Challenging Dyadic Interaction in the Context of Multi-Organizational Business Processes

Sandra Haraldson & Mikael Lind
University of Borås, School of Business and IT, Borås, Sweden
Viktoria Institute, Sustainable Transports, Gothenburg, Sweden
Email: [Sandra.Haraldson | Mikael.Lind] @viktoria.se

Abstract

Value creation of today is often a co-production in multi-organizational settings. This requires knowledge about how to conceive multi-organizational actor roles as foundations for co-ordinating and efficiently co-produce customer value. Some contemporary business process modelling approaches builds upon modelling interaction between two business parties (i.e. dyadic interaction), but do not acknowledge interaction patterns involving several network actors in their different actor roles. In this paper value creation in multi-organizational businesses are seen as value chains in value networks. The notion of assignments is the underlying structure in a multi-organizational perspective on business processes and is used to create foundations for distinguishing interaction patterns. Modelling and improving multi-organizational business processes conceived as action and interaction arranged in assignment structures, imply that dyadic role models need to be challenged as generative instruments. In this paper four generic multi-organizational network actor roles are brought forward (end-customer, main actor, co-ordinating actor, and co-producing actor) given meaning in and further instantiated in generic assignment actor roles based on their involvement in different multi-organizational interaction patterns. Thus, patterns of interaction constituting multi-organizational business processes are distinguished creating the necessary conditions for diverse network actors by the identification of their role in the action logic.

Keywords

Assignment, Actor Roles, Realization, Process variants, Business Network, Interaction patterns

INTRODUCTION

No organisation of today can afford to remain an island entire unto itself. "Every organisation is a network of other organisations" (Filos & Banahan, 2000, pp.12). Multi-organizational business processes involves several actor roles in the co-production of value for potential and particular end-customers. In multi-organizational businesses, (commercial) business is performed between involved actors within the business network as well as between the business network and its beneficiaries. The beneficiary of a multi-organizational business has been framed as end-customer (c.f. Haraldson & Lind, 2011). A beneficiary is the one that will utilize the products (goods and services) produced and delivered by the multi-organizational business. This means that actors within multi-organizational networks engage in performing business for dual reasons, both in the role as a part of the business network and in a role in relation to the beneficiary of the business network. This duality means that a certain actor necessarily will undertake multiple actor roles when acting *within* and/or *on behalf* of the network. This could also be expressed as if you are not serving the customer – your job is to serve somebody who is. In order to enable an efficient realization of multi-organizational business processes (MOBP) it becomes necessary to avoid ambiguities of which roles different actors undertake in different situations. For the purpose of developing multi-organizational business processes, supported by business process modelling, the conception of actor roles need to acknowledge interaction patterns involving several network actors in their different actor roles. It is a need for a role model expanding the scope beyond dyadic structures dominating contemporary business process modelling approaches .

Actions that an actor performs, and is expected to perform, reveals actor roles undertaken. It becomes necessary to connect the notion of roles to the viewpoint of the world (c.f. Weltanshaug according to Checkland (1981)). A multi-organizational perspective uses a view on business processes as an interaction and action system organized in assignment structures (c.f. Haraldson & Lind, 2011). Such pragmatic viewpoint on business processes put the logic of establishing, fulfilling, and concluding assignments at the core. In contrast to the original conception of business processes (c.f. Davenport & Short, 1990) this also means that a focus on what and how things are done needs to be understood by the support of which actor role that is engaged and affected. By studying the notion of roles brought forward in business process management (c.f. e.g. Davenport & Short, 1990) and business networks (c.f. e.g. Peppard & Rylander, 2006) a number of different role concepts on different levels of abstractions can be identified. Identifying roles in multi-organizational businesses needs to be based on their role

in producing value to end-customers and/or other network members. Further, these form an essential construct in business interaction patterns constituting multi-organizational processes.

The purpose of this paper is to put forward the different actor roles, and their relationships, that business network actors will and can undertake in multi-organizational business processes. The research question explored is: *Which actor roles exist in multi-organizational business processes?* The research is to be characterized as theory-driven with empirical illustrations. Through several empirical applications, a multi-organizational perspective on business processes has been developed (Haraldson & Lind, 2010; Haraldson & Lind, 2011). In this paper the production of value as well as actor roles in multi-organizational business processes will be theoretically grounded as two essential aspects of a multi-organizational perspective on business processes. As a source for this theoretical grounding strengths and weaknesses in value chains and value networks are identified and used for the purpose of revealing a perspective on value creation as value chains in value networks.

A section conceptualizing value creation in multi-organizational business processes follows this section. Then a review on how the notion of roles has been brought forward within the business process management field and within the field of business networks is performed concluded by identifying some characteristics on multi-organizational business actor roles. These characteristics are then used to bring forward generic and particular roles in multi-organizational business processes. In the empirical section of the paper different actor roles identified in multi-organizational business processes are used for illustrating this example. The paper is concluded by a discussion on interaction patterns and how these are the basis for identifying multi-organizational roles followed by conclusions and future work.

VALUE CREATION IN MULTI-ORGANIZATIONAL BUSINESS PROCESSES

Multi-organizational business processes (MOBP) builds upon that different organizations, by undertaking different actor roles, co-produce value. MOBP captures both condition-creating processes for establishing conditions for realizing value proposition aimed towards potential customers, as well as realizing business transactions with particular end-customers. As identified in Haraldson & Lind (2011) a multi-organizational perspective on business processes adopts an integrated (synthesized) view on value creation, taking identified strengths from both the Value Chain and the Value Network Perspective (see figure 1). In MOBP value is created in actor relationship (i.e. capabilities to perform future actions are established), through interaction among actors (i.e. value creation through interaction) and through the actions performed by the actors in the value network (i.e. value creating activities). In the literature value creation is often described and structured as value chains or value networks, and are often argued to be contrasting views on value creation. Instead, a multi-organizational perspective conceives value creation structured as value chains in value networks, meaning that value are created both in actor relationships and in the actions performed. A multi-organizational perspective on value creation in business processes argues that all these value components and their interrelations are required to conceive value creation in multi-organizational settings. In the figure 1 below the strengths in the value chain perspective and value networks perspective are identified and analysed as a basis to theoretically ground the perception of value creation in MOBP (i.e. value chains in value networks) brought forward in this paper.
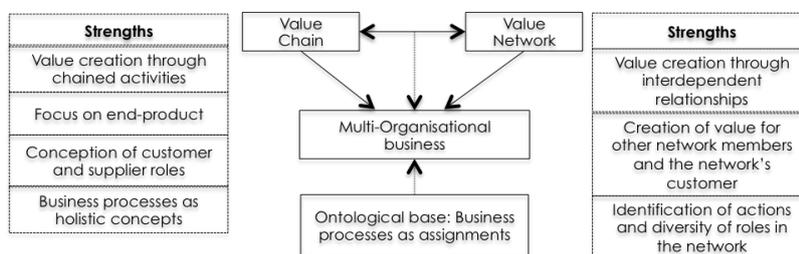

Figure 1: A multi-organizational analysis on value chains and value networks (c.f. Haraldson & Lind, 2011)

Peppard & Rylander (2006, pp.131) identifies a value chain perspective as "the logic being that every company occupies a position in the chain; upstreams suppliers provide inputs before passing them downstream to the next link in the chain, the customer". A value network on the other hand consists of specific roles and value interactions oriented towards the achievement of a particular task or outcome. The notion of relationship is the key in value networks. "From a network perspective relationships are viewed as part of a larger whole – a network of interdependent relationships […]. These relationships are 'connected' since what happens in one relationship affects positively and negatively in others." (Peppard & Rylander, 2006, pp.133). The value network perspective is promising, but do however reject a value chain perspective, by e.g. claiming that "is it not of interest to focus upon actions performed in business processes?" Allee (2009, pp. 439) claims "Value network analysis provides an opportunity to overcome the "split" in business management practices where human interactions and relationships reside in one world of models and practices and business processes and

transactions reside in another". From our point of view, to systematise business processes in multi-organizational networks, business process models need to also reflect how value is created through action and interaction.

"The active agents of any organization are real people who play particular roles to convert both tangible and intangible assets into negotiable offerings and fulfil different functions" (Allee, pp. 429). A value network is therefore to be seen as "any purposeful group of people or organizations creating social and economic good through complex dynamic exchanges of tangible and intangible value" (Allee, 2009, pp. 429). Allee (2009, pp. 439) further claim that "reorienting toward networks means supporting people in wearing different 'hats' and filling roles in multiple value creating networks".

The strengths and weaknesses identified from the two perspectives are presented in table 1 below and provides a basis to reveal which components are used to describe and theoretically ground a multi-organizational perspective on value creation in business processes. Likewise, the table 1 reveals some aspects of each approach that such a perspective does not comply with.

Table 1: Strengths and weaknesses (value chain vs. value network) (inspired from Peppard and Rylander, 2006)

Value Chain perspective		Value Network Perspective	
Strengths	**Weaknesses**	**Strengths**	**Weaknesses**
• Portraying chained linkages of activities that exist in the physical world (within traditional industries, particularly manufacturing). • Framed thinking about value and value creation. • Focal is the end-product and the value chain is designed around the activities required to produce it. • The acknowledgement of different business processes and sub processes to identify value creation.	• Does not exhibit strong co-operative behaviour with inter-firm relationships. • Linear model that does not give an account for the nature of alliances, competitors, complementors, and other members in the business network. • Does not respond to the dematerialised products and services. • Out-of-date since the value chain itself no longer have a physical dimension and does therefore not uncover sources of value.	• Focus on the value creation system itself as co-creation by a combination of players in the network. • Value networks as composed of complementary nodes and links. • Simultaneous performance of diverse activities. • Focus on how value is created through interdependent relationships. • A move away from viewing an organization's value creation as an isolated unit to how an organisation create value within the context of the network. • Dynamic nature of the networked economy by actions influencing other network members and their actions. • Focus on a diversity of roles of the network. • The duality of one network member adding value to other members in the network at the same time as the member add value for its customers.	• Unclear conception of the structure of how value is created through interdependent relationships. • Ambiguity of how to conceptualise business transactions performed within and by the network. • Unclear how actions are structured in business transactions engaging and influencing multiple parties. • Too strong focus on the network member rather than the actions performed by the network member. • Unclear which different roles an actor (organization) have in the establishment and realization of a networked business.

A viewpoint on business processes for meeting such challenges need to rely on a pragmatic foundation (c.f. Goldkuhl, 2001) emphasising different types of social actions (material and/or communicative) performed by actors acting on behalf of organizations and the business network. This means a view on *business processes as action and interaction arranged in assignment structures*.

One of the main purposes of a business process orientation is to conceive structures for actions (c.f. Lind, 2002). To address the weaknesses of the value network perspective being unclear in how value is created through inter-dependent relationships, an assignment view on business processes is adopted. This means that business processes are conceived as interactions between different roles in the creation of actor, role, and action relationships (c.f. Haraldson, 2008). Taking a viewpoint on business processes as multi-organizational, integrating elements of the value chain and value network perspective, value is conceived to be created through *actions performed by actors based on actor relationships in a multi-organizational business network*. A multi-organizational perspective on business processes acknowledges business processes as assignments (c.f. Haraldson & Lind, 2011) in which the establishment, fulfilment, and evaluation of expectations are put at the core and thereby constitutes the structure for actions. A multi-organizational perspective on business processes (c.f. Haraldson & Lind, 2011) using assignment structures as a basis to identify interaction patterns are inspired by the work of Goldkuhl & Röstlinger (2002) and adapted to multi-organizational settings. In action relationships, i.e. expectations and commitments for future actions within assignments are created through the performance of actions based on some role relationships. In multi-organizational business processes (MOBP) value is created through action relationships based on role relationships between several actor roles.

Consequently value-adding activities are seen as parts of the establishment, fulfilment, and conclusion of assignments.

Dyadic approaches to business interaction, such as the ones proposed within language-action approaches to communication modelling (c.f. e.g. DEMO, Action Workflow, BAT) (see table 2) rely on two parties interacting for the fulfilment of successful conversations. These actor roles get their meaning in the context of which actions they are supposed to be engaged in (as e.g. a customer buying products from a supplier). In this sense an actor will undertake the role of being a customer, which then comes with expectations about what action relationships that such a role should create and fulfil (as e.g. placing an order and paying for the products from a supplier). As claimed by Caetano et al (2005) "the motivation of roles is to allow particular viewpoints regarding the factors presumed to be influential in governing behaviour. It lies on a theatrical analogy of actors playing parts or roles in a play. Interestingly, Biddle & Thomas (1979) state that,

"When actors portray a character in a play, their performance is determined by the script, the director's instructions, the performances of fellow actors, and reactions of the audience as well as by the acting talents of the players. Apart from differences between actors in the interpretation of their parts, the performance of each actor is programmed by all of these external factors; consequently, there are significant similarities in the performances of actors taking the same part, no matter who the actual actors are."

Consequently, in order to conceive the logic of how assignments are established, fulfilled, and concluded in multi-organizational setting a repertoire of actor roles and their relationships need to be reflected. In the next section different actor roles brought forward in different value chain and value network approaches are depicted. The identification of these are used to theoretically ground necessary actor roles involved in multi-organizational business interaction patterns. The actor roles identified in the literature review have been analysed through a multi-organizational lens.

THEORY: DIFFERENT CONCEPTIONS OF ACTOR ROLES

Within different approaches the notion of actor roles have been used. In the table 2 below these different conceptualizations of actor roles have been brought forward. Within the field of business process management (BPM) the traditional conception has been utilizing customer-supplier roles. Since traditional BPM approaches have not acknowledged the notion of interaction, a language-action perspective (LAP) on business processes has been brought forward capturing interaction between two parties. Some value chain approaches bring forward a more diverse notion of roles (c.f. e.g. commitment modelling, theory of practice in table 2). Within value networks some different approaches are brought forward, where agents acting on behalf of a business network for some beneficiary are emphasized.

Table 2: Different conceptions of role in various value chain and value network approaches

Concept	Roles
Value Chain approaches	
Traditional Business Process Management	Basic roles: Supplier, Customer, Business Organization, Buyer, Seller (Davenport & Short, 1990) SCOR: Supplier's supplier, Supplier, Your Organization, customer, Customer's customer (Stephens, 2001) BPMN: Functional capabilities or responsibilities, participant organized in pools and lanes (White, 2004) Service interaction patterns: Party (and multi-parties), Sub contractor (Barros et al, 2005)
Language-Action Perspective on Comm. Modelling (LAP)	Action Workflow: Customer, Performer (linked work-flow loops) (Medina-Mora et al, 1992) DEMO: Initiator, executor (instantiated in business roles related to the DEMO transaction) (Dietz, 1999) CFA: Speaker A, Listener B (Winograd & Flores, 1986) BAT: (Markets of and particular) Customer and suppliers (Goldkuhl & Lind, 2004)
Others related (value chain concepts)	Agent-based supply chain management (commitment modelling): Agent, Agency, company, debtor, creditor, supplier, client (Verdicchio & Colombetti (2002) Socio-Instrumental pragmatism (SIP): Focused actor, addressee (Goldkuhl & Röstlinger, 2002) Theory of Practice: External assigners, External base providers, External knowledge & instrument providers, External normativists, External financial providers, Producer, Clients, Result taker (Goldkuhl & Röstlinger, 2002) Work Systems Theory: Participants, Customers (Alter, 2008) Soft Systems Methodology: Customers, Actors, Owner (Checkland, 1981)
Value Network approaches	
Basics within Value Networks	End-customer, Network Focal, Network Member (Christoffer, 2005)
Virtual enterprise / multi-agent systems	Enterprise agents, coordinator agents (market agents), and information agents (Camarinha-Matos, 2002)
Extended enterprise and the	Sources, Suppliers, Converters, Distributors, Retailers, Customers (Christoffer, 2005)

virtual supply chain	
Virtual organisation	Virtual enterprise, but also the involvement of other types of organizations (e.g. governmental and non-governmental entities) (Camarinha-Matos, 2002)
Imaginary organisation	Leading enterprise, Partner Organizations, Customer (Hedberg et al, 1997)

Based on the table above it can be revealed that value chain approaches mainly focuses on interaction between two roles. For some approaches these roles are broken down into several "functions" that they hold in relation to the business practice (as e.g. within theory of practice and commitment modelling). In MOBP different actors undertake different roles in value creation processes why such fine-grained conception of roles become necessary. Within value network approaches an important distinction is made between regarding actor roles within the business network (as e.g. network focal and network member) and its beneficiary (as e.g. the end-customer). Such viewpoint is in resemblance with a multi-organizational view on actor roles and value creation. In the next section these roles are used as sources for grounding the different generic role concepts existing in MOBP.

ACTOR ROLES IN MULTI-ORGANIZATIONAL SETTINGS

Multi-organizational actors and their assignment roles

Multi-organizational business processes needs to be planned for and co-ordinated in order to be successfully realized. A multi-organizational perspective on business processes (c.f. Haraldson & Lind, 2011) put forward two types of business transactions; business transactions aimed for potential end-customers, and business transactions aimed for particular end-customers. Other MOBP that can be identified are development-oriented (e.g. development of value propositions) and plan-oriented (e.g. capacity reservation) business processes based on the needs established in the transactional processes. Provision processes (covering network transactions), which creates basis (pre-products) to be utilized in realization processes. Different MOBP are combined into different process variants. These process variants exist due to diversities in value propositions, actor value, and product characteristics. Multi-organizational businesses need to be orchestrated in which action logics are set and role relationships are established and formalized. Customer assignments consist of several embedded assignments realized in the order fulfilment process. Due to the fact that MOBP are logically structured as assignment processes, consisting of both integrated and embedded business transactions, there is a need to distinguish between interaction patterns that these transactions give rise to. Such interaction patterns form the basis for identifying the role of actors as value creators and value consumers in the realization of multi-organizational business transactions.

In MOBP four types of generic actor roles are distinguished (c.f. figure 2); *end-customer* (c.f. different notions of customer such as SCOR and Value Networks in the table 2 above) (which is divided into two types (potential and particular) of beneficiaries), *main actor* (c.f. Network focal or Leading Enterprise in the table 2 above) (responsible for the relationship with, and the value propositions aimed towards, the end-customers), and *co-producing actor* (c.f e.g. different producing roles in EA in table 2 above) (acto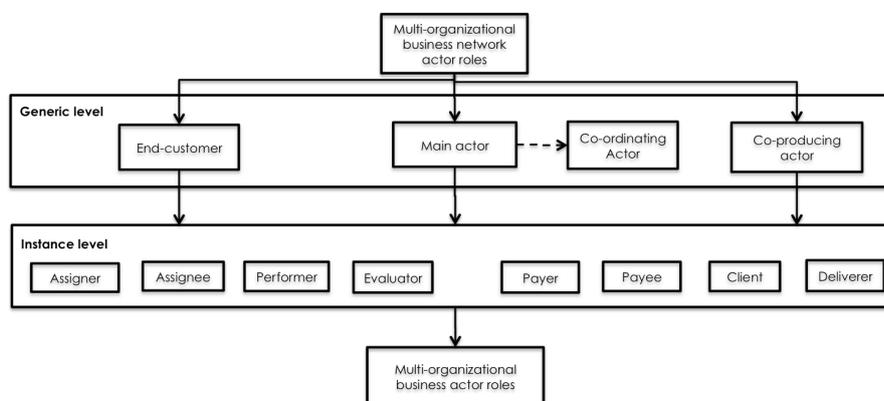r roles taking assignments from the main actor and ensure the realization of these). In the realization of business transactions the end-customer can be a co-producing actor (e.g. the end-customer providing with his/her car to the car wash and washing it). A main actor is normally the *coordinating actor* that undertakes the role of managing different assignments in the co-production of value (compare with coordinator agent (market agent) in the table 2 above).

Figure 2: Multi-organizational assignment roles as instances of generic network actor roles.

When modelling MOBP one actor needs to be chosen as the starting point for the analysis; the *focused actor*. The main actor is the natural choice as the focused actor but could be any of the other co-producing actors in the multi-organizational business network except the end-customer.

The UML definition of role is "the named specific behaviour of an entity participating in a particular context". (Wegmann & Genilloud, 2000). UML defines an actor as a coherent set of roles that users of use cases play when interacting within these use cases. An actor has one role for each use case with which it communicates (Wegmann & Genilloud, 2000). Wegmann & Genilloud (2000) propose an extension of the notion of an actor (class) as "the partial specification of an entity; this partial specification is the composition of the roles that the entity performs in use cases or in collaborations". An actor (as instance) is an instance of an actor (class), this structure is applied in the figure 2 above.

A value network consists of agents acting on behalf of the network in different roles. These agents act in relation to each other for the purpose of doing something for potential and particular end-customers. The basic understanding of roles in MOBP relies on an assignment view (Haraldson & Lind, 2011) capturing different actor roles for establishing, fulfilling, and concluding assignments. In the theory of practice (c.f. Goldkuhl & Röstlinger, 2002) assignment roles are brought forward; the *assigner* and the *assignee* agreeing upon assignments, the *producer* fulfilling assignments (either by him/herself or by forwarding assignments to other actor roles), the *client* receiving the results of the fulfilment of assignments for the utilization/provision, and the *evaluator* for concluding the assignment. In multi-organizational businesses there are several producers to a customer assignment, arranged as embedded business transactions in an overall multi-organizational business transaction. The more traditional view is to integrate several business transactions, which implies a lack of acknowledgement to the overall multi-organizational business transaction. Modelling MOBP needs to position embedded business transactions as parts of the realization of overall customer assignments. Embedded business transactions produce business value to be used as the basis for the creation of customer value components. All these components are different constituents of the customer value, which require a co-ordinating actor, giving rise to the co-production of customer value.

It is also natural to bring forward roles such as the *payer* contributing with financial value as well as the *payee* (receiving the finance). Another important role is the *deliverer* of customer value components / the overall customer value produced for the end-customer. In figure 2 above the four generic multi-organizational business network actor roles are depicted (see the first layer). The same figure also depicts a number of different generic multi-organizational business assignment (process) roles (the second layer) possible for the multi-organizational business network actor to undertake.

In MOBP, assignment relationships (and the realization of assignments) are the basis for the conception of actor roles. Role relationships are the conditions for the realization of assignments (based on that they create an action capability for future actions). Action relationships are the outcome of the interaction required to realize the assignment. Role relationships can be conceived in value networks and action relationships can be conceived based on value chain structures. In order to manage a multi-organisational business we need to acknowledge value chains **in** value networks in order to capture the multi-organizational dimension that exists in such business processes. To enable an appropriate co-ordination of a multi-organizational business, actions need to be understood in the context of established actor roles and due to the realization of different assignments. Business interaction needs to be understood from a holistic point of view that is necessary for a successful realization of the multi-organizational business transaction. Such multi-organizational business interaction is the underlying cause why we need to challenge dyadic interaction models. Such models express both role and action relationships as bilateral construction of exchanges, but as we claim: multi-organizational business transactions rely on that several parties can undertake the same assignment role in their participation in the co-production of value for end-customers. The role and action relationships between the main actor and co-producing actors need to be based on the role and action relationships between the main actor and the end-customer since the co-producing actors' roles are to co-produce customer value components for the end-customer assignment.

Constituents for patterns of interaction

The roles that multi-organizational actors can undertake are based on a logic of interaction (i.e. interaction patterns). This logic builds upon that action relationships are established related to different assignments, in giving rise to patterns of interaction. These patterns constitute the action logic within the different (types of) business processes. In the figure 3 below an identification of diverse patterns of role and action relationships has been brought forward placing the main actor in the centre. The figure visualise the need for the main actor to act as coordinator actor as an important role in the multi-
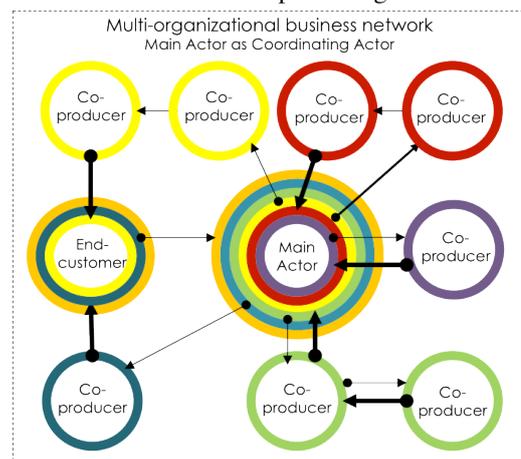

Figure 3: Role model for multi-organizational business processes

organizational business. These variances of how co-producing actors are engaged through assignments in relation to the main actor are to be seen as constituents for patterns of interaction.

All these multi-organizational business actors, as depicted in figure 3, do constitute the multi-organizational network where each actor role will undertake different assignment roles. This also illustrates that there will not exist pure customer and supplier roles in multi-organizational settings. A division into different assignment roles in the course of assignment based business processes do become necessary. As claimed by Filos & Banahan (2000, pp. 13) "when relationships are fostered via networks, roles become blurred: the seller also becomes a buyer of valuable feedback on his product". The possible interaction patterns in which customer assignments are established (forwarded), fulfilled, and evaluated are distributed among involved parties in the multi-organizational network through different actor roles.

EMPIRICAL SETTING: MULTI-ORGANIZATIONAL ACTOR ROLES

This case concerns a multi-organizational business network involving several actor roles. The case focused on the collaboration and business interaction between a main actor (MA1), a LogCom (a third party logistic company) and their common end-customer. MA1 is a retail home decoration firm and have several retail shops. The shops' product assortment is regulated from the central purchasing management at MA1. Seasonal purchase is conducted based upon estimation of customer needs and orders are then placed to a product producer (i.e. a co-producing actor). The central purchasing management (MA1) is responsible for coordinating the activities regarding distribution of goods from LogCom to the shops (as well as particular end-customer orders). The case is multi-organizational since it involves several actors (i.e. potential/particular *end-customers*, several *shops*, *transporter / deliverer*, *product producers*, a *third party logistic company*, as well as the home decoration company as the *distributor*) in the realization of customer orders. In this case, the role and action relationships are according to (parts of) the multi-organizational business network illustrated above (c.f. figure 3). In the next section a table is presented that illustrates this empirical example as interaction patters using assignment roles as instantiations of the (generic) network actor roles described above.

DISCUSSION: ACTOR ROLES IN MULTI-ORGANIZATIONAL BUSINESS

A multi-organizational perspective on business processes requires four generic network actor roles and multiple assignment roles. Assignment roles (c.f. figure 2) related to each other establish, fulfil, and conclude assignments. In figure 4 below patterns of interaction, for two realization processes, are visualized.

In realization process (RV1) the initiator is a particular end-customer. Dependent on different process variants (of realization) the interaction patterns might differ due to the assignment specification and the initiator. In the bottom part of figure 4 another variant of realization is depicted utilizing conditions created by a provision
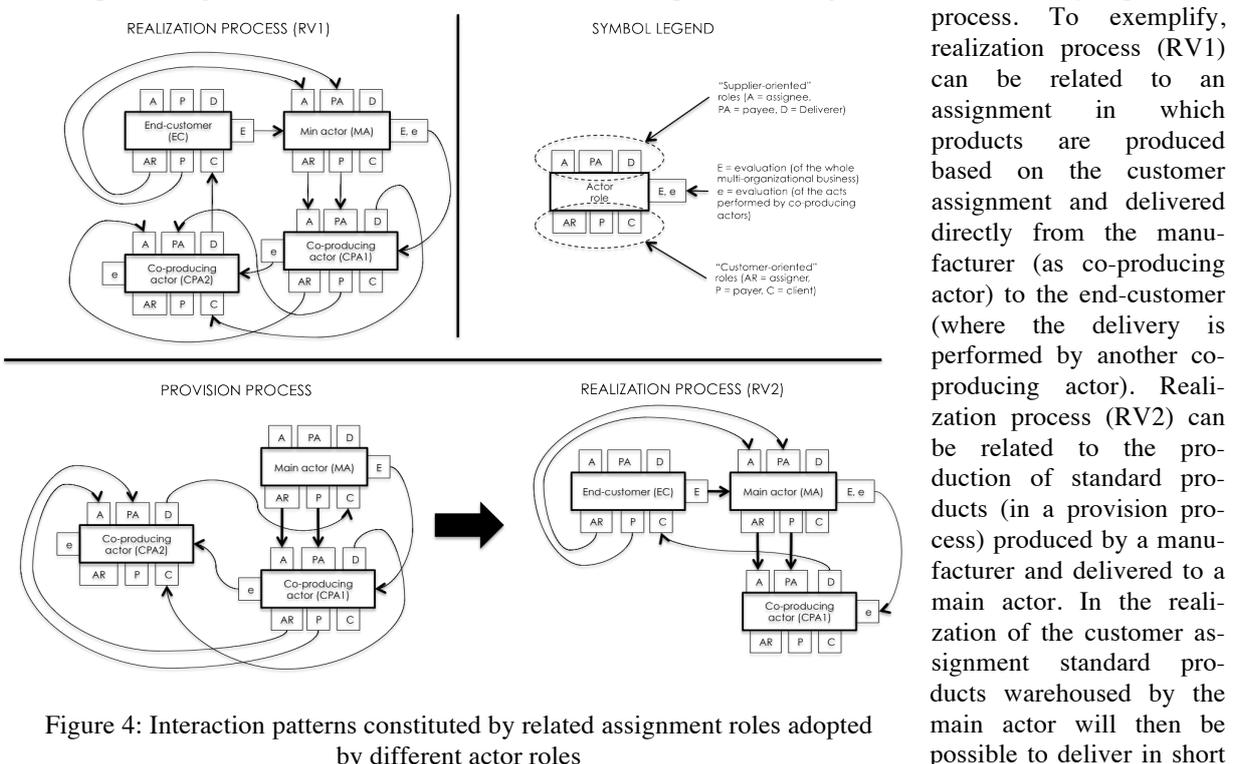

Figure 4: Interaction patterns constituted by related assignment roles adopted by different actor roles

process. To exemplify, realization process (RV1) can be related to an assignment in which products are produced based on the customer assignment and delivered directly from the manufacturer (as co-producing actor) to the end-customer (where the delivery is performed by another co-producing actor). Realization process (RV2) can be related to the production of standard products (in a provision process) produced by a manufacturer and delivered to a main actor. In the realization of the customer assignment standard products warehoused by the main actor will then be possible to deliver in short

lead times by an assigned deliverer.

Consequently, each co-producing actor does thus need to be aware of which process variant they are engaged in (i.e. the action logic) and whether they, in a situation are part of realization or condition creating processes.

In order to derive such action logic interaction patterns can be formalized according to the following theorem:

InteractionPatternID (RealizationVariantID) =

[AssignmentID [AssignmentRoleID (ActorRoleID (ActorID))] : [AssignmentRoleID (ActorRoleID(ActorID))]]

Using the following acronyms, variables and values:

Assignments: CA=CustomerAssignment, PA=ProductAssignment, TA=TransportAssignment
Assignment Roles: A=Assigner | AE=Assignee | P=Payer | PE=Payee | PF=Performer | DL=Deliverer |
             CL=Client | E=Evaluator, e = Evaluator embedded assignments
ActorRoles: EC = EndCustomer, MA=Main Actor, PR=Producer, DL=Deliverer,
Actors: EC1=EndCustomer1, FA1=Distributor1, PR1=Producer1, TR1=Deliverer1
Token: $PA1_{CA1}$ = ProductAssignment1 as embedded in CustomerAssignment1

Interaction Pattern	Assignment	AssRole	ActorRole(Actor)	to	AssRole	ActorRole (Actor)
IP1 (RV1) =	[CA	[A	(EC (1))]	:	[AE	(MA (1)] :
	CA1	[P	(EC (1))]	:	[PE	(MA (1)] :
	[PA1$_{CA1}$	[A	(MA (1))]	:	[AE	(P (1)] :
	[TA1$_{PA1.CA1}$	[A	(PR (1))]	:	[AE	(DL (1)] :
	PA1$_{CA1}$	[D	(PR (1))]	:	[CL	(DL (1)] :
	TA1$_{PA1.CA1}$	[D	(DL (1))]	:	[CL	(EC (1)] :
	CA1	[E	(EC (1))]	:	[PF	(MA (1) : PR(1) : DL(1)]:
	TA1$_{PA1.CA1}$	[e	(PR (1))]	:	[PF	(DL (1)] :
	PA1$_{CA1}$	[e	(MA (1))]	:	[PF	(PR (1)] :
	TA1$_{PA1.CA1}$	[P	(PR (1))]	:	[PE	(DL (1)]] :
	PA1$_{CA1}$	[P	(MA (1))]	:	[PE	(PR (1)]]]

The interaction patterns above, constituted by action relationships (within different business assignments), give advice in how to formulate and evaluate formal role relationships between the involved actor roles. In revisiting the case different network actor roles undertake different business actor roles (see table 3).

Table 3: Identification of action relationships in interaction patterns based on instantiated actor roles.

Actor Roles	Network Actor Roles	Assignment Roles
End-Customer	End-Customer (particular/ potential)	CA1: Assigner, Payer, Client, Evaluator
Distributor	Main actor	CA1: Assignee, Payee, Performer; PA1: Assigner, Payer, evaluator; TA1: n/a
Product Producer	Co-producer	CA1: Performer; PA1: Assignee Deliverer, Performer, Payee; TA1: Assigner, evaluator, Payer, evaluator
Deliverer	Co-producer	CA1: Performer; PA1: Client; TA1: Assignee, Deliverer, Payee

As indicated in table 3, the method for identifying interaction patterns have been used to identify different assignment roles that a particular network actor role can undertake in a particular realization variant of the multi-organizational business. This knowledge can then be used to design coordination logic. These interaction patterns expressed as theorems can also be used in process modelling for: elicit requirements upon the propositional content of agreements, evaluate the content of role assignments between a main actor and co-producing actors, elicit requirement on the coordination logic applied by the main actor as the coordinator actor, determine variants of interaction patterns supported by rules and conditions derived from the theorems, and establish procedures for evaluation of particular realizations in relation to the interaction patterns depicted.

Even though that we admit that MOBP build upon customer and supplier oriented roles it becomes clear from figure 4 that there is a need for several assignment roles for expanding the scope beyond dyadic relationships and thereby conceiving business interaction patterns in multi-organizational settings. A multi-organizational perspective on business processes goes beyond two actor roles taking all roles in an assignment process (in a dyadic matter). This also develops a need to establish patterns for informing the assignee of fulfilled assignments

since the fulfilment (the delivery) might be directed to some other actor role than the one that initiated the assignment. Such informing roles become necessary, and create essential basis for the co-ordinating actor to efficiently co-ordinate the multi-organizational business.

CONCLUSIONS

From a pragmatic point of view, MOBP conceived as inter-linked and embedded assignment processes are used to describe multi-organizational business interaction. Such viewpoint on business processes has brought forward the necessity to focus upon four generic network actor roles (the end-customer, the main actor, the co-ordinating actor, and the co-producing actor) undertaking different assignment roles (assigner, assignee, payer, payee, client, deliver, producer, evaluator) in the realization of MOBP. Supported by a multi-organizational perspective on business process this paper clarifies the notions of actor roles by positioning them in relation to value chain and value network structures in a multi-organizational context. The actor roles gets their contextual meaning by an understanding of capabilities needed, the action logic required, and the overall customer assignment. An understanding of such patterns of interactions is a necessity for the main actor to coordinate the multi-organizational business.

By understanding and positioning MOBP as assignment processes actor roles can be conceived. Without substantial knowledge about how actor roles are engaged in the business action logic it is doubtful to derive multi-organizational structures for actions (i.e. interaction patterns). A basis for establishing good relationships among involved actors, which is a condition for an efficient realization and co-ordination of multi-organizational businesses where different actors act to generate value for a common object of interest, should be derived multi-organizational business interaction.

In business process modelling, the notion of actor roles in business processes conceptualized as actor role models is one important (generative) instrument for developing knowledge about present and future business processes. Knowledge about actor roles and their relationships in MOBP is therefore essential for the conception of MOBP. As claimed in the paper a modelling role has therefore been introduced, the focused actor, which most often would be the main actor, but it could also be any other actor within the multi-organizational business network taken as the point of departure for the purpose of conceptualizing MOBP.

The next step is to develop, as well as complement existing, process modelling methods utilizing this notion of actor roles for the purpose of revealing multi-organizational business interaction patterns. Such methods, providing with procedures (which questions to ask) and notational rules (how to document answers), needs to build on actor roles as one essential concept.

REFERENCES

Allee V. (2009) Value-creating networks: organizational issues and challenges, The Learning Organization, Vol. 16 (6), pp. 427-442

Alter S. (2008) Service System Fundamentals: Work System, Value Chain, and Life Cycle, IBM Systems Journal Vol. 47 (1), pp. 71-85

Barros, A. P., Dumas M., Hofstede, A. H. M. (2005) Service Interaction Patterns. In Proceedings 3rd International Conference on Business Process Management 3649, pages pp. 302-318, Nancy, France.

Biddle B., Thomas E. (1979) Role Theory, Concepts and Research, Kluwer Publishers

Caetano A., Silva A. R., Tribolet J. (2005) Using Roles and Business Objects to Model and Understand Business Processes, ACM Symposum on Applied Computing, ACM

Camarinha-Matos L. M. (2002) Multi-agent systems in virtual enterprises, Proc. of AIS'2002 – International Conference on AI, Simulation and Planning in High Autonomy Systems, SCS publication, pp. 27-36

Checkland P. (1981) Systems thinking. Systems practice, John Wiley, Chichester

Christoffer M. (2005) Logistics and Supply Chain Management – Creating Value-Adding Networks, Third edition, Prentice Hall

Davenport T. H., Short J. E. (1990) The New Industrial Engineering: Information Technology and Business Process Redesign, Sloan Management Review, Vol. 31 (4)

Dietz J. L. G. (1999) Understanding and Modelling Business Processes with DEMO, Proc. of18th International Conference on Conceptual Modeling (ER'99), ParisLind, 2006

Filos E., Banahan E. P. (2000) "Will the organisation disappear? The challenges of the new economy and future perspectives" in Camarinha-Mator et al (Eds.) E-business and virtual enterprises – managing business-to-business cooperation, IFIP TC5/WG 5.3, Kluwer Academic Publishers

Goldkuhl, G. and Lind, M. (2004), "Developing e-interactions – a framework for business capabilities and exchanges", Proceedings of the 12th European Conference on Information Systems (ECIS2004), Turku

Goldkuhl G. (2001) Communicative vs material actions: Instrumentality, sociality and comprehensibility, Proceedings of the 6th Int Workshop on the Language Action Perspective (LAP2001), RWTH, Aachen

Goldkuhl G., Röstlinger A. (1999) Expanding the Scope – from Language Action to Generic Practice, In: Goldkuhl G., Lind M., Seigerroth U. Ågerfalk P. (1999) Proceedings of the Fourth International Workshop – The Language Action Perspective on Communication Modelling, Jönköping International Business School

Goldkuhl G., Röstlinger A. (2002) Towards an integral understanding of organisations and information systems: Convergence of three theories, in Proc of the 5th International Workshop on Organisational Semiotics, Delft

Haraldson S. (2008) Design principles for action quality in collaboration – a multi-organizational perspective on third party logistics (in Swedish), Licentiate Thesis, Linköping University, Sweden

Haraldson S., Lind M. (2010) "The Emergence of a Multi-Organizational View on Business Processes – Experiences from a Double-loop Action Research Approach" in Proceedings of the Sixteenth Americas Conference on Information Systems, Lima, Peru, August 12-15, 2010.

Haraldson S., Lind M. (2011) Value Chains in Value Networks: A Multi-Organizational Business Process Definition, Australian Conference on Information Systems, Australia

Hedberg B., Dahlgren G., Hansson J., Olve N-G. (1997) Virtual organizations and beyond. Discover imaginary systems, John Wiley, Chichester

Lind M. (2002) Dividing Businesses into Processes – Foundations for Modelling Essentials, In: Liu K., Clarke R. J., Andersen P. B., Stamper R. K. (Eds.) Organizational Semiotics, – Evolving a Science of Information Systems, IFIP TC8/WG8.1, Kluwer Academic Publisher, pp. 211-230

Lind M., Goldkuhl G. (2003) The constituents of business interaction – generic layered patterns, Data & Knowledge Engineering, Vol. 47, pp. 327-348

Medina-Mora R., Winograd T., Flores R., Flores F. (1992) The Action Workflow Approach to Workflow Management Technology, In Turner J., Kraut R. (Eds.) Proceedings of the Conference on Computer-Supported Cooperative Work, CSCW'92, ACM Press, New York

Peppard J., Rylander A. (2006) From Value Chain to Value Network: Insights for Mobile Operators, European Management Journal, Vol. 24 (2-3), pp. 128-141

Stephens S. (2001) "Supply Chain Operations Reference Model Version 5.0: A New Tool to Improve Supply Chain Efficiency and Achieve Best Practice", Information Systems Frontiers 3:4, 471–476

Verdicchio M., Colombetti M. (2002) Commitments for Agent-Based Supply Chain Management, ACM SIGecom Exchanges, Vol 3. (1)

Wegmann A., Genilloud G. (2000) The role of "Roles" in use case diagrams, UML'00, Proc. of 3rd international conference on The unified modeling language: advancing the standard, Springer-Verlag Berlin, Heidelberg

White, S. A. (2004) Introduction to BPMN, BPTrends, July 2004

Winograd T., Flores F. (1986) Understanding Computers and Cognition: A New Foundationfor Design, Ablex, Norwood NJ

COPYRIGHT