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Smart business networks: Concepts and empirical evidence

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1. Introduction

Organizations are moving, or must move, from today's relatively stable and slow-moving business networks to an open digital platform where business is conducted across a rapidly-formed network with anyone, anywhere, anytime despite different business processes and computer systems. Table 1 provides an overview of the characteristics of the traditional and new business network approaches [2]. The disadvantages and associated costs of the more traditional approaches are caused by the inability to provide relative complex, bundled, and fast delivered products and services. The potential of the new business network approach is to create these types of products and services with the help of combining business network insights with telecommunication capabilities.

The "business" is no longer a self-contained organization working together with closely coupled partners. It is a participant in a number of networks where it may lead or act together with others. The "network" takes additional layers of meaning — from the ICT infrastructures to the interactions between businesses and individuals. Rather than viewing the business as a sequential chain of events (a value chain), actors in a smart business network seek linkages that are novel and different creating remarkable, "better than usual" results. "Smart" has a connotation with fashionable and distinguished and also with short-lived: what is smart today will be considered common tomorrow. "Smart" is therefore a relative rather than an absolute term. Smartness means that the network of co-operating businesses can create "better" results than other, less smart, business networks or other forms of business arrangement. To be "smart in business" is to be smarter than the competitors just as an athlete who is considered fast means is faster than the others.

The pivotal question of smart business networks concerns the relationship between the strategy and structure of the business network on one hand and the underlying infrastructure on the other. As new technologies, such as RFID, allow networks of organizations almost complete insight into where its people, materials, suppliers and customers are at any point in time, it is able to organize differently. But if all other players in the network space have that same insight, the result of the interactions may not be competitive. Therefore it is necessary to develop a profound understanding about the functioning of these types of business networks and its impact on networked decision making and decision support systems.

The key characteristics of a smart business network are that it has the ability to "rapidly pick, plug, and play" to configure rapidly to meet a specific objective, for example, to react to a customer order or an unexpected situation (for example dealing with emergencies) [4]. One might regard a smart business network as an expectant web of participants ready to jump into action (pick) and combine rapidly (plug) to meet the requirements of a specific situation (play). On completion they are dispersed to "rest" while, perhaps, being active in other business networks or more traditional supply chains. This combination of "pick, plug, play and disperse" means that the fundamental organizing capabilities for a smart business network are: (1) the ability for quick connect and disconnect with an actor; (2) the selection and execution of business processes across the network; and (3) establishing the decision rules and the embedded logic within the business network.

2. Summary of the four papers

We have organized in June 2006 the second SBNi Discovery Session that attracted both academics and executives to analyze and discover the smartness of business networks [1]. We received 32 submissions and four papers were chosen as the best papers that are suitable for this special issue. The four papers put forward new insights about the *concept* of smart business networks and also provide *empirical evidence* about the functioning and outcome of these business networks and its potential impact on *networked decision making* and *decision support systems*.

The first paper deals with the fundamental organizing ability to "rapidly pick, plug, and play" to configure rapidly to meet a specific objective, in this case to find a solution to stop the outbreak of the

Table 1
Characteristics of traditional and new business network approaches (Van Heck & Vervest, 2007).

Characteristics	Traditional business network approach	New business network approach
Products and services	Relative simple, unbundled, and slowly delivered products and services	Relative complex, bundled, and fast delivered products and services
Value creation	Supply chains with long term connected relationships	Demand networks with quick connect and disconnect relationships
Coordination and control	Hierarchical and central control and decision making	Network orchestration with distributed control and decision making
Information sharing	Information sharing with direct business partners	Information sharing over and with network partners
Infrastructure	Actor platforms with information silos and systems	Network platform with networked business operating system

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Severe Acute Respiratory Syndrome (SARS) virus. Peter van Baalen and Paul van Fenema show how the instantiation of a global crisis network of laboratories around the world cooperated and competed to find out how this deadly virus is working.

The second paper deals with the business network as orchestrated by the Spanish Grupo Multiasistencia. Javier Busquets, Juan Rodón, and Jonathan Wareham show how the smart business network approach with embedded business processes lead to substantial business advantages. The paper also shows the importance of information sharing in the business network and the design and set up of the decision support and infrastructure.

The third paper focus on how buyer–seller relationships in online markets develop over time e.g. how even in market relationships buyers and sellers connect (to form a contract and legal relationship) and disconnect (by finishing the transaction) and later come back to each other (and form a relationship again). Ulad Radkevitch, Eric van Heck, and Otto Koppius identify four types of clusters in an online market of IT services. Empirical evidence reveals that these four portfolio clusters rely on either arms-length relationships supported by reverse auctions, or recurrent buying with negotiations or a mixed mode, using both exchange mechanisms almost equally (two clusters).

The fourth paper puts forward the role and impact of intelligent agents and machine learning in networks and markets. The capability of agents to quickly execute tasks with other agents and systems will be a potential, sustainable and profitable strategy to act faster and better for business networks. Wolf Ketter, John Collins, Maria Gini, Alok Gupta, and Paul Schrater identify how agents are able to learn from historical data and can detect different economic regimes, such as under-supply and over-supply in markets. Therefore, agents are able to characterize the economic regimes of markets and forecast the next, future regime in the market to facilitate tactical and strategic decision making. They provide empirical evidence from the analysis of the Trading Agent Competition for Supply Chain Management (TAC SCM).

3. Looking forward

We identify three important potential directions for future research. The first research stream deals with advanced network orchestration with distributed control and decision making. The first two papers indicate that network orchestration is a key critical component of successful business networks. Research of intelligent agents is showing that distributed and decentralized decision making might provide smart solutions because it combines local knowledge of actors and agents in the network with coordination and control of the network as a whole. Agents can help to reveal business rules in business networks, or gather pro-actively new knowledge about the business network and will empower the next generation of decision support systems.

The second research stream deals with information sharing over and with network partners. For example, Diederik van Liere explores in his PhD dissertation the concept of the “network horizon”: the number of nodes that an actor can “see” from a specific position in the network [3]. Most companies have a network horizon of “1”. They know and exchange information with their suppliers and customers. However, what about the supplier of the suppliers, or the customer of their customers? One develops then a network horizon of “2”. Diederik van Liere provides empirical evidence that with a larger network horizon a company can take a more advantageous network position depending on the distribution of the network horizons across all actors and up to a certain saturation point. The results indicate that the expansion of the network horizon will be in the near future a crucial success factor for companies. Future research will shed more light on this type of network analysis and its impact on network performance.

The third research stream will focus on the network platform with a networked Business Operating System (BOS). Most of the network scientists analyze the structure and dynamics of the business networks independent of the technologies that enable it to perform. It concentrates on what makes the network effective, the linked relationships between the actors, and how their intelligence is combined to reach the network's goals. Digital technologies play a fundamental role in today's networks. They have facilitated improvements and fundamental changes in the ways in which organizations and individuals interact and combine as well as revealing unexpected capabilities that create new markets and opportunities. The introduction of new networked business operating systems will be feasible and these operating systems will go beyond the networked linking of traditional Enterprise Resource Planning (ERP) systems with Customer Relationship Management (CRM) software packages. Implementation of a BOS enables the portability of business processes and facilitates the end-to-end management of processes running across many different organizations in many different forms. It coordinates the processes among the networked businesses and its logic is embedded in the systems used by these businesses.

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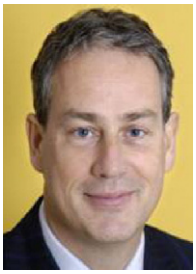

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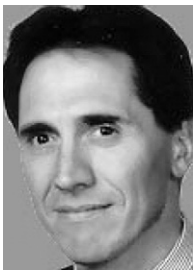

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