



## Towards evidence-based management of external resources: Developing design propositions and future research avenues through research synthesis



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### ARTICLE INFO

#### Keywords:

Evidence-based management  
Interdisciplinarity  
Research synthesis  
Alliances  
Supply chains

### ABSTRACT

The general question of how best to access and leverage resources that reside outside the boundaries of the focal firm has become increasingly important for companies during the last decennia, and scholars across management disciplines have responded with increasing research efforts. However, managers still seldom base their decisions on scientific evidence. Research on managing external resources is carried out in disciplinary silos and it is extremely difficult for managers to make sense of the vast amount of scientific studies. The success story of medicine as the first domain to widely adopt evidence-based practices has been an exemplar for other disciplines such as management to address the prevailing research-practice gap. Through a systematic review and synthesis of 601 articles in six academic journals representing three management disciplines we develop design propositions for supporting evidence-based management of external resources in firms. Our analysis reveals external resource management (ERM) research to be concentrated on six distinct, yet interrelated, themes. We adopt the CIMO-logic (Context, Intervention, Mechanism, Outcomes) for developing the set of design propositions within each of the research themes. A key scientific contribution is our identification of future research opportunities and directions to advance science in the field of ERM.

### 1. Introduction

Management of resources beyond firm boundaries is advanced as a key issue for firm competitiveness (Dyer and Singh, 1998; Gulati, 2007; Pfeffer and Salancik, 1978). External (network) resources encompass “resources that accrue to a firm from its ties with key external constituents including – but not limited to – partners, suppliers, and customers, and thus exist outside a firm’s boundaries” (Gulati, 2007, p. 3). Managing the external resources has become a major task for firms, including selection of the right combinations of internal and external resources for capturing business opportunities, finding the best available external resources, effectively utilizing the external resources, and influencing the decisions and resource allocation of business partners. The share, relative importance, complexity and opportunities of external resources for firms have been multiplied during the latest decades (Axelsson et al., 2005; Monczka, 2010; Van Weele, 2010). As a consequence, one of the key challenges of extant management is the

imbalance between the relative importance of external resources and the traditional organizational capabilities to manage those external resources. Researchers from various disciplines have responded with growing interest to the broad question of how to best leverage resources that reside outside the boundaries of the focal firm. In management research, interest has been exhibited by three disciplines in particular. Marketing and operations/supply chain management (OM/SCM) represent boundary spanning functions of the organization, while strategic management takes an overarching view of the field. Research in these management disciplines has been carried out under different labels, however. Marketing scholars’ extensive study of the leverage of external resources has been conducted under the relationship marketing discourse (e.g., Spekman and Carraway, 2006). Closely related issues have been studied in strategic management under alliance management (e.g., Schreiner et al., 2009; Sluyts et al., 2011) and strategic networks (e.g., Gulati et al., 2000) discourses, and in OM/SCM within the headings of supply chain and buyer-supplier relationship

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<http://dx.doi.org/10.1016/j.respol.2017.04.002>

Received 8 June 2016; Received in revised form 28 March 2017; Accepted 3 April 2017

Available online 16 April 2017

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management (e.g., Braunscheidel and Suresh, 2009; Paulraj and Chen, 2007).

In spite of the huge amount of research on organizations and management, managers seldom base their decisions on scientific evidence. Instead, they most commonly make decisions based on weak evidence such as their personal preference, unsystematic experience, and advice from business books or consultants. (Pfeffer and Sutton, 2006; Rousseau, 2006; van Aken and Romme, 2009). The success story of medicine as the first domain to widely adopt scientific evidence-based practices has been an exemplar for other disciplines such as management (Briner et al., 2009; Denyer et al., 2009; Rousseau, 2006). Although evidence-based management (EBM) is not a new idea, it is becoming increasingly popular in management research as a way to close the prevailing “research-practice gap” (van Aken and Romme, 2009; Rousseau, 2006).

Properly conducted systematic reviews enable practitioners to use research evidence to inform their decisions, thus depicting a cornerstone of evidence-based management (Briner et al., 2009; Tranfield et al., 2003). Naturally, the lack of using research evidence in management decisions may stem from several factors, such as managers’ urge to keep their personal freedom to run their organization, the diverse background and education of managers, long time lags and little feedback involved in managerial decisions. Yet the key barrier is that managers commonly are unaware of scientific evidence, since very few managers read academic literature. In addition, as academic literature is primarily targeted for a scientific audience, it is both difficult to locate and comprehend for many practitioners (Rousseau, 2006). Evidence-based management draws on multiple types of evidence such as monitoring data, surveys, and financial information, but a proper summary of explicit research-based knowledge is a valuable supplement for making evidence-informed decisions (Briner et al., 2009).

Design-oriented research synthesis, aiming at developing design propositions, produces relevant input to evidence-based management (van Aken and Romme, 2009). Meta-analysis is the preferred approach to synthesis in many disciplines, but it is problematic in management given variations in study designs. Thus, suitable and comparable quantitative data is seldom available (Denyer et al., 2008). In management research, literature reviews commonly follow a narrative approach, which enables addressing a wide range of research questions with the aim of mapping the existing intellectual territory. Narrative synthesis typically identifies gaps in the existing literature and results in specifying research questions for filling the voids in the body of knowledge (Denyer et al., 2008; Tranfield et al., 2003). Design-oriented research synthesis, in turn, builds particularly on a realist approach, with the goal of informing practice about how *interventions* (I) work in different *contexts* (C), and increasing understanding of the generative *mechanism* (M) through which certain *outcomes* (O) emerge. This outline is coined as the CIMO-logic. Apart from meta-analyses that combine quantitative data from several studies and analyse the data using statistical methods, the design-oriented approach regards studies as cases and relies on qualitative methods for synthesizing their results. (Denyer et al., 2008).

We adopt the design-oriented approach for synthesizing results from 601 studies about managing external resources in three management disciplines. Our purpose is to advance evidence-based management (EBM) of external resources and to identify new avenues for advancing future research in the field.<sup>1</sup> Towards this end, we first establish how past research of managing external resources in the three management disciplines informs EBM, and second, we analyse the knowledge-trade and disciplinary integration of ERM studies across the three management disciplines in order to identify gaps in research. We carry out both

qualitative and quantitative analyses of the systematically selected articles from six journals in strategic management, marketing, and OM/SCM on the topic of managing external resources. First, we synthesize the results of the sample articles by adopting the CIMO-logic, developing understanding of the relationship between problem in context, management of interventions, and the generative mechanisms through which they produce the intended outcomes. Through this analysis, we aim to develop design propositions to be used in evidence-based management, and moreover, to infer areas where research is still needed.

Second, we carry out two quantitative analyses to strengthen our research evidence: a cross-citation analysis and computational content analysis based on text-mining techniques. The aim of the quantitative analyses is to complement the qualitative analysis in an effort to identify opportunities for joint theory development in the field of external resource management across management disciplines through knowledge trade and disciplinary integration. This is important for advancing research in the field, since knowledge trade across domains, and more temporary subdomains or “research fronts,” feeds scientific growth (Pratt et al., 2012; Shafique, 2013) and helps to elevate the level of a scientific field’s paradigm development (Pfeffer, 1993). Interdisciplinarity is also important for advancing evidence-based management, since the problems managers in firms face often cannot be classified to a single discipline, and need to be approached from multiple perspectives (Linderman and Chandrasekaran, 2010).

Previous studies of scholarly exchange propose that the limited knowledge trade observed between management disciplines exerts a dampening effect (Linderman and Chandrasekaran, 2010; Merchant et al., 2003; Sanders et al., 2013). Merchant et al. (2003) observe, for example, that researchers studying organizational incentive systems seem to lock quickly into a single research discipline and ignore developments and insights from others. This tendency, they aver, has significantly hindered research progress in accounting, and Sanders et al. (2013) maintain that the lack of cross-referencing between disciplines has slowed the accretion and build-up of supply chain management theory as well. Perhaps the most convincing evidence of the tendency to build disciplinary silos in management research is provided by Linderman and Chandrasekaran (2010), whose analysis of operations management, finance, management, and marketing journals found citing of articles outside one’s discipline to be uncommon, with only 0.45% to 15.39% of citations in each discipline being from other disciplines. Previous studies show both the importance and lack of knowledge-trade between management disciplines, but they do not tell us much about how to proceed with disciplinary integration. Our qualitative content analysis acquires an overall view of the sample studies in order to assess whether the level of knowledge trade is associated with thematic proximity, and a complementary computational content analysis is conducted to objectively analyse similarities and differences in the concepts and terms utilized in the sample articles. In addition, we carry out a cross-citation analysis for studying quantitatively the knowledge trade between the three management disciplines.

Through the complementary analyses, we aim to answer the following research questions:

RQ1: How does the research in strategic management, marketing, and operations/supply chain management inform evidence-based management of external resources: what is known and what is not yet known?

RQ2: Do the three management disciplines effectively trade knowledge in the academic studies of external resource management (ERM)?

RQ3: What are the future research opportunities for further advancing evidence-based management in the field of ERM through research design and through disciplinary integration?

<sup>1</sup> This study is a part of a strategic research initiative of the Finnish Funding Agency for Innovation (TEKES), the aim of which was to advance both research and practice in the field of external resource management.

The remainder of the article is organized as follows. We describe our study methodology and briefly review the research on managing external resources reported in the selected journals during the period 1997–2012. Thereafter, building on the research themes identified in this review, we discuss the contexts, interventions and mechanisms, and outcomes identified in the studies, and synthesise the results of the studies in the form of design propositions as well as gaps in scientific knowledge. Next, we report the findings of our cross-citation and computational content analyses, which illustrate the breadth of knowledge trade between the three focal disciplines. We conclude with a discussion of the implications and limitations of our research.

## 2. Methodology

We describe here our study methodology and the article selection, review, and categorization processes and three methods of analysis employed.

### 2.1. Literature review process

The process of selecting, reviewing, and coding, and subsequent analysis of, the articles shifted between inductive and deductive reasoning. The entire process is illustrated in Fig. 1 and further explained below. We used an iterative, dialogic process to record and outline our understanding of the phenomena, and redefined our criteria and article selection as needed.

#### 2.1.1. Journal selection

Journal selection was to reflect the objective of developing an overall understanding of external resource management beyond a single management discipline. Since the theme is broad and discussed under many different labels, a keyword-based search aiming to cover all studies about the topic was not feasible. Therefore, we followed the logic of analytical generalization based on theoretical sampling (Eisenhardt, 1989; Yin, 2009), and selected two key journals from each

of the target disciplines. From each discipline, we included a journal commonly ranked as highest, these tending to lead discussion in their fields, and another high-quality journal known to publish studies on inter-organizational issues. The journals selected were, for the marketing discipline, *Journal of Marketing (JM)* and *Industrial Marketing Management (IMM)*, and for the OM/SCM discipline, *Journal of Operations Management (JOM)* and *Journal of Supply Chain Management (JSCM)* (titled until 1998 *International Journal of Purchasing and Materials Management*), for the strategic management discipline, *Academy of Management Journal (AMJ)* and *Strategic Management Journal (SMJ)*.

Our 16-year sample period, from 1997 to 2012, was deemed sufficient to detect both scientific evidence for design propositions and opportunities for disciplinary integration while remaining manageable from the perspective of manual review and coding. The time period selected coincides, moreover, with the first allusions to ERM in the management literature (see, for example, Cox, 1996; Cox and Lamming, 1997; Jagdev and Browne, 1998).

#### 2.1.2. Inclusion and exclusion criteria

Research team meetings held before and during the review process helped to assure a shared understanding of the phenomena and their manifestation in print. The inclusion criteria were as follows.

- i) Articles should focus on inter-organizational relations (within either a dyad or network of actors), not limited to contractual relationships but including all relations and external actors that support a firm’s attainment of its strategic goals (e.g., government, univer
- ii) All studies should either develop or test theory.
- iii) All studies should include a managerial viewpoint (i.e., take the perspective of an organization’s management).

#### 2.1.3. Review process for abstracts

We applied the inclusion/exclusion criteria first to all abstracts in the selected journals over the designated time frame. The review was

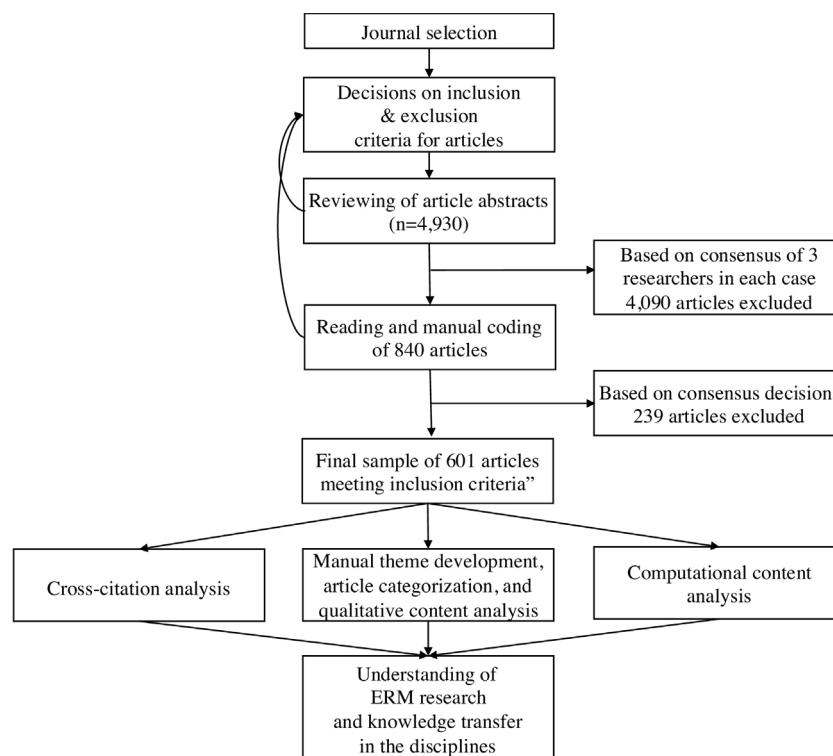


Fig. 1. The iterative article selection and review process.

**Table 1**  
Inter-rater agreement between three researchers in the review of abstracts.

Inter-rater agreement	% of articles evaluated						
	SMJ (n = 1085)	AMJ (n = 949)	JM (n = 660)	IMM (n = 1262)	JOM (n = 635)	JSCM (n = 339)	Total (n = 4930)
1	71.3%	83.5%	88.8%	54.7%	79.5%	39.5%	70.6%
0.875	9.0%	2.6%	5.8%	6.8%	5.0%	14.5%	6.7%
0.625	2.9%	0.6%	1.4%	4.0%	0.9%	7.1%	2.6%
0.5	16.8%	13.3%	4.1%	34.5%	14.5%	38.9%	20.2%

conducted by six, and each abstract independently reviewed by three, researchers. Different combinations of researchers were assigned to each journal to reduce the potential for bias arising from team composition. A traffic light coding (see, for example, [Kauppi et al., 2013](#)) was followed in which green signalled definite acceptance, yellow uncertainty, and red definite rejection. Differences in coding were discussed in the team until consensus was reached.

Inter-rater agreement within the coding teams was tested using the  $R_{wg}$  coefficients according to the ratio method ([James et al., 1984](#)), which evaluates the degree to which raters make the same decisions ([Shah and Ward, 2006](#)). Rater differences between red and green codes were double-weighted relative to those between adjacent yellow and red or green codes. The inter-rater agreement index ranged from 0 and 1 (1 = perfect agreement), with values of 0.71 or higher considered acceptable ([Koste et al., 2004](#)), although some studies (looking at survey respondents) suggest values as low as 0.6 and 0.65 (e.g., [Papke-Shields et al., 2006](#); [Shah and Ward, 2006](#)). For 70.6% of the abstracts coded, the  $R_{wg}$  coefficient was 1, which is to say, perfect agreement was reached (see [Table 1](#)). For an additional 6.7% (or 9.3% using the more lenient cut-off value of 0.6), an acceptable inter-rater agreement was achieved. We consider these scores to demonstrate sufficient reliability of the rating process, especially for a newly defined research concept such as ERM. Validity cannot be measured, as there exist no “true” rating scores ([Gwet, 2014](#)).

#### 2.1.4. Final article selection

The abstract review identified 840 articles that were subsequently read and coded. We also verified, at this point, that the articles in fact met the inclusion criteria (which was, in some cases, found not to be the case despite the indication of the abstract). An article identified by a coder as not fulfilling the inclusion criteria was independently evaluated by another researcher and removed upon agreement between the two. Disagreements were resolved in a meeting of all six researchers. Removal of 239 articles resulted in the final sample of 601 articles.

## 2.2. The three methods of analysis

Three complementary analyses of each of the sample articles were conducted to establish how past research informs evidence-based management of external resources, and to ensure that a comprehensive picture of the knowledge trade between the three disciplines was developed. Specifically, we employed (1) an in-depth qualitative content analysis that included manual coding ([Denyer et al., 2008](#); [Duriau et al., 2007](#); [Miles and Huberman, 1994](#); [Seuring and Gold, 2012](#); [Tranfield et al., 2003](#)), (2) a cross-citation analysis ([Boyack and Klavans, 2010](#); [Lockett and McWilliams, 2005](#); [Neeley, 1981](#)), and (3) a computational content analysis of the abstracts ([Smith and Humphreys, 2006](#); [Thomas, 2014](#)).

### 2.2.1. In-depth qualitative content analysis

The qualitative analysis involved reading and coding each article. We coded the pre-determined variables to achieve a holistic understanding of research on management of external resources, and simultaneously developed codes designed to inductively reveal unifying research themes within the sample articles. The pre-determined vari-

ables included (i) type of external resource, (ii) type of inter-organizational tie (dyad, triad, chain, network, or other), (iii) the theoretical basis of the study, (iv) details of the research method used, (v) the purpose and objective of the research, and (vi) key results in terms of context, interventions and mechanisms, and outcomes (CIMO).

Reliability is enhanced through a gradual process of first coding sample texts and then comparing coders' classifications and revising the coding as necessary ([Morris, 1994](#)). Consistency was assured by conducting two pilot coding rounds (of 10 and 30 articles) to ensure a unified understanding of the coding principles. Researchers then read and coded 30 articles per round, and meetings were held after each round to discuss any issues.

Categorization of the articles into cohesive themes followed the procedure presented by [Miles and Huberman \(1994\)](#) and [Dey \(2003\)](#), which inductively proceeds from low-level codes towards high-level thematic concepts. First-order codes are observed items, that is, concepts that appear in the sample articles, second-order concepts generalizations related to several first-order concepts that lead to the third-order concepts that constitute the identified themes. Themes were developed jointly in two subsequent workshops. Thirty-three second-order concepts developed in the first workshop that described topics dealt with in the articles (based on dozens of first-order concepts from the coding) were combined in the second workshop into distinct research themes that were reorganized and renamed several times to build a logical structure. Multiple iterations yielded six themes, each associated with one or two general research questions that unite the studies within it. Each article was assigned to one or several of the six themes. Articles were assigned to themes, according to their coding, by two researchers working independently. Conflicts were discussed until consensus was reached. One researcher then selected at least one theme for all remaining articles.

A detailed understanding of the six ERM themes was arrived at by in-depth qualitative content analysis ([Duriau et al., 2007](#); [Seuring and Gold, 2012](#)) of the full texts of the articles. This descriptive analysis provided a qualitative synthesis of each of the six themes, rendering unnecessary the challenge of comparing article content quantitatively, the terms used in each focal discipline having been determined to differ. To identify central topics and studied phenomena, all articles within each theme were read again, and detailed theme descriptions structured according to pre-set analytical dimensions ([Seuring and Gold, 2012](#)). These dimensions included an overview of the research on each theme and detailed descriptions of each subtheme including similarities and differences between topics, terms used, and discourses between the three focal disciplines. Both the coded data on articles and results of the computational content analysis of abstracts of each theme (e.g., the top-10 concept lists) were used to support this analysis phase (see [Table A1](#) in the [Appendix A](#)).

The coded results in terms of context, interventions and mechanism, and outcomes, intertwined with the detailed content analysis of each theme provided the basis for developing generic design propositions. The CIMO elements were each first collected and categorized for getting an overall picture of them (see [Sections 4.1, 4.2, and 4.3](#)). We then categorized the coded article summaries in order to identify context-intervention-mechanism-outcome relationships that received strong evidence in our sample. Based on the categorization we formulated a

set of design propositions (see Table 4). The elaboration of the design propositions was based on the detailed content analyses of each theme.

### 2.2.2. Cross-citation analysis

Journal citations in scientific articles constitute records of use of earlier scholarly knowledge. Studying citations may yield valuable insights into the development of scientific knowledge including identification of theoretical domains from which areas of research draw, how new constructs and themes emerge, and how themes evolve over time, whether in ascendance or decline (e.g., Boyack and Klavans, 2010; Garfield et al., 1964). The present study relied on citation analysis to analyse the exchange of scholarly knowledge across the three focal disciplines. Analysis of the interplay of scholarly activities across disciplinary boundaries interested us, it having been argued that innovative, cutting edge research frequently occurs at the crossroads between scientific disciplines (Rinia et al., 2002). Yet there exists only a handful of analyses of interactions between disciplines (Agarwal and Hoetker, 2007; Linderman and Chandrasekaran, 2010).

We relied on the Balance of Trade (BOT) concept, defined by Lockett and McWilliams (2005) as citations received [during a specified period] divided by citations sent [during the same specific period], to examine the transfer of knowledge between journals. A journal X that cites an article in journal Y is deemed to have *imported* knowledge from that journal, if journal Y represents a different discipline. BOT can thus be calculated for individual journals or collections of journals that represent specific scientific disciplines. We aggregated the citations in our six target journals to calculate the BOTs between the three focal disciplines.

### 2.2.3. Computational content analysis

As all literature reviews based on manual coding are vulnerable to subjectivity (e.g. Indulka et al., 2012), we employed an automated content analysis tool called Leximancer (Smith and Humphreys, 2006; Steimel, 2014) to validate our thematic findings and probe for further insights. Application of content analysis tools in research has steadily increased (see, for example, Cretchley et al., 2010; Dann, 2010; Indulka et al., 2012; Kuntner and Teichert, 2016; Liesch et al., 2011; Leone et al., 2012; Steimel, 2014) as researchers attempt to cope with the recent digital information explosion, or “big data” phenomenon (Bragge et al., 2013; Thomas, 2014). Leximancer employs statistical text-mining techniques based on computational linguistics and machine learning to systematically and objectively decode the underlying meaning in texts. The results of the content analyses are typically presented using frequency-based concept lists or intuitive and interactive cluster visualizations by means of which the researcher is able to drill down to the concepts behind the clusters, their associated thesaurus words, and representative text excerpts. The visualizations illustrate (via heat-mapped colours and symbol size) the relative importance of, and (via closeness and links) mutual relationships among the identified clusters and concepts. We used the tool to analyse and create frequency lists and cluster maps for the abstracts of our sample of 601 articles, and employed our secondary data fields (journal, discipline, year of publication, and thematic category from the manual review and coding) to augment the cluster maps with additional information, such as discipline tags. Although we illustrate in the paper only selected frequency lists, a multitude of cluster maps were used as support material in the analyses.

## 3. An overview of research on external resource management in the six journals

### 3.1. How extensively has external resource management been studied and in which journals?

Division of the 601 identified articles across the journals and publication years is shown in Fig. 2. As can be seen, 257 articles

(43%) have been published in marketing, 206 (34%) in OM/SCM, and 138 (23%) in strategic management journals. Interestingly, the share of ERM articles increases during the study period, from ca. 10% of all published articles in the six journals (years 1997–2000) to ca. 14% (years 2009–2012). The growth was most rapid in the marketing and OM/SCM journals during the first decade of the new millennium.

### 3.2. What method and theoretical bases have been employed?

Table 2 summarizes the most common types of inter-organizational ties or external actors studied, methods used, and theoretical bases most frequently employed in the articles. The three disciplines exhibit similar emphases on all these dimensions. The majority, in all disciplines, are theory-testing studies of dyadic relationships, most commonly with a supplier as the external resource. Because strategic management articles typically employ alliance partner as a general term for strategically important supplier, customer, competitor, or any other external actor, the comparison of disciplines on this dimension is challenging. Differences between disciplines can be identified in terms of, for example, diversity of methods, theoretical bases, and types of external actors studied. Articles published in the marketing journals, especially in IMM, are most versatile on these dimensions, studies in strategic management journals not surprisingly more cohesive. Many of the general theories originate outside management from such disciplines as economics, sociology, and psychology. Roughly half the articles identified a particular general theory as the basis of the focal study, transaction cost economics and resource-based view being cited most often. Although a few general theories dominate the studies, a surprisingly diverse array of 71 different theories was employed, most used only in a single study.

### 3.3. What themes can be identified?

We observed from the qualitative content analysis that although management of external resources is a wide, and at first glance, highly fragmented field, the studies center on a limited number of clearly distinguishable themes, which we grouped under six headings (Table 3). Given the objective of our study, we aim at designing the themes and the theme structure in a way that is easily understandable for practitioners. Next we will briefly describe each theme and discuss how the three disciplines contribute to them. In Section 4 we will then present a more detailed design-oriented synthesis of all articles.

Studies of *decisions on governance mode and mechanisms* examine conditions and circumstances under which external resources are preferred to in-house ones, mechanisms employed to access resources of external actors, and how different governance arrangements might be combined (see, for example, Leiblein and Miller, 2003; Lutz and Ritter, 2009; Mols et al., 2012). These questions are clearly of interest in all three disciplines. Studies of *network formation* explore the positioning of firms relative to the business environment, informed selection of external resources, and initiation of relationships (see, for example, Lavie and Rozenkopf, 2006; Li and Choi, 2009; Zaheer and Bell, 2005). This theme was identified as being associated with marketing and strategic management, with OM/SCM contributing, in particular, to topics of partner selection and relationship initiation. Studies of *inter-organizational relations* attempt to explain the behaviour of external partners by examining relationships in existing networks and between partners (Gadde and Snehota, 2000; Goodman and Dion, 2001; Whipple et al., 2010). This theme is studied extensively within all three disciplines, with no clear differences identified by the content analysis, although marketing dominates the discourse in our sample. Studies of *strategic aspects of exploiting the external resource base* were also found in all three disciplines. This theme provides a comprehensive picture of the knowledge and capabilities (including managerial principles and management system) needed to manage external resources and conditions requisite to benefiting from them (Avittathur and Swamidass,

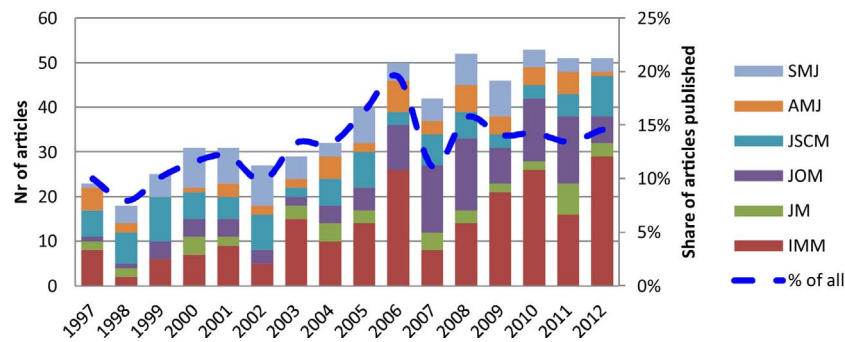


Fig. 2. Number of ERM articles identified by year, and share they represent of all published articles in the six selected journals.

**Table 2**  
Inter-organizational ties, types of external actors, and methods and general theories used.

		Marketing		OM/SCM		Strategic Management		Total	
		#	%	#	%	#	%	#	%
Inter-organizational tie	Dyad	181	70	147	71	88	64	416	69
	Network	48	19	13	6	34	25	95	16
	Chain	14	5	29	14	2	1	45	7
	Triad	5	2	2	1	4	3	11	2
	Other	16	6	18	9	14	10	48	8
	Not defined	7	3	10	5	7	5	24	4
External actor	Supplier	138	54	169	82	32	23	339	56
	Alliance partner	25	10	6	3	71	51	102	17
	Customer	50	19	37	18	12	9	99	16
	Competitor	12	5	3	1	3	2	18	3
	Distributor	12	5	3	1	0	0	15	2
	Government	9	4	0	0	2	1	11	2
	Supply chain partner	3	1	8	4	0	0	11	2
	University	8	3	0	0	1	1	9	1
	Other	65	25	19	9	30	22	114	19
	Not defined	2	1	2	1	0	0	4	1
Method	Theory testing with survey data	118	46	133	65	69	50	320	53
	Case study	61	24	27	13	10	7	98	16
	Theory testing with secondary data	9	4	2	1	52	38	63	10
	Conceptual study	32	12	16	8	0	0	48	8
	Interview study	22	9	8	4	8	6	38	6
	Simulation	2	1	1	0	1	1	4	1
	Other	18	7	19	9	5	4	42	7
	Not defined	10	4	6	3	0	0	16	3
Theoretical base	Transaction cost economics	20	8	36	17	26	19	82	14
	Resource based view	12	5	19	9	13	9	44	7
	Social exchange theory	13	5	8	4	0	0	21	3
	Organizational learning	7	3	5	2	8	6	20	3
	Social capital	4	2	8	4	8	6	20	3
	Relational view	8	3	9	4	3	2	20	3
	Knowledge-based view	3	1	8	4	8	6	19	3
	Resource dependence theory	2	1	10	5	6	4	18	3
	Contingency theory	0	0	8	4	4	3	12	2
	Agency theory	4	2	4	2	3	2	11	2
	Institutional theory	3	1	3	1	4	3	10	2
	Other	29	11	18	9	13	9	60	10
	Not defined	169	66	112	54	59	43	340	57

2007; Kale et al., 2002; Petersen et al., 2000).

Differences between disciplines were greatest in contributions to the two last themes. Although *learning and innovating with external partners* was widely and increasingly studied within all disciplines, subthemes exhibited differences, with OM/SCM concentrating on innovating with suppliers, strategic management examining primarily learning, knowledge sharing, and absorptive capacity (see, for example, Lane and Lubatkin, 1998; Möller and Svahn, 2004), and marketing adopting a versatile perspective on innovation in relationships (see, for example,

Bond et al., 2008). Interest in high technology industry and R&D oriented companies and in understanding the contributors to success in new product development was observed across disciplines. OM/SCM was clearly dominant in studies of *operational practices of managing external resources*, focused on the performance effects of specific operational ERM practices (see, for example, Braunscheidel and Suresh, 2009; Yao et al., 2009), with some contributions from marketing.

We validated the theme categorization and pursued further theme-

**Table 3**  
Six themes identified in ERM research.

Theme number and title	1 Decisions on governance mode and mechanisms	2 Network formation and relationship initiation	3 Inter-organizational relationships	4 Strategic aspects of exploiting external resources	5 Open innovation and inter-organizational learning	6 Operational practices of managing external resources
Research questions	How does one select the right governance mode and mechanism?	How does one position the firm in relation to its business environment? How does one select the best external resources and initiate the relationship?	How does one manage a relationship with an external actor? What explains the behavior of the external partners?	How does one effectively exploit available external resources?	How does one learn and innovate with external partners?	How does one operate with the external resources?
Nr. of articles in total	64	121	162	130	117	67
Nr. of articles from each discipline	18 Marketing 16 OM/SCM 30 Strategic Management	43 Marketing 23 OM/SCM 55 Strategic Management	100 Marketing 45 OM/SCM 17 Strategic Management	48 Marketing 64 OM/SCM 18 Strategic Management	53 Marketing 27 OM/SCM 37 Strategic Management	15 Marketing 49 OM/SCM 3 Strategic Management
Sub-themes	- Governance mode selection - Governance mechanisms	- Structural aspects of inter-organizational networks - Dynamism in inter-organizational networks - Inter-organizational linkages in networks - Finding and selecting external resources - Relationship formation - Characteristics of a relationship	- Social aspects - Antecedents of collaboration - Outcomes of collaboration - Factors that might destroy a relationship - Managing a set of relationships	- Knowledge and capabilities for managing external resources - Benefiting from external resources - Managerial principles for utilizing external resources - Supplier development	- Inter-organizational learning and knowledge development - Strategic partner selection for innovation performance - Relationship management - Supplier involvement	- Use of information systems - Coordination and integration - The risk of supply disruptions - Internal and external resource process improvement - Flexibility and agility

level insights by running multiple computational content analyses with the abstracts from the article sample. To identify differences and similarities between the themes at a granular level, we produced from each theme top-10 concept lists with counts and relevance scores for each concept (see the Appendix). This analysis revealed the concept **firm** to appear first or second in every theme, and **relationship**, **performance**, and **supplier** to also be common to all six themes. Concepts that appeared only in the top-10 concept lists of particular themes included governance, outsourcing, transaction, and control in Theme 1; network, resources, and value in Theme 2; trust and buyer in Theme 3; integration in Theme 4; product, knowledge, innovation, and learning in Theme 5; and practices, information, and quality in Theme 6. This result as well as other results of the computational text analyses, well aligned with our manual theme categorization, provides support for its validity.

#### 4. Design propositions for evidence-based management

Next, the articles in our sample are used as cases for designing propositions for external resource management. First, in Sections 4.1–4.3, we synthesize our observations regarding the context in which the problems are addressed, the most important interventions and generative mechanisms that have been studied and the outcomes that the literature has revealed. In Section 4.4 we configure design propositions using the CIMO-logic on the basis of the research evidence. The design propositions aim to encapsulate how research may contribute to evidence-informed management. Finally, in Section 4.5 we present the research gaps both in terms of the CIMO-elements and the research themes identified.

##### 4.1. The contexts in which management of external resources has been investigated

The key feature of context observed in the literature is the type of the inter-organizational tie in which the problem is addressed. Most studies in our sample embedded the problem in *dyadic* context (416), but a number of studies also had a *network* (95) and *chain* (45) perspective to the research problem (Table 2). The particular dyadic relationship and the terminology for describing it differ between the three disciplines. Scholars of strategic management commonly use the generic term “alliance” to a wide range of strategically important inter-organisational relationships (e.g. Capaldo, 2007; Carson et al., 2006). OM/SCM researchers, in turn, most often use the term “buyer-supplier relationship” (e.g. Carter, 2000; Corsten et al., 2011), and in marketing journals the commonly used term is “supplier-customer relationship” (e.g. Bradley et al., 2006; Möller and Törrönen, 2003). However, the context in most of these studies can be considered being the same regardless of the term used with some exceptions: *R&D alliances* (or partnership) and *joint ventures* involve some specific features that should be taken into account.

The reviewed literature also covers a wide range of industry sectors, ranging from hospitals and healthcare to knowledge-intensive industries and manufacturing. The main contextual characteristics that differentiate the various industries are *the rate of technological change*, *uncertainty of the competitive environment*, and whether the industry is producing *mainly services or mainly physical products*. Also, industries where the business is *project-based* form a unique context.

A further key context in which management of external resources is studied is *new product development*. A stream of ERM research deals with involving external partners, such as suppliers and customers, to new product development projects (e.g. Mishra and Shah, 2009; Tan and Tracey, 2007).

##### 4.2. Developing an understanding of interventions and mechanisms

A review of the literature showed that a key management interven-

tion is the decision of organizing an activity either in internal control or outsourcing it to an external partner. This decision is commonly referred to in literature as the *make-or-by decision* (Geyskens et al., 2006; Gulati et al., 2005; Leiblein et al., 2002; Mantel et al., 2006; McNally and Griffin, 2004). The view that concentrates on the transactional attributes of governance decisions originates strongly from the transaction cost economics (TCE) theory, which states that firms internalize exchanges which contain transactional hazards that are so severe that they cannot economically be protected with safeguarding mechanisms (e.g. Geyskens et al., 2006; Gulati et al., 2005). Between these two extremes lies an ill-defined relational or hybrid mode of governance (Geyskens et al., 2006; Gulati et al., 2005). When the governance mode decision is studied at the firm level the key mechanisms are *vertical integration* (e.g. Afuah, 2000; Collins and Bechler, 1999; Kotabe et al., 2008) and horizontal integration (e.g. Folta, 1998; Keil et al., 2008; Nicholls-Nixon and Woo, 2003), referring to selection between *non-equity and equity alliances, joint ventures, and acquiring a company*. A stream of literature approaches the governance mode issue in a wider network perspective, studying how firms may benefit from a proper configuration of alliance network (e.g. Baum et al., 2000; Koka and Prescott, 2008). A number of studies explore building a *combination of strong and weak ties* to configure networks (McDonald et al., 2008; Choi and Kim, 2008; McEvily and Zaheer, 1999). An important mechanism for network building is *occupying structural holes*, which are defined as “gaps between firms otherwise disconnected in the network” (Koka and Prescott, 2008; Zaheer and Bell, 2005).

The literature commonly makes a distinction between *relational and formal inter-organizational governance mechanisms*, or put in another way, social or contractual mechanisms. Relational mechanisms represent a bilateral approach which enforces obligations, promises and expectations through social processes that promote norms of flexibility, solidarity and information exchange, while formal contracts are specifications that may define the roles, responsibilities, procedures for monitoring, penalties for noncompliance, and outcomes or outputs to be delivered (Poppo and Zenger, 2002). Formal contracts are initiated through *negotiations* (e.g. Gattiker et al., 2007; Sharland, 2001); while *trust* and *commitment* are fundamental mechanism for supporting relational governance (e.g. McCarter and Northcraft, 2007; Liu et al., 2009; Nyaga et al., 2010; Spekman and Carraway, 2006). In addition, *socialization* and *social capital* have been identified as focal mechanisms in strategically important inter-organizational relationships (Cousins et al., 2006; Petersen et al., 2008).

Key mechanisms in inter-organizational relationship initiation are *partner evaluation* and *partner selection*. Partner evaluation needs to take into account both advantages and disadvantages, and thereby focus on estimating viability instead of just maximizing benefits. Costs may be indirect and difficult to identify, since they may emerge from e.g. power asymmetries (Bae and Gargiulo 2004; Nowak et al., 1997), free-riding (Lavie et al., 2007) and decreased ability to change due to relational constraints (McEvily and Zaheer, 1999). The literature proposes both qualitative methods (e.g. Choi and Kim, 2008; McCutcheon and Stuart, 2000; Rese, 2006) and quantitative methods (e.g. Degraeve and Roodhooft, 1998; Jayaraman et al., 1999; Kauffman and Leszczyc, 2005) for supplier selection, providing complementary approaches for making the best decisions.

In particular OM/SCM journals discuss widely the topic of *upstream and downstream integration* (e.g. Droge et al., 2004; Flynn et al., 2010; Frohlich and Westbrook, 2001), which focuses on the question of what kind of integration is beneficial for the firm and under which conditions. At the relational level, *collaboration* and *communication* with external partners are focal mechanisms that are widely studied in all disciplines (e.g.; Mahapatra et al., 2012; McEvily and Marcus, 2005; Voeth and Herbst, 2006; Stanley and Wisner, 2001). At the operational level, the main mechanisms addressed in the literature are *information sharing* and *use of information systems* (for example Li et al., 2005; Sahin

and Robinson, 2005; Sanders 2007; Yan and Wang, 2012; Yao et al., 2009), in particular *electronic data interchange* (EDI) (for example Larson and Kulchitsky, 2000; Stump and Sriram, 1997; Walton and Maruchek, 1997).

A widely discussed mechanism in inter-organizational context is the *use of power* (e.g. Cox, 2001; Crook and Combs, 2007), which can be divided into coercive and non-coercive (reward, legitimate, expert, referent and information) power (Leonidou et al., 2008). Likewise, the *use of incentives* has been proposed as an important mechanism to motivate external partners (Agarwal et al., 2010; Gilliland, 2003, 2004). A group of articles also deal with *supplier development*, a direct intervention aimed at leveraging buyer's capabilities for improving suppliers' performance (e.g. Hartley and Jones 1997; Krause 1997; Modi and Mabert, 2007). In addition, the studies address several specific mechanisms such as *balancing exploration and exploitation* (Lavie and Rosenkopf, 2006), *use of value analysis* (Hartley, 2000), and *selecting coordination mechanism* (Xu and Beamon, 2006).

A large share of the studied literature discusses *inter-organizational learning and knowledge development*. An influential conceptual frame of reference in this discourse is absorptive capacity – organizations' ability to achieve, assimilate, and utilize new external knowledge (Ahuja and Katila, 2001; Lane and Lubatkin, 1998; Lane et al., 2001; Sampson, 2007; Vasudeva and Anand, 2011). The literature maintains that *supplier and customer involvement* in a firm's new product development project are influential mechanisms supporting inter-organizational learning, knowledge development and innovations (e.g. Feng et al., 2010; Hartley et al., 1997; Primo and Amundson, 2002; Tan and Tracey, 2007).

#### 4.3. An overview to the outcomes addressed in the papers

We identified ten main categories of outcomes in the reviewed papers. Most papers studied the effects of various mechanisms on *firm performance* (70 studies), conceptualising it in multiple ways. The next widely addressed outcome category was *innovation, knowledge, and learning* (61 studies), which deals with various innovation types (radical, incremental, architectural innovation, process innovation etc.), innovation capability of the firm, and new product development success. The third outcome category is *relationship performance and success* (60 studies) with a focus on the success of a dyadic relationship. We identified several different terms and conceptualisations for relationship performance, such as relationship quality, alliance success, relationship value, and value co-creation.

Many studies take a social perspective to the inter-organizational relationships and networks addressing “soft” issues related to trust, commitment, attractiveness, power, and dependency. Some studies treat these issues as mechanism while some studies treat them as outcomes (50 studies). In turn, a great number of papers defined the outcomes in “hard” monetary terms, comprising the *financial performance* (42 studies) outcome category. While articles in OM/SCM journals commonly explore means for cost savings, articles in strategic management journals address e.g. abnormal returns and profitability.

Several studies also focused on *partner performance* (35 studies), exploring the outcomes of interventions and mechanism on firm's suppliers, customers, or distributors. Papers particularly in OM/SCM journals commonly investigated the effects of various managerial practices and interventions on *operational performance* (35 studies), addressing either overall operational performance or a specific element of the performance, such as quality, agility, delivery, or reliability. Many papers also addressed *risk mitigation* (26 studies), focusing on various kinds of risks related to inter-organizational relations, such as partner's opportunism and supply risks. Although quite many articles discussed networks and chains, only relatively few of them explored the outcomes on network and chain level. Altogether 17 studies explored *chain performance* at overall level or in terms of agility and cycle time, and only 7 studies addressed *network performance* in terms of effective-



**Table 4**  
Design propositions for managing external resources.

CONTEXT	INTERVENTION	OUTCOME
<i>Research theme 1: Decisions on governance mode and mechanism</i>		
In the context of high asset specificity, volume uncertainty, and behavioral uncertainty	choosing hierarchical governance	leads to enhanced performance (Geyskens et al., 2006).
In the context of low asset specificity, volume uncertainty, and behavioral uncertainty	choosing market governance	leads to enhanced performance (Geyskens et al., 2006).
In the context of make-or-buy decisions	maintaining some knowledge of the outsourced activity/technology	increases outsourcing benefits (Tiwana and Keil, 2007; Bustinza et al., 2010; Handley, 2012).
In the context of alliances with property based assets (Poppo and Zenger, 2002) and innovative, short life-cycle products with significant business uncertainties (Mahapatra et al., 2010), volatility (Carson et al., 2006)	emphasizing formal contracts as governance mechanism	safeguards opportunism (Poppo and Zenger, 2002; Carson et al., 2006; Mahapatra et al., 2012).
In the context of alliances with knowledge based assets (Poppo and Zenger, 2002), and ambiguity (Carson et al., 2006)	emphasizing relational contracts as the governance mechanism	reduces opportunism (Poppo and Zenger, 2002; Carson et al., 2006).
<i>Research theme 2: Network formation and relationship initiation</i>		
In the context of network formation	building strong relational ties with trustworthy partners	supports exploitation activities to improve firm effectiveness and performance (Beverland, 2005; Tiwana, 2008; Rowley et al., 2000).
	building a great number of versatile weak ties	supports exploration activities to develop innovations and improve firm performance (Beverland, 2005; Tiwana, 2008; Rowley et al., 2000).
	maintaining a rich portfolio of bridging ties to network resources	supports firm's innovations through access to new ideas, information and opportunities (McEvily and Zaheer, 1999; Tiwana, 2008; Choi and Kim, 2008).
<i>Research theme 3: Interorganizational relationships</i>		
In both supplier and customer relationships	increasing interfirm trust, commitment and/or using relational norms	improves relationship performance (Laaksonen et al., 2008; Whipple and Frankel, 2000; Johnston et al., 2004; Nyaga et al., 2010; Krishnan et al., 2006), including financial and relational outcomes (Palmatier et al., 2007). improves shared planning and flexibility in arrangements (Johnston et al., 2004). improves satisfaction (Nyaga et al., 2010). increases relationship effectiveness (Smith, 1997).
	collaboration/co-operation/transformational leadership in relationships/	leads to higher satisfaction with the relationship, satisfaction with performance and a higher performance (Whipple et al., 2010). increases relationship commitment (Hult et al., 2000). delivers positive supply chain operational and financial performance benefits (Fawcett et al., 2012).
	adaptive behavior within a relationship	increases levels of trust and enhance commitment (Brennan and Turnbull, 1999). improves quality of produced products (Hagberg-Andersson, 2006).
	use of noncoercive influence strategies (Rationality, Recommendations, Information Exchange, and Requests)	increases compliance by the target firm (Payan and McFarland, 2005). increases trust, commitment, and joint action (Hausman and Johnston, 2010). improves supplier's delivery flexibility under high shared vision (Chang and Huang, 2012). leads to lower conflict (Leonidou et al., 2008).
	accumulating relational capital	increases the (operational and strategic) performance in the relationship (Kohtamäki et al., 2012; Cousins et al., 2006; Villena et al., 2011). supports the growth of a SME by enhancing the transition between different growth phases (Partanen et al., 2008).
	shaping customer attraction and increasing supplier satisfaction	increases preferential treatment by suppliers. (Huttinger et al., 2012; Baxter, 2012) and makes a supplier voluntarily develop the relationship (Hald et al., 2009).
	using socialization as a tactic in influencing	increases supply chain relational capital (Cousins et al., 2006). improves communication between the companies (van de Vijver and Akkermans, 2011; Cousins and Menguc, 2006). increases operational performance (Cousins and Menguc, 2006).
	adopting procedural, distributive and interactional justice policies	increases alliance performance (Liu et al., 2012) measured as asset turnover (Luo, 2007). decreases conflict and increase satisfaction and influence the distributor's performance (Griffith et al., 2006).
	increasing (perceived) dependency	increases relationship effectiveness (Smith, 1997). supports the development of relational capital (Pettersen et al., 2008). increases the commitment of the parties (Goodman and Dion, 2001) and influences customer attraction (Hald et al., 2009).

(continued on next page)

Table 4 (continued)

CONTEXT	INTERVENTION	OUTCOME
<i>Research theme 4: Strategic aspects of exploiting external resources</i>		
In strategic alliances (dyadic context)	experiences and learning from alliances	promote alliance success (Kale et al., 2002). increase alliance benefits (Chen et al., 2004; Prahinski and Benton, 2004; Sampson, 2005).
	investment in alliance learning tools supplier development activities	increases alliance capability (Sluyts et al., 2011). increase supplier performance (Krause, 1997; Morris and Carter, 2016; Das et al., 2006; Lai, 2007; Modi and Mabert, 2007). lower supplier costs (Rogers et al., 2007).
	partner complementarities	improve alliance performance (Rothaermel, 2001; Tiwana and Keil, 2007).
In supply networks (network context)	co-operative relationships between suppliers	negatively influence supplier performance (Saxton, 1997; Wu et al., 2010).
	integration with suppliers and customers	increases supply performance (Frohlich and Westbrook, 2001). improves time-based performance and overall firm performance (Stock et al., 2000; Malhotra and Mackelprang, 2012).
	integrated information technologies and information sharing	increase supply performance (Vickery et al., 2003; Dyer and Hatch, 2006).
<i>Research theme 5: Open innovation and interorganizational learning</i>		
In the context of new product development	involving customers in the NPD project	increase the likelihood of successful major innovations (Coviello and Joseph, 2012). fasten the speed to markets (Fang, 2008). improve product quality, delivery, and reliability (Feng et al., 2010). improves market and project performance (Mishra and Shah, 2009). improves customer satisfaction (Tan and Tracey, 2007). Improves manufacturing agility (Tracey, 2004).
	involving suppliers in the NPD project	decreases costs (Feng et al., 2010). reduces delays (Hartley et al., 1997). increases product innovation (only grey box) (Koufteros et al., 2007). improves project and market performance (Mishra and Shah, 2009). improves financial results and product design performance (Petersen et al., 2005). improves product quality (Primo and Amundson, 2002). improves manufacturing performance (Vonderembse and Tracey, 1999). improves customer satisfaction (Tan and Tracey, 2007). improves manufacturing agility (Tracey, 2004).
	investing in technologically diverse alliances	increases firm's innovations (Lundberg and Andresen, 2012). predicts products on markets (Rothaermel and Deeds, 2004).
<i>Research theme 6: Operational practices of managing external resources</i>		
In supplier relationships	the use of e-business technologies such as EDI	increases supplier reliability and lowers acquisition cost (Walton and Maruchek, 1997). improves organizational performance (Feng et al., 2012). decreases relationship conflict (Yan and Wang, 2012). improves organizational performance (Feng et al., 2012).
	a right level of internal and external integration	improves operational performance (Stump and Sriram, 1997; Li et al., 2005; Li et al., 2010). improves lead-time performance (Stock et al., 2000; Garver, 2003). increases supplier reliability and lowers acquisition costs (Malhotra and Mackelprang, 2012). positively impacts a firm's supply chain agility (Lösch and Lambert, 2007).
	good communication and information sharing	lower operation costs (face-to-face and written/electronic) and acquisition costs (written/electronic only) (Percy et al., 2007). improve lead-time performance (Malhotra and Mackelprang, 2012). improve suppliers' compliance to buyer's code of conduct (Cannon and Homburg, 2001). improve supplier's performance (Sanders, 2007).

ness, efficiency, competence, and legitimacy.

#### 4.4. ERM design propositions

Drawing on our design-oriented analysis, we present a set of design

propositions categorized by our research themes (Table 4) that synthesize the findings from the literature using the CIMO-logic. Our synthesis is designed to support evidence-informed management of external resources. However, the research propositions are not meant as precise instructions to practitioners. Our large article sample (601 articles)

provides support to a large number of design propositions, but due to space limitations we present in Table 4 and discuss in the following only those propositions that the articles in our sample provide the strongest evidence for. We evaluated the strength of the evidence based on the number of studies supporting the proposition and the strength of individual studies' evidence in terms of both empirical support and theoretical explanation.

Because the mechanisms linking the interventions to the outcomes are often diverse and complex, we next elaborate the simplified design propositions that are presented in Table 4. In addition to the evidence that support the design propositions, we pay particular attention to evidence that contradicts with the supporting evidence, limitations that have been found, and further elaboration of the design propositions in various contexts.

#### 4.4.1. Research theme 1: decisions on governance mode and mechanisms

Transaction cost economics (TCE) theory propositions regarding the make-or-buy decisions have been studied widely for decades, and this research has been summarized by means of several meta-analyses. The most thorough meta-analysis of TCE arguments is Geyskens et al. (2006), who synthesize results of 200 articles in different disciplines. They found strong support for the propositions of TCE theory (see Table 4), and further maintain that the effect of relational governance on performance was substantially larger than that of hierarchical governance. However, Leiblein et al. (2002) argue that TCE theory ignores the effect a firm's existing portfolio of transactions and other firm-specific assets and capabilities have on the transaction in question. This view is supported by several scholars as the role of firm-level capabilities along with transactional attributes in vertical integration decisions is supported by strong empirical evidence (Kroes and Ghosh, 2010; Mayer and Salomon, 2006; McIvor, 2009). McIvor (2009), in turn, makes the finding that in some cases TCE and resource-based view (RBV) theories make contradictory recommendations for make-or-buy decision, suggesting that both theories should be applied with care. Our sample also provides support to the argument that the buying firm gets more benefits when it maintains some knowledge of the outsourced activity or technology (Bustinza et al., 2010; Handley, 2012; Tiwana and Keil, 2007).

The benefits of relational governance mechanisms compared to formal mechanisms and their combined effect have received a lot of attention in the literature sample. Literature notes that these mechanisms originate from somewhat different and contradicting streams of literature (Mesquita and Brush, 2008). The traditional TCE-based governance literature has been criticized for underestimating the value of relational and social elements (Carson et al., 2006), which have gained increasing attention. Poppo and Zenger (2002) maintain that exchanges become socially embedded over time, and thus cooperation becomes an important safeguarding mechanism that overcomes the adaptive limits of contracts. However, well implemented contractual governance limits the risks involved and therefore encourages longevity, cooperation and trust (Poppo and Zenger, 2002). Hence the combined effect on performance of relational and formal governance for controlling relationships is stronger than their effects when implemented alone. This view is supported by several researchers (Luo, 2002; Carson et al., 2006; Liu et al., 2009), who also conclude that relational and contractual mechanisms complement each other.

#### 4.4.2. Research theme 2: network formation and relationship initiation

Several studies in our sample (Rowley et al., 2000; Beverland, 2005; Tiwana, 2008) elaborate in various contexts Granovetter's (1985) propositions that strong ties and dense networks are enablers of effective exploitation, and weak ties and sparse networks support effective exploration. Hoffmann (2007) found evidence in a longitudinal case study at Siemens that contradicts these arguments; strong ties to trustworthy partners and dense networks best promote an innovation strategy. Rowley et al. (2000), in turn, found that the

influence of strong and weak ties is contingent on industry context. Their study supported Granovetter's propositions in the steel industry, but they found that strong ties in dense industry networks may decrease performance in the semiconductor industry. Mesquita and Lazzarini (2008) complement these studies by their finding that in environments of weak infrastructure and institutions, vertical ties yield manufacturing productivity and horizontal ties enable collective resource use as well as joint product innovation. Lavie (2007) further finds that prominent partners with marketing and financial resources enhance firm market performance, while partnering with firms with technology and human network resources does not enhance market performance. Further, Venkatraman and Lee (2004) found that firms with products that require complementary offerings should develop network orchestration capability, which is parallel with Capaldo's (2007) observation that firm's ability to integrate strong ties and weak ties impact the innovation capability of the firm.

#### 4.4.3. Research theme 3: interorganizational relationships

In general, many of the studies in our sample assume collaborative relationships to be superior compared to arm's length relationships and suggest that collaboration increases relationship commitment (Hult et al., 2000) and relationship performance (Fawcett et al., 2012; Singh and Mitchell, 2005; Whipple et al., 2010; Wittmann et al., 2009). For instance, Cao and Zhang (2011) propose that supply chain collaboration improves collaborative advantage and, indeed, has a bottom-line influence on firm performance. The studies in our sample provide strong support to the proposition that using relational governance mechanisms, such as trust, commitment and use of social norms, increases relationship performance (Johnston et al., 2004; Laaksonen et al., 2008; Nyaga et al., 2010; Whipple and Frankel, 2000; Palmatier et al., 2007; Smith 1997), and in particular, these are critical in developing collaborative relationships (Whipple et al., 2010). However, in the context of environmental uncertainty, the benefits from trust to performance are reduced, as overconfidence in the information provided by each partner restrains the environmental scanning and cross-fertilization of views that is of vital importance in that context (Krishnan et al., 2006). According to Palmatier et al. (2007) managers need to allocate more relationship marketing efforts and relationship specific investments to increase performance under environmental uncertainty. Several studies provide support that social capital, including cognitive, relational and structural capital, increases strategic and operational relationship performance (Cousins et al., 2006; Kohtamäki et al., 2012; Villena et al., 2011). Specifically for SMEs, relational capital is proposed to support their growth (Partanen et al., 2008). However, both too little or too much relational capital is proposed to reduce performance (Villena et al., 2011).

The articles in our sample distinguish between coercive and noncoercive influence strategies in buyer-supplier relationships. Use of noncoercive influence strategies, such as rationality, recommendations, information exchange, and requests, – as opposed to coercive strategies – are suggested to result in greater levels of compliance (Payan and McFarland, 2005) and increase trust, commitment, and joint action in buyer-supplier relationships (Hausman and Johnston, 2010). Coercive influence strategies, such as promises and legalistic pleas and threats, in their turn, are counterproductive in encouraging cooperation and compliance (Hausman and Johnston, 2010), but however result in compliance when the target firm is highly dependent on the focal firm (Payan and McFarland, 2005).

#### 4.4.4. Research theme 4: strategic aspects of exploiting external resources

Kale et al. (2002) and Sampson (2005) argue that earlier alliance experience increases the likelihood of future alliance success. However, an alternative approach to alliance learning is suggested by Sluyts et al. (2011), who argue that investment in dedicated alliance learning tools increases the capability of the firm to form new alliances. Thus, alliancing can be learned either by doing or by purposeful investments

aimed at supporting the activity.

Several studies provide evidence regarding the positive outcomes of direct interventions aimed at leveraging buyer's capabilities for improving suppliers' performance. The performance effects of direct interventions have been discussed both at the level of the firm (Ellis et al., 2012; Krause and Scannell, 2002; Lawson et al., 2008) and at the level of individual activities such as supplier qualification programs (Wathne and Heide, 2004), supplier evaluation and certification (Modi and Mabert, 2007), and supplier development workshops (Rogers et al., 2007).

A number of studies propose that external resources can be exploited also in a broader interorganizational context. Adopting a networked setup, scholars have argued that capitalizing knowledge in the network (Hult et al., 2006), alignment of marketing strategies (Green et al., 2012), strong upstream and downstream integration (Frohlich and Westbrook, 2011), knowledge sharing initiatives (Dyer and Hatch, 2006), and integrated information technologies (Vickery et al., 2003) all support performance at the level of the network. Others have also identified factors associated with reduced performance. Wu et al. (2010) highlight the negative performance impacts of co-opetitive behaviour between suppliers in a network. Also excessive supply base complexity may harm network performance (Choi and Krause, 2006).

#### 4.4.5. Research theme 5: open innovation and interorganizational learning

Studies in our sample also support the proposition that involving customers and suppliers to new product development projects has several positive outcomes. In particular, the studies reveal that the timing of partner involvement is very important (Fliess and Becker 2006; Handfield and Ragatz, 2005; McGinnis and Vallopra, 1999; Parker et al., 2008; Petersen et al., 2005; Tracey 2004; Wagner, 2012). Generally, it seems that it is advantageous to involve external partners at early stages of NPD project; the partner's expertise can be leveraged more effectively when the firm has access to more and better information early on (Petersen et al., 2005). However, some studies find that involving customers early may also have negative effects (Fang, 2008), and more customer interaction in NPD is not always beneficial (Bonner, 2005). Fang (2008) maintain that when process interdependence is low, customer involvement does not have a significant positive effect on speed to market and it even hurts new product innovativeness. Successful supplier involvement also requires the use of specific management practices, such as clearly defining objectives, planned interfaces between the supplier and the customer, reporting structures and planning meetings (McGinnis and Vallopra, 1999). A supplier may also have different roles and responsibilities in the NPD project. In a "black-box" model, customer just defines requirements and the supplier has full responsibility of the development, whereas a "grey-box" model is based on close collaboration between a buyer and a supplier (Koufteros et al., 2007).

#### 4.4.6. Research theme 6: operational practices of managing external resources

The studies on operational practices of external resource management provide evidence that information sharing, coordination, and integration are associated with higher performance (Löscher, and Lambert, 2007; Stock et al., 2000). Scholars largely agree that supplier integration is beneficial to manufacturing performance, however, it is important to establish the right configuration of integration practices and to consider the interaction between internal and external integration (Li et al., 2010). In particular, information exchange needs to be supported by continuous coordination (Prahinski and Fan, 2007). Performance improvements may show as manufacturing cost reduction, better quality, manufacturing cycle time reduction, shortened delivery time, increased reliability, lower acquisition costs (Malhotra and Mackelprang, 2012), increased relationship coordination and decreased relationship conflict (Yan and Wang, 2012). Reducing response time, increasing trust, improving activity integration, and frequent contacts

are the most important determinants of success in supplier relationships (Tan et al., 1998).

#### 4.5. Gaps in ERM research

Finally, we focus on the gaps and blind spots of the research: what, in our view, needs to be known but is still largely unexamined. With regard to context, we find a need to both broaden the perspective of research from dyads, chains and networks to whole industries, and to focus the perspective to better understand the idiosyncrasies of managing suppliers in different (purchasing) categories. An industry-level perspective is particularly important in network formation and relationship initiation research (research theme 2), since network structure changes can be caused by the evolution of industry, such as industry events (Madhavan et al., 1998) or the formation of structural holes (Soda et al., 2004). Although scholars agree that companies can benefit immensely from a well-designed configuration of an alliance network, in particular in new product development (Baum et al., 2000; Koka and Prescott 2008), we still know surprisingly little of how to adapt the network to the changes in the industry.

A category-focused perspective, in turn, would be particularly important in interorganizational relationship management (research theme 3), strategic aspects of managing external resources (research theme 4) and operational practices of managing external resources (research theme 5). A category can be defined as "a group of similar items that are required for specific business activities of the firm" (Trautmann et al., 2009, p. 58).<sup>2</sup> Since the seminal article of Kraljic (1983), researchers have widely agreed that categories should be treated differently (e.g. Gelderman and Weele, 2002; Hespington and Schiele, 2015), however, management of external resources is still rarely studied at the category level. In recent years, firms have increasingly deployed a category management approach to external resources (Heikkilä and Kaipia, 2009), therefore there is an urgent need for advancing the understanding of its impact.

Regarding context in terms of industry sectors, there is a dearth of studies of external resource management in the public sector. In recent years, the public sector has increasingly contracted services to private service-providers, which has shifted the focus of public management from providing services to managing external resources (Feiock and Jang, 2009). Yet, only one article in our sample addressed ERM in the public sector context. Acknowledging the limitations of our sample, we argue that there is a need for more studies that consider the idiosyncrasies of the public sector in decisions of governance mode and mechanism, network formation and relationship initiation, and inter-organizational relationships.

Furthermore, the studies in the new product development context tell us a lot about how firms with significant internal R & D resources complement their knowledge base and leverage external resources for innovation (e.g. Handfield and Ragatz, 2005; McGinnis and Vallopra, 1999; Parker et al., 2008; Petersen et al., 2005), but they remain relatively silent on situations where firms have low R & D capacity and, therefore, are limited in their abilities in learning new technological insights, and implementing them in innovation and new business development. For instance, it would be interesting to investigate how absorptive capacity (Zahra and George, 2002) manifests itself in low R & D contexts.

Having here presented key shortages of the ERM literature we move on to analyse the knowledge trade between the management disciplines to further identify opportunities for joint theory development in the field of ERM across management disciplines.

<sup>2</sup> Purchasing categories are typically divided into product-related (e.g. raw materials and components) and non-product-related (e.g. information technology and professional services).

**Table 5**  
Aggregate pattern of knowledge trade between scientific disciplines.

Citing	Cited (%)			Total citation imports
	Marketing	OM/SCM	Strategic Management	
Marketing	358 (57.8%)	75 (12.1%)	186 (30.0%)	261
OM/SCM	114 (16.2%)	382 (54.3%)	208 (29.5%)	322
Strategic Management	13 (4.3%)	7 (2.3%)	279 (93.3%)	20
Total citation exports	127	82	394	1622

Note: Rows correspond to citing (import) disciplines, columns to cited (export) disciplines.

## 5. Knowledge-trade between management disciplines

We used quantitative cross-citation measures to analyse the knowledge trade between the three focal disciplines. The aggregate citations presented in Table 5 illustrate the development of external resource management in terms of the progress of knowledge trade over the 1997–2012 period. We observe, for example, that articles published in OM/SCM journals cited articles published in strategic management journals 208 times and articles published in marketing journals 114 times. As a discourse, OM/SCM was thus most active in building on knowledge developed in the other two disciplines from which it drew 46.7% of total citations. With an external/internal citation ratio of 42.2%, marketing was also highly active in building on knowledge imported from other disciplines. Strategic management scholars, in turn, exhibited much less interest in drawing on externally developed knowledge, the marketing and OM/SCM disciplines accounting for only 6.7% of all citations by sample articles published in strategic management journals. One explanation for this finding is that strategic management is closer to basic research than the more practice-oriented marketing and operations/supply chain management, and it is natural that applied research cites basic research but not vice versa (e.g. Narin, 1976 (pp. 206–219); McMillan and Hamilton III, 2000). However, our qualitative content analyses indicated that articles in marketing and OM/SCM journals increasingly deal with general theories instead of just their applications, thus converging with the basic theory approach in strategic management journals.

Table 6 reports the balance of trade (BOT) metrics for the three focal disciplines. A metric of one would represent a perfectly balanced export to import ratio, a metric higher than one that the discipline is a net exporter, and a metric less than one that it is a net importer, of knowledge. We observe, that the knowledge (measured by number of citations) exported to the OM/SCM discipline by the strategic management discipline was 29.71 times that imported from OM/SCM to strategic management. The fact that marketing and OM/SCM exhibit a relatively even balance of knowledge trade, but are strongly dominated by knowledge exported from the strategic management discipline, indicates the role of the latter in the development of ERM to have been highly influential, yet unidirectional. Put differently, marketing and OM/SCM researchers have exchanged ideas actively and reciprocally, and benefited as well from the work of strategic management scholars in the development of the ERM discourse, whereas

**Table 6**  
Aggregate balance of trade (BOT) between scientific disciplines.

	Marketing	OM/SCM	Strategic Management
Marketing	1	0.66	14.31
OM/SCM	1.52	1	29.71
Strategic Management	0.07	0.03	1

strategy scholars have apparently perceived limited value in the contributions of the marketing and OM/SCM disciplines.

## 6. Discussion and conclusions

This study has analysed research in the area of managing external resources, a topic logically recognized to span multiple disciplines, between the strategic management, OM/SCM, and marketing disciplines. We employed both quantitative and qualitative analyses for establishing how past research informs evidence-based management, and for identifying opportunities to advance knowledge development through disciplinary integration.

In the qualitative content analysis of the 601 systematically identified articles from the three focal disciplines we observed that although management of external resources is a wide and at first glance a very fragmented field, the studies centre on a limited number of general interrelated themes: decisions on governance mode and mechanism, network formation, managing inter-organizational relationships, strategic aspects of exploiting external resources, open innovation and inter-organizational learning, and operational practices. We described in which context the problems have been addressed, what interventions and mechanisms have been identified and studied, and what outcomes the literature has revealed. We synthesized the key findings from the literature in the form of design propositions that provide support for evidence-based management of external resources.

The development of the design propositions of external resource management turned out to be quite a challenge, since the literature is voluminous and fragmented with several theoretical approaches and distinct discourses. Many studies addressed only some of the CIMO-elements, or linked several interventions to multiple outcomes, making it difficult to identify clear relationships. Also, the generative mechanisms linking interventions to outcomes are typically complex and diverse. Therefore, many studies cannot fully reveal the generative mechanism through which the intervention leads to the outcome, although they find a strong statistical relationship. However, by synthesizing a large number of studies we were able to identify a rich set of design propositions that are strongly supported by research evidence.

The citation analysis identified an encouraging bilateral knowledge trade between marketing and OM, and a broader, albeit unilateral exchange between strategic management and the other two focal disciplines. In light of earlier bibliometric research (e.g. Narin, 1976 (pp. 206–219); McMillan and Hamilton III, 2000), it is hardly surprising that strategic management, which as a discipline is closer to basic research than the more practice-oriented marketing and operations/supply chain management disciplines, does not frequently cite research carried out within the two other focal disciplines. However, we recognized articles in marketing and OM/SCM journals increasingly dealing with general theories instead of just their applications, thus converging with the basic theory approach in strategic management journals. The changes in the nature of research published in our three focal disciplines could be made more explicit by following Lewison's (1996) systematic approach for subfield analysis. If scholars do not update their perceptions of key journals periodically, they may miss considerable opportunities for fruitful cross-disciplinary integration, which may constitute a major obstacle to theory building in the field of managing external resources (Pratt et al., 2012). Even if discipline-specific studies still adopt idiosyncratic perspectives on common themes, recognizing relevant research across disciplines will advance theory development by formulating a more comprehensive picture of complex phenomena. This is important as well from a practitioner perspective, with the problems faced by managers often being multi-disciplinary by nature (Linderman and Chandrasekaran, 2010).

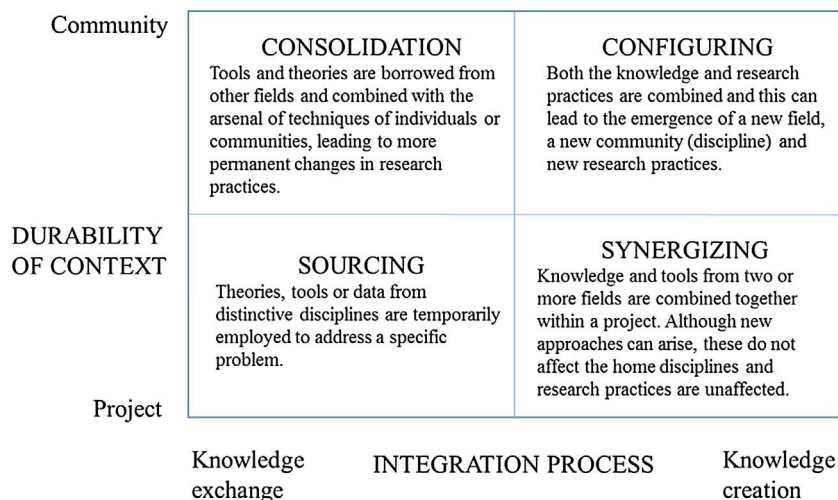


Fig. 3. A typology of disciplinary integration (Siedlok and Hibbert, 2014).

6.1. Proposals for research

During recent decades, several parallel trends have increased the importance of external resources for organizations (Axelsson et al., 2005; Monczka 2010; Van Weele, 2010). Therefore, there is a need to develop the organizational capabilities to manage those resources. Based on our study we argue that there is an untapped opportunity to advance organizations’ capabilities in managing external resources through adapting evidence-informed practises. In Section 4.4, we synthesized the results of 601 academic studies in the form of design propositions for supporting practitioners, and in Section 4.5 we presented research gaps in terms of problem in context. Next, we make proposals for management researchers to support the further development of evidence-based management of external resources.

First, we encourage researchers to adopt a design-science strategy for empirical studies of external resource management. Design-oriented research has for long been common in engineering sciences, and it is also getting increasing interest in management, but explanatory research paradigm of natural sciences and humanities still dominates management research (Holmström et al., 2009; van Aken and Romme, 2009). Although one of our article inclusion criteria was the presence of a managerial viewpoint, many selected studies provided very limited contribution to evidence-based management. The situation could be improved by adopting a design-science research strategy, which has a good fit with evidence-based management, since it is driven by field problems and aims for generic designs to solve those problems (Holmström et al., 2009; van Aken et al., 2016). Although explanatory research also addresses management problems in different contexts, and mechanisms linking interventions and outcomes, the approach to the interventions and mechanisms is different. While design-oriented research considers managers as active actors and is interested in intentional mechanisms to achieve the outcome through interventions, explanatory research sees the role of active actors secondary and is more interested in functional and enabling mechanisms, i.e., how mechanisms fit to context and how they enable various outcomes. Design-oriented research shares characteristics with action research, but while action research projects are typically case-specific, design-oriented studies aim at optimizing and generalizing a design (van Aken et al., 2016).

Second, we propose adding a design-oriented perspective to the future literature reviews in the field of external resource management. A design-oriented research synthesis is the cornerstone of evidence-based management, providing insights and guidance to practitioners and policymakers; however, a vast majority of literature reviews in management are narrative explorations of the existing intellectual

structure, aiming to propose new research questions to researchers in the field (Tranfield et al., 2003). There has been a call for design-oriented systematic reviews in management for many years (e.g. Tranfield et al., 2003; Denyer et al., 2008), but they still remain rare. This is understandable, since researchers aim to publish in academic journals that are targeted primarily for an academic audience. Adding a design-oriented perspective to traditional literature reviews would be a feasible alternative to advance evidence-base management. Traditional, narrative literature reviews and design-oriented reviews are both interested in portraying a comprehensive picture of scientific knowledge of a specified topic, but from a different perspective. If both research and practitioner perspectives are taken into account in the early phases of the literature study design, as we have here done, we believe that the reviews provide deep insights to both audiences.

Third, we propose carrying out more studies to confirm (or disprove) major findings of previous ERM studies in various contexts. Studies in our sample address hundreds of different interventions, mechanisms, and outcomes and employed over 70 different general theories. Most of these were addressed only in a single study, providing a limited contribution for evidence-based management. Research tradition and editorial policies of management journals may explain the diversity of the research settings. In management journals, a study that repeats and confirms an earlier study is commonly not considered making a strong enough contribution, while in medicine, researchers are encouraged to repeat studies to gain stronger evidence to guide practices. Repeating studies in different contexts would enable the use of meta-analysis in the research synthesis, and deepen the understanding of the impact of the context on the outcomes of interventions.

Fourth, advancing the knowledge in the field of external resource management needs more studies adopting a multiple-firm unit of analysis. Even though the perspective of most of the studies in our sample was dyad, chain, or network, the data was in most cases collected from only one side of the relationship, and true multiple-firm empirical studies remain scarce. In particular, there is a dearth of studies employing a chain and network unit of analysis. As Möller and Rajala (2007) note, there exist several types of business networks that depict different conditions and requirements for management. Effective management of these business networks requires understanding the CIMO-dynamics at the network level.

Fifth, we find that increasing disciplinary integration between strategic management, marketing, and OM/SCM would increase the effectiveness of knowledge development in the field of ERM, thus also advancing evidence-based management. To illustrate the current state of disciplinary integration and the new opportunities to advance ERM research, we adopt the disciplinary integration framework of Siedlok

and Hibbert (2014) (Fig. 3).

We find that there is both an opportunity and a need to increase disciplinary integration between the three focal management disciplines through the following mechanisms:

1. *Further increasing sourcing and consolidating ERM knowledge across management disciplines, particularly in strategic management.* We find that the level of knowledge exchange is still too low in relation to the thematic proximity and congruent research interests. Particularly, strategic management scholars should recognize ERM research in OM/SCM and marketing, which is increasingly at the same level of generality as strategic management research. Strategic management scholars tend to limit their ERM literature base to “alliance” studies (for example Meier, 2011; Christoffersen, 2013; Niesten and Jolink, 2015), although relevant literature could be found under different titles from other management disciplines.
2. *Synergizing ERM research across management disciplines particularly in the following thematic fields: governance mode decisions, network formation, and open innovation.* We find that in these thematic fields combining the idiosyncratic perspectives of the management disciplines in joint research projects would result in more reliable and valuable research findings than discipline-specific studies only. For example, in governance mode research, marketing scholars could focus on implications to customer relations, OM/SCM scholars could take the supply chain and risk management perspective, and strategic management scholars could take the perspective of strategic implications. Explorative and qualitative studies would be most useful in understanding these complex management problems from several disciplinary perspectives.
3. *Configuring ERM research across management disciplines particularly in*

*the following thematic fields: interorganizational relations and exploiting external resources.* We find that in these thematic fields the research interests of all management disciplines are congruent, and no discipline has a clear idiosyncratic perspective to the theme. One means to configure ERM research across disciplines would be the establishment of hybrid disciplinary communities to address these themes that are of interest in all management disciplines. In the field of interorganizational relations, the Industrial Marketing and Purchasing Group (IMP) is an example of a hybrid disciplinary community, which has succeeded to attract researchers both from marketing and OM/SCM.

### 6.2. Limitations

The ideal of conducting a thorough keyword search of several databases to identify all possible studies of ERM was deemed impractical given the scope of articles likely identified and potential bias in search words based on their disciplinary origins, preliminary searches having already indicated that different terminology is used within disciplines. The 601 articles identified in our study were selected through a systematic review of all (nearly 5000) abstracts that appeared in six selected journals during the period 1997–2012. They are therefore not a sample, but rather the entire census of external resource management studies in the selected journals within the specified time frame. The journals, however, as they clearly do not exhaust the population of management journals publishing studies on the topic of managing external resources, form a theoretical sample that enables us to draw analytical generalizations (Eisenhardt and Graebner, 2007). Repeating the study using other management journals would likely increase the external validity of the findings.

## Appendix A

Table A1

Key concepts in six ERM theme discourses. Concepts common to all six themes appear in **boldface**, distinct concepts for one theme in *italics*.

Theme	1: Decisions on governance mode and mechanisms		2: Network formation		3: Inter-organizational relationships	
Key concepts (count/ relevance score <sup>a</sup> )	<b>firm</b>	60/100%	<b>firm</b>	180/100%	<b>relationship</b>	544/100%
	<i>governance</i>	52/87%	<i>network</i>	132/73%	<b>firm</b>	157/29%
	<b>performance</b>	51/85%	<b>performance</b>	82/46%	<b>supplier</b>	147/27%
	<b>relationship</b>	37/62%	<b>relationship</b>	81/45%	<b>performance</b>	112/21%
	<i>outsourcing</i>	36/60%	<b>supplier</b>	78/43%	<i>trust</i>	97/18%
	<i>costs</i>	30/50%	<i>alliance</i>	76/42%	<i>management</i>	84/15%
	<i>transaction</i>	27/45%	<i>management</i>	58/32%	<i>buyer</i>	72/13%
	<i>alliance</i>	27/45%	<i>strategic</i>	42/23%	<i>supply</i>	66/12%
	<i>control</i>	25/42%	<i>business</i>	39/22%	<i>chain</i>	65/12%
	<b>supplier</b>	25/42%	<i>resources, value</i>	36/20%	<i>business</i>	60/11%
Theme	4: Strategic aspects of exploiting external resources		5: Operational practices of managing external resources		6: Learning and innovating with external partners	
Key concepts (count/ relevance score <sup>a</sup> )	<b>supplier</b>	196/100%	<b>firm</b>	109/100%	<b>firm</b>	135/100%
	<b>firm</b>	186/95%	<i>supply</i>	104/95%	<i>product</i>	132/98%
	<b>relationship</b>	145/74%	<b>supplier</b>	88/81%	<i>development</i>	113/84%
	<b>performance</b>	123/63%	<b>performance</b>	75/69%	<b>supplier</b>	98/73%
	<i>supply</i>	105/54%	<i>management</i>	74/68%	<i>knowledge</i>	96/71%
	<i>chain</i>	91/46%	<b>relationship</b>	58/53%	<i>innovation</i>	93/69%
	<i>strategic</i>	73/37%	<i>practices</i>	30/28%	<b>relationship</b>	86/64%
	<i>management</i>	71/36%	<i>costs</i>	30/28%	<b>performance</b>	71/53%
	<i>integration</i>	57/29%	<i>information</i>	29/27%	<i>learning</i>	58/43%
	<i>development</i>	53/27%	<i>quality</i>	28/26%	<i>alliance</i>	52/39%

<sup>a</sup> The relevance score is the percentage frequency of text segments (studied in two-sentence blocks) coded with that concept relative to the frequency of the most frequent concept in the list.

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