

Sustaining extended enterprises as a matter of institutional logics: insights from the railway sector

Maria Lammerdina Bobbink, Andreas Hartmann and Geert Dewulf

Department of Construction Management and Engineering, University of Twente, Enschede, The Netherlands

Abstract

Purpose – This paper aims to investigate the effect of institutional logics on the intended resource coordination and integration in extended enterprises (EEs).

Design/methodology/approach – The qualitative multiple case study approach collected data from three EEs and their hierarchical organizational context in the restructured and privatized railway sector of the Netherlands by observing 40 meetings, conducting 31 semi-structured interviews and 9 feedback meetings and perusing organizational documents.

Findings – Performance and professional logics characterized the EEs and their hierarchical organizational context. Aligning these logics failed to support the resource coordination and integration in the EEs because of the logics' resource-centric nature. The co-creation logic in one of the EEs mitigated this resource centrism by addressing the resource personifications and representations of the professional and performance logics. Business unit representatives having hierarchically overlapping organizational positions supported this change process by offering protection from resource-centric logics.

Research limitations/implications – The chosen research design limits the generalization of the findings but reveals new scientific and practical insights on the role of institutional logics for sustaining EEs.

Practical implications – The various EE business-units, but especially their contract and concession authorities, need to realize the crippling effect of resource-centric logics on sustaining an EE. Becoming aware of the resource personifications and representations of these logics can assist in addressing their negative effects.

Originality/value – No previous studies have empirically investigated the effect of institutional logics on the intended resource coordination and integration in EEs.

Keywords Integration, Coordination, SCM performance, Public-private extended enterprises, Institutional logics, Resource integration, Railways

Paper type Research paper

1. Introduction

Since the 1980s, private and public organizations have been privatizing and outsourcing the non-core operational activities of and resources for their product services to reduce costs and risks. To maximize the value of their product-services, they spread the responsibility for delivering these services over various organizations through contracts and/or concessions (Bititci *et al.*, 2012; Osborne *et al.*, 2013). The organizations, in turn, delegate this responsibility to their operational business units that now have to coordinate and re-integrate activities into an interoperable supply chain process. What emerges are hierarchically bound heterarchical, i.e. level-playing, supply chain clusters that do not possess the management authority derived from labor contracts and call for new inter-organizational resource coordination and integration mechanisms. The notion of the extended enterprise (EE) has been introduced as one of these supply chain clusters (Gulati *et al.*, 2012).

An EE is a supply chain cluster that, led by a focal unit, coordinates and integrates the various resources of its units, and thus maximizes the value of its overall product-service delivery and optimizes the same for each of its units (Post *et al.*, 2002; Bititci

et al., 2005). In support of this, scholars have suggested interrelated performance measurement systems to integrate financial and organizational information (Bititci *et al.*, 2005; Folan and Browne, 2005; Verdecho *et al.*, 2012) and the building of a shared identity to facilitate information sharing, open contractual borders and level power differences (Paulin and Ferguson, 2010; Braziotis and Tannock, 2011). Finally, scholars proposed fitting organizational designs in support of the aforementioned suggestions (O'Neill and Sackett, 1994; Barratt, 2004; Bobbink *et al.*, 2016).

Despite the positive effect of supply chain integration on firms (Leuschner *et al.*, 2013), coordinated resource-integrating supply chains and EEs are rare (Fawcett and Magnan, 2002; Masten and Kim, 2015; Spekman and Davis, 2016). First, this is due to the continued predominance of firm-centric business models and performance management and measurement approaches that are based on the tenet of contract authority (Gulati *et al.*, 2012). Second, firm owners and contractually responsible managers and employees structure and arrange their processes and related work routines in support of their own product service. As a result, they have little or no experience with inter-organizational resource coordination and integration (Barratt, 2004; Arshinder and Deshmukh, 2008; Fawcett *et al.*, 2015). Third, organizations and/

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or business units misuse and try to sustain their power-position (Kähkönen, 2014). Finally, this is because of barriers leading to mistrust, such as the non-existence of an EE identity and perceptions of incongruous risk and benefit-sharing (Spekman and Davis, 2016). One by one, these reasons point at different assumptions, values and beliefs that the involved individual and organizational actors use in their interaction and that are grounded in their negotiated, experienced and reproduced resource-coordinating and integrating actions (Friedland and Alford, 1991; Thornton *et al.*, 2012; Edvardsson *et al.*, 2014). These so-called institutional logics provide organizational principles and blueprints to individuals, organizations and societies, which when sinking in, eventually become the “taken for granted aspects of human behavior” (Cloutier and Langley, 2013, p. 360). This paper puts forward the argument that these institutional logics support and hamper the resource coordination and integration in supply chains and, thus, represent main drivers or barriers for the emergence of EEs. As the effect of institutional logics on establishing and sustaining EEs has received little attention, this paper aims to answer the following research question:

RQ1. How do the institutional logics affect the intended resource coordination and integration in EEs?

To answer this question it used a qualitative multiple case study method involving three EE settings rooted in the vertically restructured and privatized railway sector of The Netherlands. The chosen research design enabled to discern three institutional logics: the performance, professional and co-creation logic. The prevalent performance and professional logic led to resource segregation among EE-partners; the co-existing co-creation logic softened this effect and facilitated resource coordination and integration. These findings contribute to the wider debate on the coordination and integration challenges in supply chain management in general (Bititci *et al.*, 2012; Osborne *et al.*, 2013; Stevens and Johnson, 2016) and supply chain clusters such as EEs in particular (Lehtinen and Ahola, 2010; Spekman and Davis, 2016) by giving insights into the nested context of institutional logics and their role in establishing collaborative supply chains.

Section 2 elaborates on the theoretical concepts used, i.e. the extended enterprise and institutional logics, followed by a Section 3 on the research method. Subsequently, the paper presents the research findings in Section 4. Finally, it discusses these findings and shares conclusions and recommendations for future studies in Sections 5 and 6.

2. Conceptual background

2.1 Extended enterprises and their resource coordination and integration

The number of firms involved in supply chains has increased over time. Simultaneously, the need for resource coordination and integration in supply chains has increased too. This includes the task of initiating and sustaining activity planning and performance improvements (Wang *et al.*, 2018) and the process of reducing identity and power differences, inventory and lead times (Cox, 1999; Power, 2005). In support of both, supply chains have usually copied the contract-authority based hierarchical firm design resulting in high coordination costs, reduced performances and environmental and social excesses (Flynn *et al.*, 2010; Stevens

and Johnson, 2016). Meanwhile, addressing these coordination and integration challenges through advanced information technologies, strategies, tools, techniques and the incorporation of social and environment concerns appear to rather mask than cope with them (Goldstein and Newell, 2019; Seepma *et al.*, 2020).

Devolving supply chains into EEs, though, comes with the promise of business units engaging in “[...] collective and mutually supportive [activities], such that any conflict can be addressed.” Stevens and Johnson (2016, p. 32) and in doing so maximize their collective service, optimize each business unit’s service and contribute to maximizing the product-service of their hierarchical supply chain (Bititci *et al.*, 2005; Bobbink *et al.*, 2016). However, none of these business units possesses the contract-based authority to settle conflicts (Gulati *et al.*, 2012). This calls for a, mutually accepted, focal business unit coordinating the integration of an EE-units’ resources (O’Neill and Sackett, 1994; Post *et al.*, 2002), and the mandate and agency of the business units to integrate these resources that are often socially differently valued (Scott, 2012, p. 31) whether they are natural, technical, intellectual, financial, legal, social and/or cultural (Table 1).

The reflection and action of an EE’s business units on their resource coordination and integration can strengthen their agency and mutual norms in support of it and increase their EE-enhancing practices (Lemke *et al.*, 2011; Edvardsson *et al.*, 2014). Hence, an EE’s resource-coordinating and integrating practices, are not, but become (Power, 2005; Edvardsson *et al.*, 2014).

However, recent studies have shown that EEs hardly reflect on the translation of their value-adding activities into EE-enhancing practices (Spekman and Davis, 2016). Sharing information about available resources appears to remain restricted to business units having a direct interface (Heather *et al.*, 2015). The underlying reason for this dyadic integration might be that units embody and objectify similar resources leading to what can be called resource personification and representation (Bourdieu, 1986). Resource personification refers to resources internalized by actors and reflected in an actor’s personality, thinking and acting (e.g. being a traffic manager) (Laud *et al.*, 2015). Resource representation refers to resources reflected in human- and nature-made objects (e.g. timetables) (Ngoye *et al.*, 2019). These eventually may sink in and turn into differing institutional logics, which may act as a barrier for resource integration, as is suggested by research on intra- (Pache, 2010) and inter-organizational change (Shaw *et al.*, 2017).

Table 1 Resources and their definition adapted from Bourdieu (1986, 2005), Scott (2012), Gulati *et al.* (2012)

Definition of resources	
Natural	Not made by humans
Technical	All human-made objects
Intellectual	Human knowledge and skills
Financial	Invested, saved and circulating money
Legal	National and international laws and their representations such as concessions and contracts
Social	Relational networks, both personal and virtual, based on shared identities and interpersonal ties
Cultural	Actors positions and conditions based on inherited and acquired properties, such as status, respect, reputation

2.2 Institutional logics

Supply chain research frequently uses the concepts of coercive, normative and mimetic institutional pressures of DiMaggio and Powell's (1983) neo-institutional theory on isomorphism because it explains the uniformity and persistence in organizational structures, cultures and output (id., p.147) and with it the success or failure of intra- and inter-organizational practices and coordination (Kauppi, 2013; Wang *et al.*, 2018; Gligor *et al.*, 2019). The theory's origin is seldom referred to Kauppi and Hannibal (2017) because the institutional context that organizations have to cope with are usually considered as given (Ocasio and Gai, 2020).

Institutional pressures are derived from various societal institutional orders, i.e. "[...] multifaceted durable social structures made up of symbolic elements [i.e. rules, norms, common beliefs], social activities and material resources." (Scott, 2013, Ch. 3, p. 5), such as the state, religion or family. Another strand of institutional theory, organizational institutionalism (Ocasio and Gai, 2020) posits that they are underlain by institutional logics, i.e. "socially constructed, historical patterns of material practices, assumptions, values, beliefs and rules" (Thornton *et al.*, 2012, p. 804) that result from and reinforce the cognition, behavior and resource use of societal, organizational and individual actors, thus providing the organizing principles for their distinct resource-coordinating and integrating practices (Thornton *et al.*, 2012; Edvardsson *et al.*, 2014; Besharov and Smith, 2014).

Friedland and Alford (1991) defined institutional logics by revealing the categorical elements of "[...]the most important institutional orders of contemporary Western societies[...]. Capitalism, family, bureaucratic state, democracy and Christianity [...] (pp. 248–249)." Thornton *et al.* (2012) refined and added to both the categorical elements and institutional orders using the analysis of existing studies and their own research. Based on nine, non-exhaustive, categorical elements, they distinguished the underlying logics of seven institutional orders, respectively, family, community, state, religion, market, profession and corporation (Thornton *et al.*, 2012). The first column of Table 2 presents these categorical elements.

The categorical elements assist both the analysis of empirical research and the unveiling of the inter-institutional system to which actors are subject, for example, the institutional orders family, market and religion. Actors combine the elements of their inter-institutional system in addressing resource-coordinating and integrating situations and in doing so, they develop their own institutional logic. The majority of institutional logics therefore do not directly relate to one of the institutional orders at society level (Friedland and Alford, 1991; Thornton *et al.*, 2012).

Whether an institutional logic changes and sustains depends on the agency of the actor(s) that bring it into being and incarnate it, and the number of actors that sustain it (Edvardsson *et al.*, 2014). In this context, agency refers to "the ability to have some effect on the social world-altering the rules, relational ties or distribution of resources" (Scott, 2013, Ch. 4, p. 17).

Institutional logics, thus, emerge from and have an effect on actors' resource-coordinating and integrating actions, experiencing and collaboration (Smets *et al.*, 2012; Besharov and Smith, 2014; Edvardsson *et al.*, 2014). However, to our knowledge, no one has addressed this effect on the intended resource coordination and integration in EEs and their nested context. This paper, therefore, aims to address this gap by investigating the effect of institutional logics on three EEs in the railway sector of The Netherlands. The following section explains the design for this investigation.

3. Research design

3.1 Research context

In 2005, the National Railways in The Netherlands was privatized through national and provincial concessions. As then, the state is the authority of the national railway infrastructure concession and the train operation concession. The provincial governments possess the authority for the train operation concessions on the predominantly single-track railway tracks at the regional level. Hence, the national train service became the concessionary responsibility of several organizations.

Based on the planned construction activities, the concession-owning Railway Agency (RA) annually sets up a negotiation process among the remaining concession-owners to schedule the

Table 2 Categorical elements of institutional logics based on Thornton *et al.* (2012, p. 56)

Categorical elements	Definition
Root metaphor	Basic structural form of experience that increases the understanding of what is common to a phenomenon by means of another phenomenon, thus supporting the engagement of actors in understanding and organizing their world (Morgan, 1983)
Sources of legitimacy	The underlying factors securing the social acceptability and credibility of actors (Scott, 2012)
Sources of authority	The underlying factors securing the acceptance of orders by contributing actors (Barnard, 1968; Spencer, 1970; Grimes, 1978)
Sources of identity	The factors supporting the perception of belonging to a group of actors compared to another group (STETS and BURKE, 2000; Ashforth and Mael, 1989)
Basis of norms	The factors underlying the shared expectations of individual and organizational actors that support accepted and sanctions unwanted behavior (Opp, 2001)
Basis of attention	The factors initiating the top-down and bottom-up selection, sustenance and allocation of certain cognitive resources above others (Ocasio, 1997, 2011)
Basis of strategy	The factors underlying the purposeful and emerging actions that create fit among an actor's activities (Porter, 1996; Ahlstrand <i>et al.</i> , 2001)
Informal control mechanisms	The actors and factors that unobtrusively assist in supporting or correcting actor behavior (Goebel and Weißenberger, 2017)
Economic system	Goods- or service-centric economic reasoning, respectively, focusing on the exchange value or the use value of goods (Grönroos and Voima, 2013; Gronroos and Gummerus, 2014; Vargo and Lusch, 2016)

use of the railway infrastructure for maintenance and train operation purposes. Despite this agreed-upon schedule, the perfect alignment of train operation, maintenance and construction activities at operational level is virtually impossible due to unexpected daily disturbances at operational level (e.g. failing infrastructure and trains, weather, third actors). The performance of the national train service, therefore, depends on whether the operational business units at regional level coordinate and integrate their resources to address these disturbances and form an EE. Hence, each of these regional railway settings forming a perfect research case in view of our research question.

3.2 Method

This paper uses a qualitative multiple case study approach because it enables to combine different data sources to capture the actions and experiences of actors, their collaboration and their used and emerging institutional logics. The three cases involved, Cases A, B and C are each responsible for the scheduled train service in either the national or a provincial concession. The differing train concession owners referred to as CIS (Cases A and B) and TRANS (Case C) offered the maximum variation and therefore determined the case selection (Flyvbjerg, 2006).

Each case consists of four core units, i.e. the asset and traffic management units of the RA and the traffic management and service and operations units of either CIS or TRANS. In addition, one or more preventive maintenance contractor units and a unit of the train maintenance firm (a CIS subsidiary) are involved. Case A consists of these units and, respectively, the maintenance contractors B and D units (MCb and MCd). In Case B, in addition to the core units and the train maintenance unit, the performance analysis unit of the RA, the CIS EE-secretariat and local planning unit and the international train operator unit (a CIS subsidiary) are involved. Case C, though, has a different setup. Next to the core units, the train maintenance firm and MCb units, the planning and control unit of TRANS and the regional railway allocation unit of the RA are involved. In contrast to Cases A and B, the service and operation manager of TRANS is a concession owner too.

The research followed the guidelines for research ethics. The research ensured that all interviewees and observed meetings agreed to participate and treated their information confidentially, not using it when so requested. Finally, the research did its utmost to prevent the identification of the EEs and interviewees.

3.3 Data collection

The data collection draws on three data sources: observations of EE meetings and inter- and intra-organizational meetings at strategic level, supported by semi-structured interviews, group conversations and archival materials. From July 2013 until February 2017, the observation of 40 meetings, execution of 31 semi-structured interviews and 9 feedback meetings took place (Table 3). Furthermore, reports and archival data (ranging from 2011–2017) were analyzed, which include concession documents, meeting minutes and internal presentations of the RA, CIS and TRANS.

The observation of series of meetings enabled the investigation of the used institutional logics and their effect on resource coordination and integration. In contrast to interviews, observations reveal the level of interactive contacts,

the experienced and perceived organizational and inter-organizational reality per business unit, and the ongoing negotiations about the sense-making and giving of this reality (Smets *et al.*, 2012; Jerolmack and Khan, 2014; Weick *et al.*, 2005; Gioia and Chittipeddi, 1991). From the start, the first author observed a number of railway allocation, asset management (AM) and project meetings at the RA office and gained access to inter-organizational meetings during the research. As a non-participating partner at the meeting tables, she observed the differing positions in the meetings and the opportunistic, defiant, submissive and collaborative behavior of the various actors involved. In addition, she listened to the shared, conflicting and neglected interpretations of their differing but related contractual and professional reasoning.

This research chose the semi-structured interview method to support the observation data. It did so because this method encourages interviewees to reflect and elaborate on meetings and the discussed ongoing concerns, which led to deeper insights into the observed behavior and their reasoning. On top of this, interviewees gave access to other meetings and valued resource persons, such as their colleagues, collaborating partners, senior managers and knowledgeable employees. This research thus snowballed its interviews and meetings. In the interviews, it asked the interviewees to describe their work and specify the contributions and challenges of their collaboration with the divisions and business units in their own and partner organization(s), as well as with contextual actors and to characterize the effect steering mechanisms had on the collaboration by giving examples of their own actions and experiences.

The feedback meetings resulting from research-related discussions and presentations validated the observational findings. Similarly, the archival data validated the observational and interview findings on the formal steering mechanisms and the intra- and inter-organizational management structure and processes.

Phase one of this intra- and inter-organizational research started in July 2013 and lasted until May 2014. This explorative phase gave first insights into the resource coordination and integration among the RA, its maintenance contractors, infrastructure projects, CIS and the freight train companies (Bobbink *et al.*, 2014). Based on this, the research excluded the freight train operators, the RAs construction division, and their contractors and no longer focused on the financial and natural resources.

In phase two, which lasted from May 2014 to September 2015, Case A and dyadic AM contractor meetings were observed. In addition, various employees and managers of the business units involved, along with managers and employees of the concerned RA and CIS divisional managements were interviewed. Access to the AM – contractor meetings was sought because the contractor units did not take part in the EE meetings. However, access to these meetings was only gained in Case A.

In phase three, lasting from October 2015 to February 2017, a sequence of biweekly Case B and triweekly Case C meetings was observed, 18 in total. In addition, two supra-provincial meetings involving representatives of three provinces, the RA, CIS, TRANS and the train maintenance firm, and two national meetings involving the five CIS EEs were observed. Finally, five feedback meetings, one with Case B and Case C each, one with Case B's AM unit, who missed the feedback meeting, one for staff of the CIS national office and one with the EE secretaries of the five CIS EEs.

Table 3 Primary data sources

Observed meetings at national inter- and intra-organizational/ divisional level	1 AM + MCB+ MCD; 2 Internal RA Railway All; 2 AM +Provincial Authorities (3) + CIS+TRANS+ TMF; 1 Railway all. + All TOs; 3 AM + Consultant; 1 Railway all. +TRANS+ CIS; 1 Railway all. + Freight operator + AM/ MCA; 2 for all 5 CIS EEs (incl. EE A + B)			
Feedback meetings at national level	1 with 5 EE secretaries, 1 CIS meeting, 3 AM-CIS (leading EE transformation process)			
Interviews at national level	RA: 2 Railway All. mgr, 1 Information policy mgr, 2 AM mgrs., 2 AM advisors, 1 TM project mgr CIS: 1 Silo integration mgr, 2 EE program project mgr; 1 RA Account Management Unit employee			
Observed meetings at operational level	Case A	Case B	Case C	Additional
• EE	2	11	5	Different TRANS-EE: 1 and CIS-EE: 2
• AM unit-MCb	1		1*	
• AM unit-MCd	3			
• AM division-AM unit	1	1		
Interviews at operational level	Case A	Case B	Case C	Additional
• Managers	4 (1 AM, 1 TM, 1 CIS TM, 1 MCB*)		3 (TRANS; 2 S&O, 1 MCB*)	RA: 6 AM, TRANS: 1 S&O CIS: 1 TM, 1 LP
• Employees	5 AM of RA		1 P&C of TRANS	
Feedback meetings		1 with AM-unit 1 with TM-unit mgr and EE-secretary EE: 1	(short feedback during each EE meeting)	1 with 2 MCA employees

Notes: * = same; AM = asset-management (division or unit) of the Railway agency (RA); Railway all. = Railway allocation division; TMF = train maintenance firm; TM = traffic management unit of the RA; MCB = maintenance contractor-B; MCD = maintenance contractor-D; MCA = maintenance contractor-A; S&O = service and operations; LP = local planning, P&C = planning and control

3.4 Data analysis

In line with qualitative research approaches, initially line-by-line coding of the transcribed interviews and meetings, and reports of interviews, meetings and group conversations took place. Iterative rounds of coding stressed the different perceptions and practices of the differing actors on how to sustain and improve the train service. During this process, it became evident that the appearing categories referred to differences in strategies, reasoning and practices of the business units, divisions, organizations and concession authorities involved. Reviewing performance management and measurement, supply chain management and EE literature did not shed enough light on these findings, but reading [Edvardsson's \(2014\)](#) article on the effect of institutional logics on resource integration did. The institutional logics and resource definitions used, though, were not exclusive enough, this in contrast to the categorical elements of the inter-institutional matrix proposed by [Thornton et al. \(2012\)](#). By defining and using these elements, three institutional logics were revealed, two of which are prevalent in both the hierarchical organizational context of and in the EEs, i.e. the performance and professional logics. The remaining one is a co-existing institutional logic at EE level, the co-creation logic. Subsequently, the effect of these logics on the social, intellectual, technical, legal and cultural resource coordination and integration of the three cases was established.

4. Findings

4.1 Institutional logics at work

The analysis revealed three institutional logics prevalent in the three cases: the performance, professional and co-creation logic ([Table 4](#)).

4.1.1 The performance logic

This logic uses concessions and contracts to control, manage, protect and where possible increase actor-owned technical and intellectual resources. In this manner, concession/contract authorities spread their risks over the concession/contract owners, often without necessarily taking care of their fair distribution. In the railway sector, for example, the RA's AM units are contractually responsible for weather and third-actor-related train incidents, thus reducing the risks and strengthening the negotiation position of the train operator units. A concessionary-created juxtaposition that strengthens the employee perception of belonging to their own unit, while steering their attention only to their contractually determined technical resources. Staff introductions and training strengthen this attention, e.g. the training of traffic management employees on their own concessionary responsibilities. The same applies to the targets of concessionary and contract criteria because their positive target results strengthen the credibility and acceptance and with it the market position of actors, thus securing their presence and supporting the acquisition of new concessions/contracts. Hence, the performance logic grounds its economic system in legal resources, while attuning and improving its intellectual resources to it in support of its technical resources, leading to a resource-centric economic system.

4.1.2 The professional logic

The professional logic improves and sustains the quality of professional expertise to reduce the risks of using product services. In the railway sector, its attention is on sustaining and improving the safety of the technical objects used, for example,

Table 4 Institutional logics prevalent at EE level

Categorical elements	Performance logic	Professional logic	Co-creation logic
<i>Root metaphor</i>	Risk allocation	Risk reduction	Risk sharing
<i>Sources of legitimacy</i>	The contract or concession	Well-functioning technical objects; successful innovations, above standard knowledge and skills	Conviction in the mutual responsibility for service delivery
<i>Sources of authority</i>	The management positions in public agencies, private firms and projects	Established and agreed-upon specialized standards	Increased use of the service
<i>Sources of identity</i>	Contractual/concessionary responsibilities of firm, division, business unit and employee	Association with sustained and improved quality of technical resources	Establishing the most reliable service
<i>Basis of norms</i>	Firm and business-unit interests and resources	Safety of technical artefacts	Membership of the operational service network
<i>Basis of attention</i>	Status in the market and firm hierarchy	Uptime of technical resources compared to other business units/firms/concessions/regions/countries	Contribution of each partner (suppliers and customers) to the usability of the joint service
<i>Basis of strategy</i>	Securing resources by granting or acquiring contracts and, respectively, controlling or meeting/exceeding the contract criteria	Sustaining and improving technical and intellectual resources	Improving the use of the joint service
<i>Informal control mechanisms</i>	Inducing contractual performance enhancing approaches through introduction and training	Sharing and implementation of profession-specific resource solutions	Mutually established norms; inter-professional relations; inter-contractual solutions
<i>Economic system</i>	Resource-centric	Resource-centric	Resource-use centric
<i>Related example quotes</i>	<p>"Once the train schedule is out, we are in control" ... (CIS traffic management manager)</p> <p>"... I wonder how long his train focus lasts now he belongs to us." (divisional AM manager)</p> <p>"... We did not incorporate time for railway maintenance in our proposal to our concession authority, and they did not ask for it." (TRANS manager at head office)</p> <p>"... Contractors are not our concern." (CIS traffic management manager)</p>	<p>"... We manage to solve head-breaking infrastructure problems together with the AM unit. We even proposed several improvements; as long as contractual issues stay out of it, we manage just fine" (M/Ca employee)</p> <p>"... The AM unit and its contractors do not take train operation interests into concern" (CIS local planning manager)</p> <p>"... I certainly do not belong to the AM unit" (RA traffic management employee)</p> <p>"... Why can't they give us sufficient time to do our job properly" (general complaint of contractor and AM units, AM division)</p>	<p>"... I'm supporting our EE-learning and improvement circle by sharing (AM representative)</p> <p>"... "When we present an issue as EE to our various managements, it has a bigger chance to succeed" (TRANS planning and control employee)</p> <p>"... I try to be at every EE meeting even after a night shift and during my holidays" (traffic management representative of RA)</p> <p>"... I am enraged because my divisional level has not considered our discovered flaws in the railway allocation yet." (RA regional railway allocation representative)</p> <p>"... "We should share our excellent performance rates nationwide." (regional AM manager to TRANS S&O manager)</p>

the prevention of rapid train wheel and railway infra-wear by adapting train driving to slippery railways. Succeeding in this supports the acceptability and credibility of the professional expertise by peers and others.

Profession-specific norms embedded in legislation and captured in profession-specific standards assure the quality of the profession. In the railway sector, the railway law (Hagdorn, 2017) stipulates the standards for train operation and railway infrastructure maintenance, construction and allocation. The incorporation of these standards in separate contractual procedures aims to secure the safety of the technical artefacts and consequently the safety of their environment and of those using, maintaining and constructing these artefacts. Established professional standards that others recognize and adhere to aid in providing authority, e.g. a train guard's ability to fine passengers trying to embark after the departure whistle. Exceeding specific professional standards secures and focuses the attention of peers and others. This logic grounds its economic system on the available intellectual resources to support developing and sustaining its technical resources, also leading to a resource-centric economic system.

4.1.3 The co-creation logic

This logic establishes unity by sharing risks and improving both the resource use of the individual actors and the resource integration of all. To sustain this process, it seeks to accommodate the conflicting pointers of other logics, for example, the time needed for railway maintenance versus the time needed for train operation schedules. Hence, this logic supports attention to the use value of each other's contracts, expertise, experiences and work routines and the integration of this learning into a joint routine to improve the final service delivery. The resource-use-centric economic system of this logic results in performance improvements at the actor-specific and overall level, which increases the social acceptance and credibility of the actors using it. On top of this, this logic supports the creation of EE-supporting norms and regulations and the strengthening of inter-professional relations. Adhering to and nurturing these informal norms and regulations is a means to control the negative effect of the performance and professional logics in an EE and its organizational context, while this concurrently strengthens the co-creation logic.

4.2 The effect of institutional logics on the resource coordination and integration in extended enterprises

In the three cases, the prevalent institutional logics had different effects on resource coordination and integration (Table 5).

4.2.1 Case A: the effect of differing performance logics: lack of resource coordination and resource segregation

In the Case A meetings, all participating units reasoned from their own divisional or organizational performance logic. A mutually recognized coordinator facilitating the integration of these logics was lacking. Hence, the participating units strengthened their contractual borders instead of exploring them. The only exception were the traffic management units of CIS and the RA because of a

joint divisional project stressing their partly mirroring assignment. The resulting superficial personal relations, non-existent EE identity, reasoning on behalf of others, and disregard for the cornered and subordinate position of the AM unit, led to an overall resource segregation.

4.2.1.1 *Social resources.* Each operational unit focused on their own divisional or organizational assignment, which hindered building their EE. The shared identity and aligned agreements of both traffic management units and the AM-contractor units promoted the interpersonal relations among employees having partly mirroring assignments. The resulting dyad-centric behavior did not improve the interpersonal relations among these dyads and the other units, as a resource coordinator supporting their EE identity by mitigating their inter-unit and inter-dyad conflicts was lacking. Instead, they resolved conflicts and sought confirmation for resource integration actions via their contracting agency, division or organization.

4.2.1.2 *Intellectual resources.* The actor and dyad-centric behavior hindered the timely exchange and translation of information and mutual performance-sustaining or enhancing actions. Instead, units reasoned on behalf of other units, based on their own information gathering and/or perceptions about these units. Hence, the information leading to mutual performance enhancing knowledge and actions was generally too little, too late. This led to an EE without executive power and units increasingly skipping the six-weekly EE meetings.

4.2.1.3 *Technical resources.* Case A specifically felt the effects of the mismatching of technical features of trains and railway infrastructure causing premature wear and tear because of their region's high traffic density and maintenance-ignoring railway construction. However, its units had no say in the choice of trains and railway infrastructure layout. Because of this, the AM and contractor units needed extra railway access time to re-address the effects of these mismatches, which was hard to get and spurred the railway access disputes with the CIS and the RA traffic management units.

The imposed performance measurement systems had a similar effect. Each unit focused on its own divisional/organizational system; an EE system did not exist.

4.2.1.4 *Legal resources.* Due to the pilot improvement program on train service delivery initiated by the RA, CIS and their concession authority, consisting of divisional, bi-divisional and EE improvement projects, the RA and CIS traffic management divisions had started a bi-divisional process to align and harmonize their performance criteria at operational level in support of their concessionary key performance indicator (KPI), punctuality. This KPI supported their professional standards, too, thus strengthening their personal relations and shared identity, and hence increasing their rift with the other Case A units in particular because the EE project intending to bridge these differences had not started yet.

The main concessionary KPI of the AM unit, i.e. "train operation-affecting occurrences" (TAOs), consisted of five infrastructure disruption-causing criteria: infrastructure, climate, third actors, processes (RA, train operators, contractors) and "other." However, TAOs were not included in the contractor contracts. Their contractual criteria focused on infrastructure criteria only, such as the number of switches maintained and time needed to fix switch failures. Because of

Table 5 The effect of the performance, professional and co-creation logic on the intended resource coordination and integration in three EEs in the railway sector

Effect on	Performance Logic	Professional Logic	Co-creation logic
Resource coordination	Failing resource coordination because of resource-centric interests	Informal resource coordination among professionally related, partly mirroring, operational actors	Informal resource coordination because of recognition and integration of differing performance and professional logics
Resource integration	<p>Social resource segregation:</p> <ul style="list-style-type: none"> Encourages function-specific identity formation and relationship building and restrains relationship building with differing functions and professions <p>Intellectual resource segregation:</p> <ul style="list-style-type: none"> Encourages reasoning for other actors Encourages hiding behind labor contract <p>Technical resource segregation:</p> <ul style="list-style-type: none"> Legitimizes using technical resources for actor-specific interests <p>Legal resource segregation:</p> <ul style="list-style-type: none"> Allows business actors to retreat from EE Prevents EE resource integration being part of actor management contracts <p>Cultural resource segregation:</p> <ul style="list-style-type: none"> Sustains and strengthens the difference in position and enhances “blaming” Supports imposing resource-centric interests Allows for acceptance of “invisible” actors, such as AM unit, maintenance contractors and train maintenance unit 	<p>Social resource segregation:</p> <ul style="list-style-type: none"> Hinders relationships between professionally differing actors Legitimizes counterproductive acting based on differing professional identities <p>Intellectual resource segregation:</p> <ul style="list-style-type: none"> Hinders exchange of differing professional knowledge and skills <p>Technical resource segregation</p> <ul style="list-style-type: none"> Hinders joint prioritizing of the same technical resource, e.g. use of railway infrastructure for trains and maintenance <p>Legal resource segregation</p> <ul style="list-style-type: none"> Prevents informal inter-professional agreements <p>Cultural resource segregation:</p> <ul style="list-style-type: none"> Legitimizes prominent position of “visible” professions such as train operation while downgrading “invisible” professions, such as railway maintenance 	<p>Social resource integration:</p> <ul style="list-style-type: none"> Encourages search for joint EE identity Settles performance and professional conflicts of interest Stresses and defends regular personal contact <p>Intellectual resource integration:</p> <ul style="list-style-type: none"> Erases borders between conflicting performance and professional logics Initiates exchange of knowledge and asking for knowledge support Encourages the transfer and translation of the differing knowledge and skills of actors <p>Technical resource integration:</p> <ul style="list-style-type: none"> Sharing use of technical resources, such as allowing barrier closing for speedy train returns and securing train free periods for maintenance <p>Legal resource integration</p> <ul style="list-style-type: none"> Supports reinterpreting and bending of rules and regulations for the benefit of the EE <p>Cultural resource integration:</p> <ul style="list-style-type: none"> Counteracts on and resets firm-centric strategic management and profession-centric behavior Mutual norms for conflict resolution and EE improvement established and adhered to

their daily work on the railway tracks though, contractors possessed valuable information on the other TAO criteria, too. However, the AM unit could not contractually enforce the provision of this information. Hence, they connected to the contractor units by sharing their expertise, stressing their shared railway maintenance identity and pointing at those limiting their railway access, i.e. the traffic management and CIS units.

From the national perspective, a reduction in TAOs sustained an increase in punctuality, and thus the overall service delivery. At Case A level, this interdependency favored both traffic management and the service and operation units because they could blame a reduced

punctuality on the AM and contractor units, without addressing the negative effect of their own practices:

[...]Driving with 130 km/hour past persons near to the track is frightening. Why should the CIS units care about your administrative performance at all? Your asset management performance is not their concern[...] (RA traffic manager in Case A meeting)

Efforts of the AM manager to create joint performance criteria at EE level supporting both concessionary KPIs failed because the CIS units stressed this was not their responsibility, but that of their divisional management.

4.2.1.5 Cultural resources The position of the different units in Case A differed due to the governmental and nationwide train-service focus, the neglected role of

railway maintenance in this and the lacking and ignored knowledge about what railway maintenance entails. Because of this, the RA had tucked railway maintenance away into a nationwide, all-inclusive 4 h train-free timeslot (TFT) from 01.00–05.00 a.m.:

[...] I wonder what the directors of the Railway Sector and the Concession Authority talk about. I have a feeling it is about ever more trains, without attaching any importance to railway maintenance[...] (trajectory manager, asset management-unit)

In Case A, though, night trains, freight trains, infrastructure projects and the train maintenance firm made use of this same timeslot. Hence, the AM unit had to secure enough scheduled TFT on behalf of its contractor units during the annual railway allocation process, pointing to the necessity of maintenance activities. Once allotted, both had to defend their TFT especially when needing additional TFT to finish a maintenance job or repair an infrastructure disruption. Getting this additional TFT was virtually impossible because of the potential negative effect on the train schedules of their own and other operational regions, but at the same time, it was needed to prevent just that.

4.2.1.6 Summarized effect of the differing performance logics on Case A. The differing divisional and organizational performance logics are grounded in differing legal resources. The personifications (e.g. “our train and your AM performance”) and representations of these resources (e.g. train and maintenance schedule, concessionary and contract KPIs) hindered not only the recognition of a mutually recognized resource coordinator but also their resource integration: a situation which resulted in the reasoning on behalf of other units; imposing resource-centric interests; retreating behind individual contracts and management agreements; sustaining and strengthening the existing differences in business-unit positions; allowing for skipping Case A meetings and the “invisibility” of concessionary/contractually subordinate supplier units (AM, contractors and train maintenance units). This prevented the development of a Case A identity and the establishment of an informal resource-integrating agreement. The hierarchically coordinated resource integration of the professional mirroring traffic management of RA and CIS and the AM units of RA and contractors, i.e. having similar professional-cum-performance logics, contributed to this resource segregation because of the increased focus on their own legal and intellectual resources.

4.2.2 Case B: the effect of a dominant professional logic: resource-integrating segregation

In the Case B meetings, seven of the nine participating units reasoned from a dominant professional logic grounded in trains and train operation. This professional logic strengthened the personal relations and shared identity in addition to improving their knowledge sharing about interrelated train schedules, train starts, train maintenance demands and fine-tuning their technical resources in support of it. However, the strengthening of this dominant professional logic ignored the identity, knowledge and technical resources of the AM unit and stressed the non-operational identity of the CIS local planning unit.

4.2.2.1 Social resources. In addition to participating in divisional improvement projects of the pilot RA-CIS improvement program, the units in the Case B meeting also participated in the EE project. The EE project’s obligatory, full presence, biweekly meetings improved Case B’s communication lines considerably:

[...] We know whom to contact now[...] and they know how to contact us [...] (asset management unit representative)

However, the divisional improvement trajectories and the train operation focus of the EE project hindered the creation of an EE identity and eventually drained Case B’s resource-coordinating and integrating energy. The train operation units, for example, focused on improving the timely start and departure of trains and so did the visiting CIS directors, the overall EE project managing representatives and the consultant of the, Case B initiated, resource-integrating process. Because of it, they ignored the railway maintaining identity of the AM and contractor units, contributing to the informal withdrawal of the AM unit’s representative from the Case B meeting:

[...] Our EE meeting only tackles CIS issues [...] (AM unit representative)

The train operation identity did not match the planning identity of the local planning unit either, which eventually contributed to their formal withdrawal from the Case B meeting. Although the coordinator and train operation units strongly disputed the withdrawal of the train operation-related local planning unit, they more or less accepted the withdrawal of the AM unit.

4.2.2.2 Intellectual resources. Supported by all units, the coordinator addressed the dissipating energy that the divisional improvement projects had caused in the Case B meeting. He initiated a consultancy process to improve the knowledge exchange on their differing work routines to improve train starts and strengthen the position of their EE in its hierarchical organizational context. The CIS-related consultant, though, failed to probe for the railway maintenance knowledge, while the AM unit failed to push for it and the train operation units hardly asked for it. Hence, Case B’s train operation knowledge strengthened and ignored the railway maintenance involvement in improving their train service delivery.

This partial resource integration, though, improved Case B’s position with respect to the divisional CIS management. For example, they added train parking and maintenance areas to their operational area, despite the instructions of a divisional CIS director stating that their responsibility stopped beyond their train station and shunting yard. However, they failed to include the operational area of the AM unit beyond it.

4.2.2.3 Technical resources. The increased demand for train services led to a steady increase of the number and length of trains. The available parking and maintenance areas for trains, though, did not increase. The train operation units had to bear the consequences of this mismatch:

[...] It is what you told me jokingly yesterday[...] “You don’t have enough railway tracks for my trains”[...] I answered: No, you just have too many trains”[...] (TMF representative to TM representative (coordinator) in Case B meeting)

In discussing their increasing problems because of the railway infrastructure shortage, the train operating units did not involve the AM unit, though it experienced similar problems. After all, the shortage of railway infrastructure reduced its railway access for maintenance while increasing the need for it. Incorporating these issues could have strengthened the Case B claim for additional railway infrastructure, instead of repeatedly being snubbed for it:

[...] Demanding additional railway infrastructure is **not** EE business[...] (CIS process facilitator-cum-lean consultant to Case B coordinator in first national EE meeting)

4.2.2.4 Legal resources. During the consultancy process, the Case B units had to add contributing, self-controlled, contractual performance criteria in support of their mutual objective. The assumption was that by monitoring, discussing and acting upon the results of these criteria, the effectiveness of their meetings would improve, the unit-specific and overall performance would increase, and the risks pertaining to their train service would be reduced. Discussing the criteria revealed the similarities and interrelations between the train operation units, but stressed the differences with the local planning and AM units. In addition to the earlier mentioned social resource segregation process, this contributed to their withdrawal from the Case B meeting, too.

The subsequent reporting on these self-controlled criteria turned the attention to the unit-specific work routines but failed to address the overall workflow. This became apparent when discussing the targets of the concessionary KPI, punctuality. During these spare moments, they discussed the lacking management of their overall workflow, an issue the coordinator repeatedly mentioned to visiting CIS directors and in the national EE meetings, who replied that they should take up this management informally. Case B, though, failed to do so themselves.

4.2.2.5 Cultural resources. The positions of the train operation units leveled out because of the train focus of the pilot improvement program but failed to integrate the AM and local planning units. Two factors contributed to this: the earlier mentioned social, intellectual and legal integration of the train operation units only and the active CIS support to integrate the unit of the train maintenance firm. Where before the CIS and international train operator units could blame this unit for a late start or wrong coach setup, CIS had started to stress the need to provide the train maintenance unit with the proper information and the right carriage formation, thus changing this unit's previous scapegoat position. However, blaming the AM unit for written-off railway infrastructure and solving AM-related conflicts via their divisions/organizations continued:

[...] I keep on telling them (= train operation units) that replacing written-off railway infrastructure is the responsibility of the construction division, not ours[...] They simply do not want to understand, so what is the use of participating in the Case B meetings[...] (representative of asset management unit)

4.2.2.6 Summarized effect of the dominant professional logic on Case B. Case B's adjustment of an imposed train-starting strategy based on the resource representations of their own professional logics, e.g. the correct carriage formation, timely train arrival at the right platform, resulted in a dominant professional logic focused on train operation. This dominant professional logic enabled Case B to fend off the differing

performance and professional logics of visiting divisional CIS directors. However, it hindered the social relations between the seven train-related units and the RA's AM (and its contractors) and the CIS local planning unit. Among them, it also hindered the exchange of professional knowledge and skills, the joint prioritizing of the same technical resources and the establishment of informal inter-professional agreements. Finally, it legitimized the prominent position of the "valued" train operation professions and ignored the position of the AM unit. Each of these exclusions hindered the formation of an EE identity and strengthened the resource-centric attention on either train operation, AM or local planning, resulting in a coordinated resource-integrating resource segregation.

4.2.3 Case C: the effect of the co-creation logic, resource integration The units involved in the Case C meeting reasoned each from their own performance and professional logics, but their additional co-creation logic, which the Case C coordinator unconsciously encouraged, interrelated their differing logics. The coordinator was able to do so because of his hierarchical overlapping position as TRANS concession owner. Also, being a recognized partner in the concession meeting enabled him to fend off the negative influences of his own organization and the RA on Case C and to ask for their support instead. Thus, he could protect Case C's co-existing co-creation logic, which stimulated reflection and allowed for the questioning and changing of existing knowledge, skills and power differences, strengthening the mutual understanding and social ties, which encouraged the search for and implementation of innovative Case C-level improvements. As a result, the various units forming Case C opened their contractual and professional borders and formed a strong EE.

4.2.3.1 Social resources. The coordinator's consistent mitigation of railway access conflicts between the stand-alone AM unit and the train operation units supported the Case C meeting efforts for joint improvements and resulted in strong personal relations and a shared Case C identity. Because of this, not only the railway infrastructure improved but also its use by TRANS and the RA's traffic management unit. The latter, for example, adapted the nationally agreed railway allocation to TRANS's needs:

[...] We are doing so well because we trust each other[...] (traffic management representative in Case C meeting)

The train maintenance unit did not take part in the Case C meetings and neither did the MCb unit. The train maintenance unit was not part of the Case C identity. When discussing train maintenance issues, the disinterest of the train maintenance unit in TRANS trains and its tightening bond with CIS were stressed:

[...] CIS is increasingly re-integrating the train maintenance firm[...] (Coordinator in Case C meeting)

The MCb unit, though, was unknowingly part of the Case C identity because of its dyadic relation with the AM unit.

4.2.3.2 Intellectual resources. Led by their coordinator, the units shared their expertise and experiences willingly. They articulated what was on their mind, added to or corrected arguments based on information gathering, asked explanatory questions, gave out-of-the box suggestions and sought for mutual understanding, which aided solving or finding the underlying reasons for their encountered problems, for example, on the delayed start of train operation because of a frozen-over catenary

system. The result was a new protocol launching three locomotives at the start of train operation during glazed frost periods from the winter of 2016–2017 onwards.

They also uncovered strategic capacity-planning flaws of the RA hindering their mutual performance, which they repeatedly addressed in vain to the divisional railway allocation level: for example, the RA's reassignment of their not-used railway access time by construction projects to freight trains instead; using unrealistic construction project planning schedules in the railway allocation planning leading to foreseeable train operation disruptions; freight trains hindering their train schedule. However, at their own level not including the train maintenance unit in this process led, among others, to hiring the wrong mechanics for the planned revisions of TRANS trains, while not including the MCB unit prevented the discussion on alternate railway maintenance periods.

4.2.3.3 Technical resources. The railway infrastructure construction of a bypass had solved a large part of the infrastructure problems of TRANS, enabling a partly 15-min train schedule on their mainly single railway track. Because of the location of this track and the scarce alternates for railway tracks under construction, part of the routing and rerouting of freight trains took place on it, which had a negative bearing on the TRANS train schedule.

At their own level, Case C improved the integrated use of their technical artefacts as much as possible. For example, they effectively used the closing of railway crossing barriers and train personnel planning for allowing short train returns; maintained and repaired the railway as much as possible during the TFT at night and during construction projects; instructed specific train driving during autumn, reducing the wear and tear of railway infrastructure and trains – all of which contributed to an improved train service delivery.

4.2.3.4 Legal resources. All units in the Case C meeting focused on improving the target of TRANS concessionary KPI, punctuality and limiting its train-cancellations. Because its unit representatives were willing to cross their contractual boundaries, legal resource integration became possible, though informally. The RA's traffic management unit, for example, adjusted the annually agreed railway allocation to the train operation needs of TRANS:

[...]My staff wrongfully thinks that this is the nationally agreed train allocation[...] (Representative RA's traffic management unit in Case C meeting)

The resulting excellent punctuality performance (99%) supported the RA's punctuality and TAO targets.

In turn, the coordinator, being TRANS S&O manager and concession owner, assured a smooth train operation through his personnel instructions and planning. The "autumn driving instructions" for slippery railway tracks reduced related train cancellations and prevented blaming the AM unit for it. The only downside was the limited maintenance time: a 2.5 h TFT combined with a monthly 5.5 h TFT, instead of the standard 4 h TFT from 01:00 to 05:00 a.m. Despite the fact that the joint risk-sharing focus of the Case C meeting supported looking for and applying innovative alternates to ensure this limited time, this did not solve the contractor's nightmare of deploying and retaining personnel because of these TFTs.

4.2.3.5 Cultural resources. The Case C meeting units shared the same position because of their shared norms of not jumping to conclusions, but listening to and respecting each other:

[...]We do not copy the accusing behavior of our firm's traffic management office. This is simply not how we agreed to approach each other"[...] (coordinator Case C meeting)

These norms did not yet count for the MCB unit, though its manager expressed interest in having direct communication lines with TRANS to discuss and negotiate railway access needs and possibilities to avoid miscommunications. The coordinator supported this reasoning. However, for the traffic management representative, inviting the contractor unit to their meeting was one bridge too far because of his performance logic:

[...] The recent consultant report evaluating the major train cancellation in our RA region (Case A plus Case C) specifically stated we should keep to our designated roles, so my contact is the AM unit, and certainly not the contractor[...] (traffic management representative, Case C meeting)

The widely commended excellent performance of Case C could not prevent the withdrawal of unit representatives and units because their divisional and organizational management teams did not formally recognize their meeting, coordinator and mandate. Hence, the AM unit participated once every other meeting and the TRANS head office pulled out its planning and coordination unit. However, the latter's representative did not follow this order because of the learning and innovation opportunities in Case C.

4.2.3.6 Summarized effect of the co-creation logic in Case C. The six units in the Case C meetings reasoned each from their own performance and professional logics. Their additional co-creation logic interrelated the resource personifications and representations of their differing logics. This enabled not only the strengthening of their joint EE identity and social relations but also the sharing of their knowledge, skills and technical resources and the re-interpretation of their resource-segregating contractual rules. The latter, in turn, supported the establishment of informal agreements and mutual norms to safeguard their EE effort. The hierarchical overlapping position of especially their coordinator-cum-concession owner supported the co-creation logic. Because of this overlapping position, they could fend off the interference of the divisional and organizational performance logics and form a strong EE focused on sustaining its resource coordination and integration.

5. Discussion

A remaining challenge of supply chain clusters such as EEs is the resource integration and coordination of the involved business units for the overall product-service delivery. By adopting an institutional logic perspective this paper offers new insights into this challenge. It, first of all, shows that EEs belonging to the same hierarchical supply chain can have different co-existing resource-integrating and resource-segregating logics. Additionally, it reveals that each logic's categorical elements are grounded in varying combinations of resources and that these combinations determine a logic's resource-integrating or segregating character.

The multiple case study of the Dutch railway sector revealed three institutional logics: the performance logic primarily grounded in legal resources, the professional logic in

intellectual and technical resources and the co-creation logic in social and intellectual resources. The personifications and representations of these resources strengthen the logics' grounding (Bourdieu, 1986; Misangyi et al., 2008; Ngoye et al., 2019) and appear to be critical for the resource coordination and integration in supply chains. The resource personifications and representations of the performance logic (e.g. management position and contracts) and the professional logic (e.g. maintenance expert and maintenance-norms) show a strong resource-centric tendency that segregates rather than integrates the resources of an EE's business units. These logics seem persistent and hard to change especially because of the continued use of their resource representations (e.g. railway schedules, contractual KPIs). The co-creation logic is able to alleviate the segregation effect of these logics by interlinking them and allowing the joint translation and transformation of the resource-centric personifications and representations. This suggests that the agency needed for resource coordination and integration builds on an interlinking co-creation logic and if such logic is absent business units sharing similar resource personifications and/or representations are prone to mimic each other (Reusen et al., 2020) forming dyadic and multi-tier inter-organizational factions. This, in turn, hinders the resource coordination and integration in EEs (Flynn et al., 2010).

This paper's findings support that intra- and inter-organizational commitment at the hierarchical and EE-level of supply chains is critical for their resource coordination and integration (Fawcett et al., 2006; Reusen et al., 2020). They also suggest that the resource-centrism of a supply chain's institutional logics results in paying lip-service to integration efforts. Hence, the commitment, relationships, capabilities and technologies meant to support supply chain integration (Flynn et al., 2010; Yu and Huo, 2018; Rajaguru and Matanda Margaret, 2019; Reusen et al., 2020) appear to depend on an interlinking co-creation logic.

Previous research revealed that the dominance and constellation of institutional logics determine organizational and inter-organizational design (Besharov and Smith, 2014; Annala et al., 2019). However, proper leadership appears to be essential too (Kampstra et al., 2006). Our findings support both. The dominance and constellation of logics determined the organizational design of the three cases, and so did the presence and institutional logic of the focal resource coordinator. In Case A, the absence of the latter, resulted in a disintegrated EE consisting of separate silos and one, hierarchically induced, dyadic faction. The professional logic of the Case B coordinator and six train-related units excluded the AM and contractor-units, resulting in a factional train-operation cluster. In Case C, the coordinator's co-creation logic connected the differing resource personifications and representations of the EE's business units (including his own), which supported their mutual learning resulting in improved EE business unit and firm performances.

In addition, the hierarchically overlapping organizational positions of the Case C coordinator and two business unit representatives enabled the emergence of the co-creation logic, which supported Case C in averting resource-centric hierarchical supply chain interferences. Cases A and B not having similar positions were virtually unable to do so, hindering their resource integrating initiatives. Boundary-spanning positions (Williams, 2002; Smink et al., 2015) thus seem crucial for EEs because the mandates of these positions

protect the emergence of a co-creation logic against the dominance of resource-centric logics.

5.1 Limitations and directions for future research

This paper underrepresents certain organizations/units that also played a role in the resource coordination and integration of the researched EEs, for example, the maintenance contractors, train maintenance firm, construction project contractors, freight operators and their shipping agencies. However, the observations of RA, EE and national meetings and interviews with AM, contractor and CIS and TRANS representatives provided some insights. Research into the perspective of the private freight train actors therefore could provide a stronger foundation for the revealed institutional logics and their effect on freight train EEs and freight-cum-passenger-train EEs.

A second limitation is that this paper did not research the effect of the institutional logics on the coordination and integration of the EEs' natural and financial resources. They undoubtedly have a bearing on them. It could be of interest to research this effect in EEs involved in railway infrastructure expansion. Another interesting research topic would be to reveal the effect of institutional logics on the financial consequences of using each other's resources.

Finally, the generalization of the findings of this explorative research focused on three cases of a specific sector in one country is limited. Expanding it to neighboring countries or examining the effect of institutional logics on other EE-settings could provide a stronger foundation for the found effect of resource-centric logics and the interlinking logic focusing on the use of their resource personifications and representations on the resource coordination and integration in EEs and supply chains in general to improve and sustain them.

6. Conclusions

Institutional logics appear to matter for sustaining EEs because in the research-context of this paper the resource-centric logics governing EEs and their hierarchical supply chain context not only resulted in failing resource coordination but also in resource segregation. A co-existing interlinking logic mitigating the personifications and representations of the differing, resource-centric, institutional logics appears to support the resource coordination and integration in EEs. Becoming aware of the institutional logics present in an EE and its supply chain/network context, their resource personifications and representations, and addressing the latter for the benefit of the EE are essential skills for both the EE management and contractual/concessional authorities.

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Corresponding author

Maria Lammerdina Bobbink can be contacted at: m.l.bobbink@utwente.nl