other dimensions of electronic cooperation. Previous researchers have examined various dimensions of inter-organizational cooperation, but this study focused on IOS resource-enabled electronic cooperation. We leave this as limitation and suggest future researchers be open to identify other relevant dimensions of electronic cooperation.

6.3. Concluding remarks

Rooted in two key theoretical frames, this study identified four dimensions of electronic cooperation and proposed how electronic cooperation could develop and evolve over time. We are hopeful this study spurs other researchers to evaluate and extend this research and contribute significantly to research and practice.

7. References


