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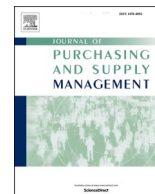
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How online information search behavior and the role of tacit knowledge differ across clusters of purchase situations[☆]

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ABSTRACT

Online information sources increase the amount of information that is available for purchasing managers in a particular purchasing situation. Yet, how buyers make use of that information and thereby rely on tacit knowledge is theoretically still poorly understood. This paper relies on 40 qualitative in-depth interviews with purchasing managers from different manufacturing industries. Whereas previous research mainly considered the purchasing organization or the purchasing department as the unit of analysis, we are able to provide a finer-grained understanding by zooming-in on separate purchasing situations and employing a quantitative method to cluster these. We find that online information search is differentiated in terms of its extent and role. It is particularly relevant in buying situations characterized by high novelty, while at the same time, these can have either high or low levels of risk, complexity, and importance. We also find that the role of tacit knowledge is differentiated. Across different purchase situations, this provides various kinds of support to purchasing managers to identify, retrieve and use information. Sometimes tacit knowledge aids speed and efficiency of decision-making, but in other clusters, it helps to deal with large amounts of complex information. Furthermore, purchase situations can be distinguished as to whether tacit knowledge is based on accumulation of experience with similar buying situations versus broader purchasing experience.

1. Introduction

Information technology and online information have enormous consequences for purchasing and supply management (P. F. Johnson et al., 2007; Karttunen et al., 2023; Liu et al., 2010; Lorentz et al., 2021; Srai and Lorentz, 2019). Many drivers and consequences of e-procurement have been investigated, including user acceptance of e-procurement systems (Brandon-Jones and Kauppi, 2018; Croom and Brandon-Jones, 2007; Olson and Boyer, 2003), shorter lead-time, lower inventory, or better on-time delivery (Devaraj et al., 2012; Mishra et al., 2013). Practitioner-oriented publications claim that information technology and digital channels are “dramatically changing the way B2B companies and their customers approach buying and selling”

(Zoltners et al., 2016, p. 2). Studies on the use of e-procurement and online sources investigated contingency factors, including absorptive capacity, knowledge scanning, purchasing, digital procurement competence, and digital embeddedness (e.g., Brandon-Jones and Knoppen, 2018; Krijestorac et al., 2021; Mishra et al., 2013; Schiele, 2007; Vaidyanathan and Devaraj, 2008).

The increased availability of information that purchasing managers have at their disposal through online sources may also change the role of tacit knowledge in purchasing. Research suggests that purchasing managers need to rely on tacit knowledge to make use of information in purchasing situations (Giunipero et al., 1999). When amount and variety of information that purchasing managers have at their disposal in a purchasing situation increase, the role of tacit knowledge using that

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information may also change.

Connecting these two topics, however, we know little about online information and the role of tacit knowledge at the level of individual purchase situations. With exceptions (e.g., Bartezzaghi and Ronchi, 2005; Garrido et al., 2011; Garrido Samaniego et al., 2006) e-procurement use and online information search has been investigated at the level of the buying organization or the purchasing department, but not at a more detailed level. This is the starting point for our study. The research question is “How can purchasing situations be differentiated in terms of (online) information search and the role of tacit knowledge?” We study how and when purchasers gather information from digital and non-digital information sources in various purchasing situations and how these efforts relate to different roles of tacit knowledge.

Given the exploratory stage of the field and the “complex, evolving processes, relationships, and interactions” (Griffin, 2012, p. 678) associated with marketing and purchasing questions in business markets, we are using a qualitative approach (DeHoratius and Rabinovich, 2011; Lilien, 2016). We conducted in-depth interviews with purchasing managers employing the repertory grid technique (Kelly, 1963), followed by a semi-structured interview.

We contribute to theorizing on the role of contingency factors in purchasing (e.g., Bals et al., 2018; Rozemeijer et al., 2003). At the level of individual purchasing situations, we relate the purchasing manager’s online information search and the role of tacit knowledge to important contingency factors of purchasing: product complexity and purchasing importance (e.g., Kraljic, 1983), novelty (Robinson et al., 1967), and purchase risk (e.g., Heckmann et al., 2015). By synthesizing the 198 purchase situations described by purchasing managers in the repertory grid interviews through a cluster analysis, we identify five types of buying situations. They differ both regarding online information search and the role of tacit knowledge. Novelty distinguishes purchasing situations in terms of the importance of online information search and the basis for building tacit knowledge. Risk, complexity, and importance separate purchasing situations regarding overall information search, as well as the support function of tacit knowledge.

This paper is structured as follows: We review prior studies looking at online information behavior and tacit knowledge in Section 2. Our research method is described in Section 3. Results are presented in Section 4, and we discuss implications for research and practice in Section 5.

2. Literature review: online information behavior and tacit knowledge in procurement

2.1. Purchasing decision makers’ use of e-procurement and online information search

E-procurement concerns the support of purchasing activities with information technology (de Boer et al., 2002; Karttunen et al., 2023). It can be defined as “the use of integrated (commonly web-based) communication systems for the conduct of part or all of the purchasing process” (Croom and Brandon-Jones, 2007, p. 295). E-procurement uses electronic data interchange (EDI) (Caniato et al., 2010; Teo et al., 2009), enterprise resource planning (ERP) software (Karttunen et al., 2023; Mital et al., 2014), and more recent technologies, such as cloud services, big data analytics, artificial intelligence, or mobile technologies (Srai and Lorentz, 2019). E-procurement supports various activities, including searching and selecting products and suppliers, comparing prices, negotiating, contracting, placing orders, general information exchange, approving and paying invoices, and analyzing customer reviews (Caniato et al., 2010; de Boer et al., 2002; Krijestorac et al., 2021; Mishra et al., 2013; Rai et al., 2006; Steward et al., 2018). A central element for e-procurement is to establish a data infrastructure that provides common data for various applications (Karttunen et al., 2023). E-procurement can also include marketplaces for e-auctions and e-tenders (Rodríguez-Enríquez et al., 2016; Schoenherr and Mabert, 2011).

E-procurement systems yield benefits that include making purchasing processes faster and more efficient (Seyedghorban et al., 2020), for example, by removing duplication of activities, avoiding paper-based documents, supporting workflows, automating activities, and reducing complexity by doing business with fewer suppliers (Davila et al., 2003; Karttunen et al., 2023; Ronchi et al., 2010; Teo et al., 2009). Advantages may also arise from an increased collaboration between different parties along the supply chain (Karttunen et al., 2023; Wang and Archer, 2007).

Moreover, e-procurement can improve decisions by providing better information. Some of that information originates from within the buying organization, for example suggested products and suppliers and the experiences with these, standard contracts, purchase prices and other conditions in past transactions (Barratt and Barratt, 2011). Diverse information is available from outside the buying organization, mainly on the Internet (Vaidyanathan and Devaraj, 2008). For example, online customer reviews allow the direct comparison with the experiences other buyers have made (Steward et al., 2018, p. 178). Moreover, e-procurement allows improved internal collaboration and supports staff to become more strategic thinkers (Seyedghorban et al., 2020).

Table 1 comprises empirical studies published after 2001 studying contingency factors for the use of e-procurement broadly, or specifically for online information search in e-procurement. The adoption of e-procurement technology alone may not yet provide benefits to the firm, as this depends on how the organization can make effective use of the new technology and knowledge. Contingency factors capture that the effects of e-procurement technology depend on the situation. The papers in Table 1 differ with regard to their unit of analysis, ranging from the organization, to the purchasing department, to individual buyers or purchase situations.

At the level of the purchasing department, Mishra et al. (2013) find that the procurement integration competence of a firm has a significant impact on *digital procurement competence*, which comprises internal and external digitization. Digital procurement competence has significant procurement performance implications. This idea is more broadly reflected in the concept of absorptive capacity of the purchasing organization (Schiele, 2007). This combines abilities of internal knowledge and information sharing, capabilities to process gathered information, and the ability to adapt this information and knowledge to specific problems (Schiele, 2007; Zahay and Handfield, 2004). Especially effective knowledge scanning, understood as setting the focus on recognizing the important knowledge and technology information from external and internal sources, has a significant impact on successful implementation of e-procurement tools (Brandon-Jones and Knoppen, 2018; Schütz et al., 2020).

Also, the *maturity of the purchasing function* matters for the implementation of e-procurement, and for achieving innovations in purchasing more broadly, because more mature departments may have greater absorptive capacities (Schiele, 2007). Maturity is defined as “level of professionalism in the purchasing function” and is typically measured on the basis of multiple criteria (Rozemeijer et al., 2003, p. 7). Furthermore, the size of the purchasing department is relevant (Hartley et al., 2004). Larger purchasing departments can implement online tools easier and use these more efficiently (Teo et al., 2009), due to greater technology openness and availability of concentrated purchasing and IT knowledge (Hartley et al., 2004).

Only few papers consider a more detailed unit of analysis, such as individual buyers or purchase situations (Bartezzaghi and Ronchi, 2005; Garrido et al., 2011; Garrido Samaniego et al., 2006; Walker and Harland, 2008). For example, training (Brandon-Jones and Kauppi, 2018) and user acceptance of e-procurement tools matter, because these tools may support purchasing activities but also create limitations for buyers (Olson and Boyer, 2003). Krijestorac et al. (2021) consider *digital embeddedness*, which refers to the extent to which information from online sources affect an individual’s decision making. More digitally embedded buyers are more willing to adopt novel solutions and tend to be more willing to switch suppliers. Furthermore, they find that buying

Table 1

Selection of papers investigating contingency factors for the use of e-procurement or specifically for online information search in e-procurement.

Paper	Unit of Analysis	Qualitative or quantitative and method details	Content or purpose of external, digital information	Contingency factors
Bartezzaghi and Ronchi (2005)	Purchasing situation	Qualitative: Interviews with target informants in 110 Italian companies.	Purpose: Requirement definitions, supplier scouting and qualification, request for bid, final negotiation, selection Content: Materials and services	Criticality of a purchase, market criticality, frequency of the purchase, knowledge of the market
Brandon-Jones and Kauppi (2018)	Buyers	Quantitative: Survey with 139 employees who use e-procurement		Individual-level acceptance of e-procurement by an organization's employees
Brandon-Jones and Knoppen (2018)	Purchasing department	Quantitative: Survey with 309 purchasing managers or equivalent positions in manufacturing and service firms	Paper does not provide information on content or purpose	Knowledge scanning, service-based versus manufacturing-based organizations
Caniato et al. (2010)	Purchasing department	Qualitative: A framework for measuring e-procurement maturity is applied to 13 case studies of information technology purchases	Content: Buying hardware, software and IT services	Maturity level of e-procurement adoption in the organization
Croom and Brandon-Jones (2005)	Organization	Qualitative: 15 interviews with semi-structured and open questions	Paper does not provide information on content or purpose	IT infrastructure, rollout experiences (e.g., to incorporate suppliers), finance system integration
Croom and Brandon-Jones (2007)	Organization	Qualitative: Phase 1 with 14 semi-structured interviews with senior managers, phase 2 with 27 semi-structured interviews with senior managers and team leaders	Paper does not provide information on content or purpose	Compliance, training, hardware resources, network resources, web server issues
Davila et al. (2003)	Organization	Quantitative: Survey with 168 U.S. organizations, further analysis with 86 of these who use e-procurement	Purpose: Automating workflows, consolidating, and leveraging organizational spending power, identifying new sourcing opportunities Paper does not provide information on content or purpose	Internal business risks, technology risks, e-procurement process risks, external business risks, aggressive or conservative technology adoption strategy
Devaraj et al. (2012)	Purchasing department	Quantitative: Survey with 131 purchasing managers	Purpose: Supporting need recognition, technical specification, search for suppliers, assessing alternatives, formalization of the purchase	Purchase volume and mix flexibilities facilitated by e-procurement applications
Garrido et al. (2011)	Purchasing situation	Quantitative: Survey answered by 103 Spanish firms	Purpose: Supporting need recognition, supplier search, purchase, technical specification, alternatives evaluation Content: Diverse information on products/services, prices, conditions order status, etc.	Novelty, complexity, perceived risk, time pressure, personal stake, service procurement phase
Garrido Samaniego et al. (2006)	Purchasing situation	Quantitative: E-Mail Survey answered by 103 Spanish firms	Purpose: Supporting need recognition, supplier search, purchase, technical specification, alternatives evaluation	Purchasing situation (in terms of novelty, complexity, perceived risk, time pressure, personal stake), purchasing phases
Kauppi et al. (2013)	Purchasing department	Quantitative: Survey with 297 procurement executives in ten countries	Content: Diverse information on products/services, prices, conditions order status, etc.	Absorptive capacity (consisting of buyer competence, manager competence, communications climate, communications network, knowledge scanning)
Mishra et al. (2013)	Purchasing department	Quantitative: Survey with 412 manufacturing firms	Purpose: Supporting product search, identification of supplier, and more specifically: negotiation, completion of transactions, document exchange, financial settlement	Procurement integration competence (consisting of internal process knowledge, external relationship knowledge), digital procurement competence (consisting of internal procurement digitization, external online search digitization, external online ordering digitization)
Kennedy and Deeter-Schmelz (2001)	Organization	Quantitative and qualitative: Semi-structured interviews with five professional buyers and 232 quantitative surveys with purchasing professionals	Purpose: Provision of product/component information, search of suppliers, competitive information, external customer information	Personal perceptions of technology, organizational influences on use of the internet by industrial buyers, market conditions
Olson and Boyer (2003)	Buyers	Quantitative: Survey with 416 business customers of a major internet retailer	Purpose: Order placement, order estimating, order tracking	User acceptance of the new technology
Rai et al. (2006)	Purchasing department	Quantitative: Survey answered by 166 senior procurement professionals	Purpose: Supplier selection, order placement, order fulfillment, payment and settlement Content: IT purchases	Top management support, electronic procurement innovation infrastructure capability, IT sophistication
Ronchi et al. (2010)	Organization	Qualitative: Developing and testing an e-procurement value assessment methodology. Design validated by 12 experts; tested with 6 multinational companies		Resources invested, target spending via e-procurement
Srai and Lorentz (2019)	Organization	Qualitative: Construction of a framework, validated in focus-group-type full-day workshops with four firms	Purpose: Various, such as supplier management, cross-functional integration, strategy development, human resource management, purchasing and supply management control	Transaction management, coordination and control, process improvement and innovation, aligned category management, supplier capability assessment, relationship management, supply market knowledge management
Teo et al. (2009)	Purchasing department	Quantitative: Survey with 141 companies in Singapore	Content: Information on maintenance, repair, operational items, production goods, raw materials, other items Purpose: Supporting detailed activities, such as request for proposal or information, identify new suppliers, gather and distribute purchasing information,	Firm size, top management support, perceived indirect benefits, business partner influence

(continued on next page)

Table 1 (continued)

Paper	Unit of Analysis	Qualitative or quantitative and method details	Content or purpose of external, digital information	Contingency factors
Vaidyanathan and Devaraj (2008)	Purchasing department	Quantitative: Survey with 131 purchasing managers	electronic order placement, price and availability check, tracking orders, electronic payment, creation and approval of purchase requisites, electronic submission of tenders	Information flow process quality and logistics fulfillment quality
Walker and Harland (2008)	Organization and Purchasing situation	Quantitative and qualitative: 26 participants surveys; 3 case studies were conducted, and focus group discussions with 37 participants	Content: Direct or indirect materials Purpose: procurement, handling of value-added services	Organizational factors, readiness factors, supply factors, strategic factors, policy factors
Zahay and Handfield (2004)	Organization	Quantitative: Online survey with 77 suppliers in the airline industry	Purpose: Supporting transactions of routine, non-strategic purchases Purpose: Automation of order requisition, purchase order, accounts payable processes	Ability to learn and share information, technical capabilities

processes of services are more complex than of products, leading to differences in successful use of online information search.

2.2. Tacit knowledge in purchasing

Table 1 highlights that the role of tacit knowledge has hardly been investigated in relation to e-procurement technology and external online information search. Connecting these topics is important, though, because purchasing managers require also tacit knowledge to utilize information in their decision-making processes (Giunipero et al., 1999). Digital tools and online information sources increase the amount of information that is available for purchasing managers in a particular purchasing situation. Little is known about how buyers rely on tacit knowledge when it comes to identifying relevant information for a particular purchasing decision, retrieving that information, and then using it for decision-making purposes. The growth of available information and the importance of tacit knowledge for making use of that information make it important to study the connection between these two topics. More generally, Anand et al. (2010) suggest that in operations management it is “important for practice and academia to examine the missed opportunities that may result from ignoring tacit knowledge” (p. 304).

Organizational knowledge involves tacit as well as explicit knowledge, being built up through a constant exchange between both forms of knowledge (Nonaka, 1994). Explicit knowledge describes knowledge that can be articulated and shared at low cost and effort (Nonaka and von Krogh, 2009). People who have explicit knowledge can communicate this knowledge clearly. Explicit knowledge is assigned attributes such as “objective and rational, and created in the ‘then and there’” (Nonaka and von Krogh, 2009, p. 641). Tacit knowledge, on the other hand, is knowledge that one possesses but which is difficult or almost impossible to articulate (W. H. A. Johnson, 2007). It can formally be defined as knowledge that is “implicit, hard-to-conceptualize and subjective, and is part of an individual’s experiences; it is evidenced in behavior or actions, and is often highly ambiguous” (Schoenherr et al., 2014, p. 123). Tacit knowledge develops over time, based on experiences: “learning-by-doing” (Schoenherr et al., 2014, p. 123). “Take an example. We know a person’s face and can recognize it among a thousand, indeed among a million. Yet, we usually cannot tell how we recognize a face we know. So most of this knowledge cannot be put into words” (Polanyi, 1966, p. 4). Thus, people have particular knowledge and can apply it, but do not know how to express and share this information. Tacit knowledge is assigned attributes such as “actionable, subjective, experiential and created in the here and now” (Nonaka and von Krogh, 2009, p. 641).

Tacit knowledge is inseparable from action, not only bodily action and skills (like playing a piano or riding a bike) but also cognitive action, such as decision-making. The cognitive facet of tacit knowledge

comprises beliefs, values, attitudes, ideals, mental maps, and schemata (Schoenherr et al., 2014). Tacit knowledge is used in various ways: to find, to solve, and to predict and anticipate problems (Harlow, 2008). Essentially, tacit means that a decision is ‘somehow’ made, on the basis of a gut feeling or some form of future prediction that is derived from experience (Brockmann and Anthony, 2002), but how and why is difficult for the individual to express. In the SECI model (Nonaka et al., 2000), externalization describes how organizational knowledge is created. As knowledge becomes more explicit, it becomes a basis for reflection and conscious action, and it becomes more feasible to share it with others in the organization.

Early studies in purchasing show that buyers rely relatively equally on tacit knowledge and explicit knowledge (Giunipero et al., 1999). Buyers have to make many decisions, which are often complex and consist of several steps. They must process much information and are often under time pressure. Given the frequency and complexity of decisions, buyers often do not have enough time to look at and evaluate all the information, which even without time pressure might already be too challenging (Giunipero et al., 1999). Buyers have to resort to tacit knowledge to be able to filter important information and to recognize intuitively, by a gut feeling, which data they have to use. (Giunipero et al., 1999). “They experience an automatic, subconscious process that draws upon experientially established cognitive structures. These cognitive structures are schemata (mental maps) or knowledge formed from abstractions of experience” (Giunipero et al., 1999, p. 44). If tacit knowledge is missing, errors are more likely to occur (Hazlett et al., 2008).

Tacit knowledge is important in the interaction between buyers and suppliers to make accurate estimates, maintain stable relationships, and prevent misunderstandings (Plantinga and Dorée, 2016; Yang et al., 2016). Moreover, the purchasing function needs to tap into external tacit knowledge from suppliers to respond rapidly to crises and changing conditions, which requires trust and effective knowledge transfer mechanisms between buyers and suppliers (Parente et al., 2022). In new product development, for example, tacit as well as explicit knowledge from suppliers can help companies to gain a competitive edge by creating products that are difficult to replicate, which requires companies to work on relationship quality, which includes to cultivate information and knowledge sharing (Sjoerdsma and van Weele, 2015). Thus, successful companies in today’s digitalized business environment rely on both explicit and tacit knowledge to thrive, making it critical to exchange both forms (Bouncken and Barwinski, 2021). Purchasing and supply management practitioners need various kinds of competencies that draw on both explicit and tacit knowledge (Schulze et al., 2019).

To conclude, prior studies show that tacit knowledge in purchasing may play an important role for identifying, retrieving, and using information. Digital tools and online information sources increase the information purchasing managers have at their disposal. Connecting these

two perspectives, far less is known about the role of tacit knowledge as a factor for understanding how purchasing managers use external online information. Specifically, it would be important to better understand how purchasing situations are differentiated in terms of online information search and the role of tacit knowledge.

3. Research method

Although digital technologies and tacit knowledge use have received attention in the purchasing literature, there is little knowledge on how characteristics of specific purchase situations are associated with varying importance of online information search and different roles of tacit knowledge. We take a contingency approach and build clusters of different purchasing situations on the basis of four contingency factors of purchasing situations (Novelty, Risk, Complexity, and Importance) and use these clusters to differentiate the importance of (online) information search and the roles of tacit knowledge at the level of purchasing situations. Given the lack of testable theories in this domain, this research is exploratory in nature. Building upon the rich literature on organizational buying behavior, we focus on discovering new constructs and relationships regarding online information behavior and the role of tacit knowledge.

Our data source are in-depth interviews where we employed the repertory grid technique (Kelly, 1963). This technique involves construct elicitation and construct rating. Participants identified bipolar constructs that describe purchasing information behavior in six typical purchase situations in which they have been involved. Participants then rated their six purchasing situations regarding the newly identified constructs. Additionally, we asked respondents to rate those purchase situations in terms of a number of constructs we had selected beforehand. Finally, to deepen our understanding of why and how online information behavior does (not) occur, the interviews included with a semi-structured part.

3.1. Repertory grid interviews

Given that macro trends have possibly changed the buying and information habits of business customers (Grewal et al., 2015; Wind and Thomas, 2010), it is important to allow new constructs relevant for organizational buying to emerge. That is why we chose to conduct field research through in-depth interviews (DeHoratius and Rabinovich, 2011). To reduce interviewer effects (given that interviewers are potentially primed to rediscover well-known findings from the field), we decided to use the repertory grid technique (Davis and Hufnagel, 2007; Goffin et al., 2006; Handfield and Melnyk, 1998; Macdonald et al., 2016; Manello and Calabrese, 2019; Van Rossem, 2021). The repertory grid technique derives from Kelly's (1963) personal construct theory and is considered particularly helpful when the domain knowledge of interest is tacit rather than explicit (Goffin and Koners, 2011). Repertory grid interviews are based on interviewee storytelling while capturing their mental models, so these are highly applicable for studying information search behavior by purchasing managers. Repertory grid interviews allow for the development of bipolar constructs that describe elements (in our case, purchase situations) within a domain of interest (in our case, purchasing information behavior). Whilst generating these constructs, this interview technique maintains the benefits of qualitative research and generates "a large amount of rich, in-depth, qualitative and narrative data relating to a research participant's explanation of an elicited construct" (Hunter and Beck, 2000, p. 98).

Fig. 1 shows the interview process. First, we asked the participants to identify six purchase situations that were representative of their area of responsibility, with which they were involved in the last twelve months and in which they gathered information. Each of the identified purchase situations were written on numbered cards by the interviewer. Then the

participants had to relive the situations by briefly describing each of them and how they gathered information.

Second, the interviewer selected three of the six purchase situations and participants were asked to identify differences by answering the question, "In what way are two of these purchase situations similar to each other and different from the third in terms of how you gathered information?" The answers (e.g., "I've mainly been at trade fairs for these purchases, but not for this one.") resulted in bipolar constructs that described the participants' information behavior (i.e., little/intensive use of trade fairs as information source).

Third, the participants were asked to rate all six purchase situations—the three they used for developing the construct and the remaining three—on a scale from one to five regarding the construct just developed. These steps to elicit new constructs and rate the six purchase situations were iteratively repeated until no further construct could be elicited.

Fourth, we asked the participants to rate all six purchase situations regarding the established contingency factors complexity, importance, novelty, and risk, as well as on number of other variables (Bals et al., 2018; Grewal et al., 2015; Kraljic, 1983; Robinson et al., 1967; Roze-meijer et al., 2003). Participants were also asked to rate all six purchase situations regarding the extent that they interacted with supplier salespeople. Finally, we included a number of variables concerning the purchased product, some of which were not used for this part of the research (search characteristics, experience characteristics, trust characteristics).

The final part of the interview was semi-structured regarding the participants' online information search behavior. If during the repertory grid interview a participant identified the Internet as being relevant for her or his information search behavior, the understanding of when and how could be deepened here. The semi-structured part of the interviews addressed reasons (not) to gather information online, the type of information retrieved online, the sources used when gathering information online, the role of a potential supplier's website compared to third party websites, and reasons why participants contacted a potential supplier over whom they gathered information on the Internet.

3.2. Data collection

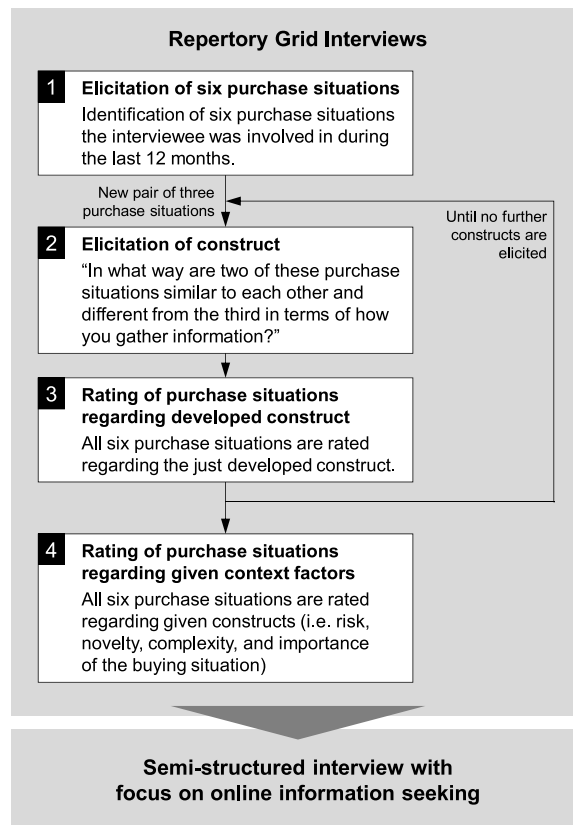
We acquired 40 participants from 38 business units in 34 firms in Germany, where the authors are located. We focused on recruiting participants from manufacturing (particularly, automotive, mechanical engineering, and chemicals) to ensure that there is a large variety of products purchased by these firms (e.g., these firms tend to invest in machines etc.). Participants were recruited from three sources: (1) we purchased company addresses from an address provider and sent a letter asking purchasing managers to participate in the interview study. Twenty-three recipients agreed to participate. (2) Twelve participants were recruited from the practitioner network of the authors; and (3) five participants were recruited through snowball sampling.

We considered Germany to be a good choice for our empirical study for a number of reasons. Manufacturing is a highly relevant sector in Germany with 19% value added of GDP, compared to, for example, France 9% and USA 11%.¹ According to the European Investment Bank, the level of digitalization in German manufacturing firms is with slightly over 60% comparable to the EU average.² Within Germany, sectors vary regarding digitalization, with mechanical engineering and automotive,

¹ The World Bank. Manufacturing, value added (% of GDP). <https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=DE> (accessed May 16, 2023).

² European Investment Bank. Digitalization in Europe 2020–2021. Evidence from the EIB Investment Survey. https://www.eib.org/attachments/efs/digitalisation_in_europe_2020_2021_en.pdf#page=57 (accessed May 15, 2023).

A: Interview Process



B: Sample Repertory Grid

		1							
		Connector	PR agency	Combiner	Documents folder	Desiccant bags			Safety vests
2	Construct pole (1)							Construct pole (5)	2
	1. Little online information search	1	5	2	5	5	4	Intensive online information search	
	2. Number of relevant attributes small	3	5	4	2	5	4	Number of relevant attributes high	
	3. Little use of internal supplier database	2	3	2	4	5	5	Intensive use of internal supplier database	
	4. Low level of interaction with supplier	1	5	2	1	3	2	High level of interaction with provider	
5.		
...									
	Low complexity	5	3	5	1	2	2	High complexity	
	Low importance	4	5	5	1	1	1	High importance	
	Low novelty	2	4	2	3	2	4	High novelty	
	Low risk	5	4	5	1	1	1	High risk	

Fig. 1. Interview process followed in this study and sample repertory grid.

which make up the largest part of our sample, having by far the highest digitalization index, after ICT.³ Hence, the manufacturing sector in Germany seems to be an appropriate choice for studying the role of online information search in purchasing.

In total, we obtained over 50 h of face-to-face interview material (median interview duration: 76.33 min) that resulted in approximately 1200 pages of transcripts. Seven participants did not complete the repertory grid because they were either (a) not involved in six different purchase situations (e.g., new to the company) or (b) unable to identify differences in their information behavior. These participants were interviewed in an unstructured manner regarding their information behavior in general and online information search behavior in particular. 282 freely developed constructs were elicited from the 33 repertory grid interviews (on average 8.5 per interview), and a total of 198 purchase situations (six per interview) were rated.

3.3. Data analysis

We analyzed our data in four steps, which involved analyzing the data from the repertory grid to identify behavioral constructs, cluster analysis of purchasing situations, quantitatively describing the clusters using variables not used in the clustering process, and qualitatively characterizing the clusters regarding information search behavior and the role of tacit knowledge.

In a *first step*, we relied on established procedures to analyze the data from the repertory grid interviews, involving construct standardization and construct categorization. Participants did not use the exact same words to describe the same phenomenon (e.g., “extensive list of requirements” and “large number of relevant attributes”) and therefore, *construct standardization* aimed to identify identical information behavior constructs across the interviews (Macdonald et al., 2016). By reviewing all 282 raw constructs and their corresponding portions in the transcripts, the first and the second author narrowed down the raw constructs with the same meaning to 50 standardized constructs, labeled and then defined them. We then provided the 282 raw constructs, their corresponding transcript portions, and the list of 50 standardized constructs and their respective definitions to a second, independent team of two PhD candidates in marketing. This team freely assigned all 282 raw constructs to the standardized constructs. Cohen’s (1960) kappa, a measure of interrater reliability, was 0.83, which indicates a strong agreement between the two rater groups regarding the assignment of raw constructs to standardized constructs (Landis and Koch, 1977). Cases of inconsistent assignments were then discussed and resolved.

Next, *construct categorization* involved grouping related (but not identical) constructs to higher-order constructs on the basis of content analysis (Goffin and Koners, 2011; Jankowicz, 2004; Lemke et al., 2011). For example, the standardized, lower-order constructs “internal word of mouth”, “external word of mouth”, “personal network”, and “reference customers” (as sources of information) were merged into the higher-order construct “use of personal supplier recommendations”. While none of these four standardized constructs occurred in more than 10 interviews, the higher-order construct occurs in 24 interviews. In a series of workshops and discussions among the first and second author, we were able to iteratively narrow down 31 standardized, lower-order constructs to nine higher-order constructs. Of the standardized constructs that could not be merged with other constructs and remained uncategorized, we only kept the constructs that were mentioned in three or more of the repertory grid interviews, resulting in a final list of 17 constructs that are shown in Table 2.

³ Bundesministerium für Wirtschaft und Energie. Digitalization of the Economy in Germany. Digitalisation Index 2022. Figure 3 on page 4. https://www.de.digital/DIGITAL/Redaktion/DE/Digitalisierungsindex/Publikationen/publikation-digitalisierungsindex-2022-kurzfassung-english.pdf?__blob=publicationFile&v=1 (accessed May 15, 2023).

In a *second step*, we used the quantitative aspect of the data to conduct a cluster analysis. Based on scores of all 198 identified purchasing situations with regard to the four contingency factors risk, complexity, novelty, and importance, we can group the purchase situations identified by the participants. Based on simulation results (Cooper and Milligan, 1988; Milligan and Cooper, 1985) we used the Calinski-Harabasz (CH) index (Calinski and Harabasz, 1974) (sometimes also referred to as “Pseudo-F”) to determine the number of clusters. Consistent with simulation studies in Milligan and Cooper (1985) and based on the overall favorable results of simulation studies reviewed by Milligan and Cooper (1987), we combined the CH index with Ward’s method.

Similar to ANOVA, the CH index compares the ratio of between-cluster-variance to within-cluster-variance. It reaches its maximum at a number of five clusters (CH(k = 2) = 69.59; CH(k = 3) = 78.62; CH(k = 4) = 78.61; CH(k = 5) = 79.44; CH(k = 6) = 75.84; CH(k = 7) = 72.33), which indicates that this cluster solution maximizes the relative amount of between cluster variance. In an additional analysis using the R package NbClust (Charrad et al., 2014) that computes thirty indices that can be used to determine the number of clusters, three more criteria suggest that a number of five clusters is optimal. Only a solution with three clusters is rated as better according to more criteria (eight compared to four). Neither a four-cluster solution nor a six-cluster solution are suggested by any of the criteria included in NbClust.

Ultimately, the best number of clusters also depends on the interpretability of the solutions. Hence, we carefully compared the three-factor solution to the five-factor solution. Importantly, we would lose two conceptual distinctions if we were to use a three-factor solution: One, the distinction between novel purchasing situations that are otherwise fairly straightforward and novel purchasing situations that are complex and risky (Cluster 3 and 5 below). Two, the distinction between routine purchase situations that are important, but fairly straightforward and routine purchase situations that are important, complex, and risky (Cluster 2 and 4 below). As these distinctions help to uncover how purchasing managers use the Internet, we decided to work with a five-factor solution. We used k-means clustering to improve the five-factor solution.

Cluster analytical methods may lack robustness across different samples. For this reason, we calculated the stability of our cluster solution based on the method proposed by Dolnicar and Leisch (2010). Specifically, we applied the processes described in Dolnicar et al. (2018) using the R package flexclust (Leisch, 2006). We computed both the overall stability of the cluster solution as well the stability of individual clusters. The average overall stability is quite high (.7488). Similarly, the stability of individual clusters across bootstrapped samples is also high, ranging from 0.718 to 0.866. These indices are reported in Table 3 in the next section.

In the *third step*, we quantitatively describe the clusters using variables not used in the clustering process in order to understand the clusters better and to explore their relationship with information search behavior. Here, we look at three types of variables: (a) variables regarding information search, (b) purchasing-specific characteristics of the purchased product/service, and (c) the use of tacit knowledge in the purchasing situation.

- (a) We include variables that specifically look at information search. As we were generally interested in how information search has changed, we had asked all respondents to rate the buying situations regarding the extent to which they exchanged information with salespeople from the supplier. Moreover, we added two constructs from the repertory grids to this analysis: overall information search and online information search. These constructs are—due to the repertory grid method—only available for a subset of buying situations.
- (b) We include variables that take purchasing-specific characteristics of the purchased product/service into account. Again, we could

Table 2
Constructs relevant to B2B purchasing information behavior.

Construct ^a (lower-order constructs, if present)	Definition	Illustrative quotation ^b	Number of interviews ^c
Buying market complexity (Lower-order constructs: Market volatility, number of potential suppliers)	The sourcing market is perceived as not easy to understand.	<i>The speed at which the information changes is very high in this case. Whereas in this area the market is actually relatively stable. (K8_6)</i>	6 (18%)
Clarity of requirements	Clarity of the requirements to be met by the product or service to be purchased when the purchasing and information process is initiated.	<i>We had a very clear idea about this [one], so this and that is what we would like to have. Here it was like, okay, yes, we need <product X>. (M2_4)</i>	3 (9%)
Cognitive complexity of information search (Lower-order constructs: Degree of cognitive effort required, expert knowledge required, number of relevant attributes, products that are not self-explanatory, required level of detail of information)	Cognitive effort required to be able to come to an informed purchasing decision.	<i>The decision on this requires far more investment in in-depth knowledge and information because you have to have this information to decide on it. (M15_4)</i>	18 (55%)
Competitive intelligence as information source	Competitor products are purchased and/or inspected to identify third-party components and uncover potential new sources of supply.	<i>Our Asian competitors even copied our machines, so we flew to China to see what they were building. We were able to obtain some results. (M14_1)</i>	3 (9%)
Degree of interaction with supplier (Lower-order constructs: Collaboration with supplier, personal interaction with supplier)	Extent of discussions with the (potential) supplier during the purchasing process.	<i>Now let's say the sample parts are available but do not yet exactly meet our expectations, but we think the remainder is fine: costs, machinery, and overall impression of the supplier. In that case, an in-depth dialogue on tolerances and the realization of our drawings must take place. (M18_8)</i>	18 (55%)
Degree of internal coordination (Lower-order constructs: Cross-functional degree of interaction, degree of involvement of purchasing function in decision-making, internal experts required)	Extent of discussions with other departments during the purchasing process.	<i>Unfortunately, with <Service X> there were many people involved, because the assembly foreman had to be involved, the logistics foreman had to be involved, the purchasing department was involved, and we also needed a budget manager in case it would become more expensive than expected. (M12_6)</i>	16 (48%)
Degree of openness for new suppliers	Extent to which the purchasing organization is willing to work with a new, unknown supplier.	<i>Yes, these are well-known companies so we can rely on a certain group of suppliers. And this [purchase] is where we have to find new ways. (M16_1)</i>	12 (36%)
Degree of supplier examination (Lower-order constructs: Search for competence signals of the supplier, supplier audit, supplier site visit as information source)	The extent to which a potential supplier is examined with regard to its capabilities.	<i>Now we assume that everything suits us, we are about to sign the contract. And of course there is another important aspect that we need to consider from a risk management point of view, for example creditworthiness inquiries: do we believe these to be stable partners? (M18_5)</i>	13 (39%)
Derived demand	The company's purchase need is derived from the needs of one or more of its customers.	<i>... (W)e got a sample from the customer and he specifically wanted this container. And by an imprint on the container it was then relatively easy to see who the manufacturer was. (C5_4)</i>	5 (15%)
Extent of information search (Lower-order constructs: Continuous market monitoring, information accessibility ³ , intensity of information search, number of information sources, supplier willingness to share information ⁴)	The amount of time, effort, and resources invested in information retrieval.	<i>This is a recurring purchase. The prices are regularly renegotiated as well. However, I then usually gather only few information. With this [other] purchase, of course, I will gather more information because there may also be some new suppliers. (M4_4)</i>	20 (61%)
Online search as information source	Using the Internet for information retrieval, e.g., on supplier websites, forums, or professional social media platforms.	<i>And with <Product X> it was a little different. It was a proactive approach, not an existing product. So I first had to gather information through the Internet by comparing different < raw materials > using Google. What do I need exactly? I then searched Google for suitable companies with regard to that material. Special processing needed; it's not very common. (M1_1)</i>	30 (91%)
Purchasing manager's experience with buying problem	Purchasing manager's experience with the buying problem.	<i>Here, of course, experience is also important. I know the market from previous market studies or from suppliers already available to us. (M13_1)</i>	9 (27%)
Sample purchases	Purchase of a small amount of a product (that is to be purchased in larger quantities in the future) with the aim of examining it.	<i>That's a must. Sample purchasing. Or initial sample clearance. (K4_7)</i>	8 (24%)
Supplier database as information source	A pool of potential suppliers is identified from an internal supplier database.	<i>In this case, I am looking into our system, the internal < company K8 > information system. We have a supplier database where much information is stored already. (K8_1)</i>	4 (12%)
Supplier's employees as information source (Lower-order constructs: Cold calling, supplier's presentations, supplier's sales force, trade fair as information source)	Information is provided by or gathered from the supplier's employees.	<i>In that case, it was even— Actually, a business development manager approached us. (M14_7)</i>	19 (58%)
Use of personal supplier recommendations (Lower-order constructs: External word of mouth, internal word of mouth, personal network, reference customers as information source)	Supplier recommendations are taken into account during the purchasing process.	<i>With <Product X> we also consulted other medium-sized companies and asked them, 'Okay, what do you have in use what—, what are your recommendations?' (K4_4)</i>	24 (73%)
Use of third-party information providers (Lower-order constructs: Federations, information service providers, trade press as information source)	Third-party services are used to identify potential suppliers or suitable products.	<i>In addition to our own competencies, we employ service providers that offer market studies in Asia. (K4_10)</i>	8 (24%)

Notes.

^a Listed alphabetically. The lower-order standardized constructs that constitute a higher-order construct are reported in parentheses. For the remainder of the paper, we refer to the 17 boldfaced entries in the first column (top row) of this as constructs regardless of whether they are higher-order (e.g., “buying market complexity”) or standardized constructs (e.g., “clarity of requirements”).

^b Translated by the authors.

^c Only constructs contained in this table that occur in at least 3 out of 33 repertory grids.

^d Construct ratings are reversed when higher-order construct is calculated.

use two variables that respondents rated for all buying situations: the share of services purchased, and the degree to which value vs. price played a role in the specific buying situation. Moreover, two authors jointly coded all buying situations based on the qualitative information available (e.g., the verbal descriptions from respondents) as to whether the purchasing concerned a production item (coded as 1, when the purchased item becomes part of the final product) and as to whether the purchasing concerned an investment item (coded as 1, when the purchased item is an asset for the buying firm).

- (c) Three authors used the qualitative information to code all buying situation regarding whether tacit knowledge played a role. Whenever they were not in agreement, two authors discussed the codes until they reached a consensus. The coders looked for indications in the interviews that the purchasing manager only implicitly identified which information they would consider relevant for the purchasing situation at hand, or only hinted at how they would actually retrieve that particular information, or only vaguely expressed how they would use the retrieved information for drawing conclusions.

In the *fourth step*, we went through the qualitative accounts of all purchasing situations and the online information search behavior. Based on these accounts, we qualitatively describe exemplary online activities and the role of tacit knowledge for each cluster. We also assigned category codes to statements on channel use and typical online information search activities.

4. Results

Table 2’s list of constructs that emerged from our repertory grid interviews indicates, interestingly, that information behavior in purchasing has changed already. In 30 of our 33 repertory grid interviews, the participating purchasing managers independently developed online search (as information source) into a construct that distinguishes some purchase situations from others. In comparison, supplier’s employees (including salespeople) were only mentioned in 19 interviews as a criterion for distinguishing purchase situations. Moreover, online information search was developed as one of the first three constructs in 20 of these 30 interviews. This implies that online information search as a potential resource is foremost in the minds of most purchasing managers and it has become a regular activity in purchasing situations.

4.1. Different types of buying situations

Results of this cluster analysis are shown in Table 3. Cluster 1 and 3 include the largest number of buying situations. For each of the four contingency variables novelty, risk, complexity, and importance that have been used for clustering, the bandwidth of the average values is considerable and ranges from around 1.5 to 4.6 across the clusters. The variables related to information search, which have not been used for clustering, also show considerable ranges: overall information search extends from 2.02 to 4.14, use of supplier salespeople as an information source from 2.40 to 4.12, and online information search from 1.90 to 3.12. It is remarkable that Cluster 4 has the lowest value of all clusters for online information search but the relatively highest value for the other two information search variables. Online information search seems to be quite a distinct variable that differs from the other two

information search variables (overall information search and use of supplier salespeople as an information source).

The pattern for the five clusters suggests that as the levels of risk, complexity, and importance are higher, so are overall information search and use of supplier salespeople as an information source. For example, Cluster 3 and 4 have generally the highest levels of risk, complexity, and importance and also the highest levels of these two information search variables. On the other hand, novelty of the buying situation shows a different pattern: Cluster 3 and 4 are quite similar regarding risk, complexity, and importance, but they starkly differ regarding novelty and online information search; Cluster 3 and 5 have the highest values of both novelty and online information search, but these clusters differ considerably on all other variables. Thus, novelty of the buying situation seems to be particularly important for online information search, but not for other variables related to information search. Risk, complexity, and importance seem to be important for overall information search and use of supplier salespeople as an information source, but not for online information search.

Interesting patterns also emerge for the purchasing-specific variables. Compared to the share of production items in the entire sample, where 51% of all buying situations concern production items, Cluster 2 (Simple deal breakers) has a much higher share (78%) whereas Cluster 5 (New simple tasks) has a much lower share (26%). At the same time, online information search is relatively low in Cluster 2 and high in Cluster 5, which could imply that online information search is lower for production items. Moreover, Cluster 5 with a relatively high degree of online search comprises an above-average share of investment items (29% vs. the sample share of 17%) and an above-average share of services purchased (39% vs. the sample share of 28%). Finally, a value focus in the purchasing process (higher values for Clusters 3, 4, and 5 characterized by novelty, complexity, or both) does not seem to be associated with online information search, but possibly with the use of salespeople as information source.

Cluster 1, Simple routine tasks. The first cluster of buying situations is characterized by basically the lowest relative level of all four contingency variables novelty, risk, complexity, and importance. This cluster appears to represent Simple routine buying tasks. Overall information search and use of supplier salespeople as an information source are also at the lowest level. However, online information search is moderate—not low. These simple routine buying tasks require collecting additional information only very limitedly, but if so, the Internet is a relevant source of information. Web shops, supplier platforms, industry associations, and general search tools such as Google suffice to identify and select offerings and suppliers.

The role of tacit knowledge can be characterized as drawing on experience that enables the purchasing manager to quickly obtain an impression on available suppliers and offerings and then to decide based on gut feeling. Tacit knowledge supports a process of sieving the options and selecting one. It helps the purchasing manager to make a fast decision and to be efficient, because these purchasing situations are not so important and not so difficult.

We describe some exemplary buying situations. A purchasing manager at a company in the chemicals industry looking for bisulfate: “Due to the fact that the scope is not so large, you actually inform yourself somewhat spartan. You ask dealers, you go—well at least I go to the Internet and just look, who makes something like that? ... You read between the lines, then you get another new search term and you wriggle closer and closer around on the Internet. But, you really

Table 3
Types of buying situations and online information search.

	Simple routine tasks	Simple deal breakers	Unfamiliar challenges	Recurring strategic challenge	New simple tasks
Cluster size (n)	57	36	50	24	31
Avg. cluster stability	.866	.718	.760	.738	.770
Variables used for clustering					
Novelty of the buying situation (mean) ^{a, b}	1.5	1.44	4.13	1.62	4.42
Risk in the buying situation (mean) ^{a, b}	1.74	2.47	4.17	4.56	1.53
Complexity of the buying situation (mean) ^{a, b}	1.67	2.38	3.98	4.58	2.71
Importance of the buying situation (mean) ^{a, b}	1.66	4	3.44	4.83	2.53
Variables related to information search (not used for clustering)					
Use of supplier salespeople as an information source ^{a, b}	2.4	2.83	4.03	4.12	3.05
Overall information search ^{a, c}	2.02	2.92	3.59	4.15	2.65
Online information search ^{a, c}	2.69	2.42	3.12	1.9	3.1
Tacit knowledge use					
# of situations (%)	15 (26%)	7 (19%)	12 (24%)	7 (29%)	8 (26%)
Variables related to purchasing-specific characteristics of purchased offering (not used for clustering)					
% production items	46%	78%	52%	54%	26%
% investment items	16%	8%	18%	17%	29%
% services (of offering)	28%	23%	28%	23%	40%
Focus on value (vs. price) ^{a, b}	2.14	2.64	3.59	3.06	3.03
Exemplary buying situations	<ul style="list-style-type: none"> • Office supplies • Fixing materials (e.g., dowels, screws, nuts) • Work clothing • Packaging materials 	<ul style="list-style-type: none"> • Precious metal chemicals • Machine parts • Logistics services • Packaging bags 	<ul style="list-style-type: none"> • Vacuum cleaner for reselling • Demolition • New kind of production equipment 	<ul style="list-style-type: none"> • Cast iron parts • Complex milled parts • Bevel gear motor • Production automation 	<ul style="list-style-type: none"> • Heavy duty shelves • Water treatment installation • Wooden pallets • Paternoster
Exemplary online activities	<ul style="list-style-type: none"> • "Google and buy" • Supplier platforms 	<ul style="list-style-type: none"> • Supplier qualification • Search for alternatives 	<ul style="list-style-type: none"> • Longlisting • Learning about suppliers and offering 	<ul style="list-style-type: none"> • Staying informed about the market 	<ul style="list-style-type: none"> • Quick shortlisting • Superficial learning

Notes: ^a Measured on a scale from 1 (low) to 5 (high). ^b Not an outcome of the repertory grids, included in all interviews. ^c Outcome of the repertory grid interviews, not measured for all situations in the cluster.

shouldn't believe everything that's written there." In another purchasing situation, he asks international purchasing colleagues for hints on potential suppliers in another country: "Then the first information comes, you filter it out, you talk with people and you nicely, slowly get to a point where you say, aha, now I understand the market" (C1). Another purchasing manager describes that when looking for a possible new gardener, he finally selected the one "who simply left behind a better impression, so generally during our talk. That was a kind of gut feeling, that is just not directly measurable" (M13).

Another purchasing manager mentions that he needs to consider how much effort to spend when purchasing a sensor part. Tacit knowledge role plays a role when colleagues from other departments of his firm meet with a current supplier and he needs to decide whether to also be in the meeting. "The art, of course, is to do this at the right level." He also needs to decide whether to start doing business with a new supplier, which involves a lot of work. "And then I weigh that up and say 'no, effort and benefits'" (M4).

Cluster 2, Simple deal breakers. The second cluster of buying situations differs majorly from the first cluster regarding the importance of the buying situation (4.00 versus 1.66). Novelty is similar, risk and complexity are slightly higher. This cluster of very important but not very difficult buying situations seems to comprise Simple deal breakers. Online information search is moderate and comparable to the first cluster, but overall search and use of supplier salespeople as an information source are somewhat higher. These familiar buying situations require collecting some additional information—not because these buying situations would be new, but because they are so important. The Internet is used for online activities such as supplier qualification and searching for alternatives to the incumbent supplier, and it complements other information sources. This cluster concerns similar kinds of products and services as in the first cluster, and purchasing managers are also very familiar with these. However, the much greater importance of the buying situation—it concerns an invitation for larger tender instead of single purchase, for example—makes the purchasing managers spend more time and place more weight on other, complementary information sources, besides the Internet.

Tacit knowledge matters for how the purchasing manager somehow makes a judgment regarding the adequacy of particular suppliers and offerings, whereby the process for arriving at their conclusion is intangible. For example, a purchasing manager visits a potential new supplier for machined parts and looks at workstations, processes, tidiness and cleanliness. "But, that's, of course, still also always such a personal judgment. ... Do I have faith in the supplier, or not?" (M4). Another purchasing manager mentions that when buying energy-efficient lighting, predicting the energy savings is not really possible. He uses "whichever calculation models, estimates, the devil knows what, whatever, because now I can't measure it. And so it's relatively subjective" (M5). And when selecting a wiper system for a new car model, a purchasing manager mentioned that this involved "sensitive data, complex information. And you need a lot of dexterity to be able to make the right decision. I rarely base my decisions on facts and figures. That means it's a lot about soft facts, I would say" (K8).

Cluster 3, Unfamiliar challenges. The third cluster is a very different story. These are highly novel, risky, complex, and important buying situations. Understandably, overall information search is very high, as well as specifically online information search (highest level of all clusters) and use of supplier salespeople as an information source. This cluster stands out by very high absolute and relative levels on all characteristics. This cluster comprises Unfamiliar challenges.

Tacit knowledge in this cluster helps the purchasing manager who needs to consider the multitude of information, to build an understanding of an important, difficult purchasing situation, and to arrive at a conclusion of which supplier or offering is most trustworthy. Tacit knowledge supports the purchasing manager in making that judgement, even though in-depth expertise is lacking to judge all the information in detail, because the purchasing situation is new and complex, and at the

same time, the decision is risky and important to the organization.

An exemplary buying situation concerns the selection of a PR firm. "The PR agency, for example, is something very soft for me. ... The information that I have obtained, when then give the presentation, is also very personal – somehow, how does it touch a chord with you. ... I would go a little bit in the direction of gut feeling, where you just say that somehow—where you were most convinced" (K1).

For a purchase decision concerning chemistry for car batteries, a key question was "Is this supplier able to do it?" "And then it's quite difficult to get information somehow and, above all, to be able to use it well." Relying on many sources of information, they somehow came to a selection: "Okay, we have enough faith in those three. We know, he is probably the most expensive one, but he'd probably also be the best. Let's see if he can do it" (K5).

Similarly, for the selection of engineering consulting services, a purchasing manager mentioned that they somehow had to know whom to consider trustworthy: "Yes, engineering consulting services is also trust. You cannot understand and follow every step" (M12). For the selection of a waste disposal company after demolishing a building, another purchasing manager mentioned that illegal documentation of waste disposal is a problem. "Whether the proof of correct disposal is any good, that is something you should already consider when choosing a supplier. In this respect, a certain amount of trust is still necessary" (M5). Somehow, the purchasing manager made that assessment, without being able to articulate the process.

Cluster 4, Recurring strategic challenges. The fourth cluster provides an interesting contrast. Novelty and online information search are very low (in sharp contrast to the third cluster), but this cluster shows very high absolute and relative levels on all other characteristics (similar to the third cluster). The fourth cluster comprises risky, complex, and important—but familiar—buying situations. We label these Recurring strategic challenges. Online information search is the lowest of all clusters, in combination with the highest levels for overall information search and use of supplier salespeople as an information source. Buying situations in this cluster require extensive information collection efforts, but these do not involve using the Internet much, because they are familiar and other information sources are available.

Tacit knowledge most frequently plays a role in this cluster, and it concerns knowledge based on previous experience with also significantly risky, complex, and important purchasing situations. The know-how is partly implicit and affords the purchasing manager with an intuition to identify, find and process relevant information. As in the first and second cluster, the purchasing situations are not very novel and this familiarity is the basis for building experience, but in contrast, the purchasing situations in this cluster are considerably more important and difficult, so the tacit knowledge supports decisions in a different way.

Purchasing manager K4 looking for cables for trains describes how the number of suppliers in the market is limited and known. "Well, of course you already know the manufacturers that are on the market from your purchasing portfolio." Purchasing decisions were based on "knowledge, experience, partly trade fair, yes. But rather less trade fair, because experience was more the important topic here." For cast iron parts for train car coupling, this purchasing manager uses the Internet to search for new foundries, but more importantly, contacts foundries through the cast iron forum of the national purchasing association and asks colleagues at the firm's production site in another country to look at potential suppliers located there. "And lo and behold, there was also a caster, which we then also visited and also considered to be good." Finding and assessing suppliers was possible, because "extensive personal experience was available."

Purchasing manager M19, who buys complex five-axis milled parts, also describes the importance of existing suppliers and personal experience with supplier selection. The firm works with a base of existing suppliers with whom they have much experience. "So, it's not like we go on the Internet and just compare suppliers and say: 'now, who makes

such a five-axis milled part?” In a particular buying situation, they request quotations from suitable suppliers and then selecting the supplier involves much experience. “And the final decision, I would say, as to who gets the part, is not just about the price, but also such things as delivery time, for example, delivery reliability from the suppliers. This is all taken together to then assess such things. [Interviewer: This decision—so we look at who can do it—how does that work? What do you base that on? Is it experience?] It’s experience. So, that comes out of experience.” (M19) Similarly, purchasing manager M1 indicated that the assessment of existing suppliers for new purchases of complex machined metal parts involved experience and intuition: “There you already have personal [experience], if you know one or the other supplier, then you have a gut feeling and think: “This won’t quite work out.”

Cluster 5, New simple tasks. Finally, the fifth cluster also provides an interesting contrast to the third cluster. Cluster 5 and 3 both have much higher levels of novelty (4.42 and 4.13) than the other clusters, as well as the highest levels of online information search (3.10 and 3.12). However, risk, complexity, and importance of Cluster 5 are not particularly high. As in the third cluster, these are very new buying situations, but far less difficult than in the third cluster. That explains why overall information search and use of supplier salespeople as information source are clearly less important than in the third cluster. We label these buying situations New simple tasks. Online information substitutes other information sources, because it offers practical, fast information for these very new, but not particularly difficult or important buying situations.

Tacit knowledge enables the purchasing manager to deal with these novel buying situations, as in Cluster 3. Here too, experience with more or less the same buying situations cannot be the basis for accumulating tacit knowledge, but it comes with gaining more general experiences in purchasing. Moreover, efficiency and swiftness are important in Cluster 5, because these are simple tasks, as in Cluster 1. Tacit knowledge also helps the purchasing manager to act efficiency and quickly in buying situations in Cluster 5, typically by intuitively assessing new suppliers based on subjective impressions.

The example of the exceptional purchase of a stair lift illustrates the role of online information search and tacit knowledge for the novel but not so difficult purchasing situations in cluster 5. “And then I find out more about this product, the possible suppliers, about all the subsidies that you could get, and so on and so forth. ... Just this collection of information, the detailed identification with the product, that takes place in advance for the most part. ... And with the stair lift, the [online search] was quite interesting, or intensive, rather.” (M7) Then he had invited several potential suppliers, so they could see the situation for the stair lift, and he would be able to say “on the basis of a personal impression, okay, we have a good feeling there or not.”

Purchasing manager M13 described he was looking for machine repair services and needed to filter out the right supplier. He did not continue after the first contact with a potential supplier because “I had the feeling that there was another mechanism behind it that was now delaying the whole thing.” But another supplier “had just left behind a really [good] impression.” Similarly, purchasing manager M2 was talking about the challenge of going “to four producers, they tell me four times a pack of lies, and then I have to decide.”

4.2. Synthesizing the role of tacit knowledge in different types of buying situations

The contingency variables novelty, risk, complexity, and importance help to distinguish the use of various information sources, as well as to differentiate the role of tacit knowledge for identifying, retrieving, and making use of the information. The identified clusters suggest four different roles of tacit knowledge, which can be described along two characteristics: the *basis* for building up the purchasing manager’s tacit knowledge and the kind of support *function* that tacit knowledge provides to the purchasing manager. This is shown in Table 4.

The basis for accumulating tacit knowledge depends on how similar new purchasing situations are to previous purchasing situations the purchasing manager has encountered. In clusters that comprise purchasing situations that are *not* particularly novel (Simple routine tasks, Simple deal breakers, and Recurring strategic challenges), experience with similar purchasing situations provides the basis for building tacit knowledge. In clusters that are characterized by highly novel purchasing situations (New simple tasks, and Unfamiliar challenges), the broader experience gained by working in the purchasing function affords the purchasing manager with tacit knowledge that helps in specific *new* purchase situations. These are also the clusters with a high level of on-line information search, suggesting that online information search and broader experience in purchasing complement each other in novel purchasing situations.

The other dimension in Table 4 concerns the kind of support function that tacit knowledge affords the purchasing manager. Recurring strategic challenges and Unfamiliar challenges are more difficult purchasing situations in terms of *risk, complexity and importance*. These involve a high level of overall information search and use of supplier salespeople as an information source. Identifying, gathering, and making use of information is more difficult in these purchase situations, and tacit knowledge helps the purchasing manager to consider extensive and diverse information effectively. Simple routine tasks, Simple deal breakers, and New simple tasks, on the other hand, are not particularly challenging purchasing situations in terms of risk, complexity and importance. Here, the purchasing manager needs to be fast and efficient in identifying, gathering, and making use of information. Tacit knowledge supports the purchasing towards those ends.

4.3. Additional findings regarding online information search

This section provides additional findings regarding online information search. By describing how online information search comprises various information channels and also represents different modes of online information behavior, we obtain an additional and deeper understanding of information behavior in purchasing.

Channel use. We identify four key *channels* that purchasing managers use to inform themselves when on the Internet. First, purchasing managers use *search engines* (e.g., Google) to identify all sorts of online information sources suitable for answering questions relevant to the buying problem. Second, they use *supplier search engines* (e.g., thomasnet.com or vendop.com for the US, wer-liefert-was.de for Germany) to identify potential suppliers and learn new technical terms and industry names. Third, *supplier websites* are visited mostly to assess suppliers and learn things relevant to the products and services offered by the supplier. Fourth, *third party websites* (e.g., industry associations, trade press websites, trade fair websites) potentially offer insights on customer problems and possible supplier solutions, or simply list suppliers from a certain industry. Interestingly, social media and professional networks (e.g., LinkedIn) are seldom named as relevant information sources for

Table 4
Types of buying situations and the role of tacit knowledge.

		Basis for tacit knowledge:	
		Accumulated on the basis of general
		... similar	... general
		buying	purchasing
		situations	experience
Support function of tacit knowledge:	... selective information efficiently and quickly	Simple routine tasks	New simple tasks
	... extensive information effectively	Simple deal breakers	Unfamiliar challenges
Helping the purchasing manager to identify, gather and use selective information efficiently and quickly	Recurring strategic challenges	Unfamiliar challenges
	... extensive information effectively	Simple deal breakers	Unfamiliar challenges

the purchasing managers.

Modes of online information search behavior. We also identified six different modes of online information search behavior (Table 5), which describe the typical manners by which purchasing managers proceed when collecting information online. The first three modes (supplier longlisting, supplier shortlisting, and supplier auditing) are all related to the supplier selection process. The other three modes (problem-related self-education, fact-checking of offline information, and continuous information search) describe activities that more generally pertain to professional issues for the purchasing manager.

5. Discussion and conclusions

Whereas previous research mainly considered the purchasing organization or the purchasing department as the unit of analysis, we are able to provide a finer-grained understanding by zooming-in on separate purchasing situations and employing a quantitative method to cluster these. The overall research question is “How can purchasing situations be differentiated in terms of (online) information search and the role of tacit knowledge?” We build on established contingency factors in purchasing (e.g., Bals et al., 2018; Rozemeijer et al., 2003) to identify five clusters of purchasing situations, based on product complexity and purchasing importance (e.g., Kraljic, 1983), novelty (Robinson et al., 1967), and purchase risk (e.g., Heckmann et al., 2015; Kraljic, 1983). The five clusters provide a remarkably differentiated understanding of the importance of (online) information search and the role of tacit knowledge. *Novelty* distinguishes purchasing situations in terms of the use of online information search and the basis for building tacit knowledge. Purchasing managers use online information in novel

purchasing situations (New simple tasks, and Unfamiliar challenges). They accumulate tacit knowledge for identifying, retrieving and making use of information on the basis of their general purchasing experience. In known purchasing situations (Simple routine tasks, Simple deal breakers, and Recurring strategic challenges), online information is used far less, and very similar buying situations provide the basis for building their tacit knowledge.

Risk, complexity, and importance separate purchasing situations in terms of overall information search, use of supplier salespeople as an information source, and the support function of tacit knowledge. Purchase managers make use of these information sources when confronted with more difficult purchase situations in terms of risk, complexity, and importance (Unfamiliar challenges, and Recurring strategic challenges). The support function of tacit knowledge is helping the purchasing manager to identify, gather, and use extensive information effectively. The same information sources are used less in easier situations (Simple routine tasks, Simple deal breakers, New simple tasks), whereby tacit knowledge helps the purchasing manager with identifying, gathering, and using selective information efficiently and quickly.

5.1. Implications for purchasing and supply management research

As a first contribution, our study reinforces the importance of established contingency factors novelty, risk, complexity, and importance of the purchase situation, which have been very influential in the purchasing literature (Caniëls and Gelderman, 2005; Kraljic, 1983; Padhi et al., 2012). For example, novelty of a buying situation refers to how unfamiliar the buying situation is to individuals in the firm (Anderson et al., 1987) or how much experience they lack with similar

Table 5
Modes of online information search behavior.

Mode	Definition	Illustrative quotation ^a
Supplier longlisting	Identify suppliers potentially suited to the purchase situation.	<i>Exactly, <product segment> is actually an interesting topic because <company> had zero know-how. ... And this is when information gathering starts at the very beginning: identify firms on the Internet. (K5)</i> <i>Google is my preferred search engine. In most cases it will give me useful results. I just type in what I am looking for, obtain some results, and then go to the supplier websites straight away. (M1)</i>
Supplier shortlisting	Preselection of a few providers to contact based on quality indicators available online.	<i>You gain a first impression from the suppliers' websites. I then pick four or five of them. Because personally I don't really believe in what I call the "shotgun principle". In other words, I don't approach 20 or 30 suppliers but four or five. (M7)</i> <i>Some claim to be great service providers but have crappy websites. How can they be good service providers? They lack empathy. Those suppliers are dropped. (C2)</i>
Supplier auditing	A brief supplier audit is carried out as part of quality and risk management procedures using online information.	<i>I inform myself about suppliers there. We are using the Internet to carry out [some] sort of an integrity check, I would call it, with new suppliers. (M5)</i> <i>I'll check the certifications there. In case of high tool or maintenance costs, I will especially have a look at the financial situation. ... What is the management structure like? Are they owner-operated? Is it a company with limited liability? Because that is something I have to evaluate in our risk matrix. (K8)</i>
Problem-related self-education	Self-reliant exploration of problem-related technical issues without third-party personal assistance.	<i>I conduct online research to gain knowledge in areas I don't know very much about yet. (M13)</i> <i>For this purchasing problem, I had to gather information on the Internet first. I searched Google to compare different <materials>. I found out what I actually needed and identified the best technical characteristics. (M1)</i> <i>You read between the lines and find a new keyword. Then you gradually make your way through the Internet towards a solution. ... It's almost like doing a puzzle. You put four or five pieces of the puzzle together and say, "Now I get a first impression of the whole picture." (C1)</i>
Fact-checking of offline information	Information on a buying problem, potentially gathered from different sources, is reviewed and/or substantiated online.	<i>There was a brief Internet research because we wanted to double-check how credible the procurement consultancy was. However, there were no further actions. It was more a plausibility check. (M14)</i> <i>Sometimes you find stuff on the Internet that you just discussed with someone four weeks before. And then you visit the company's website and you read something that is in stark contrast to what you just discussed. (C1)</i> <i>One will also find some potential suppliers at trade fairs whom you have not even had on your screen before. And then you'll do a little research afterwards. (M11)</i>
Continuous information search	Regular utilization of online information to stay up-to-date regarding sourcing market developments or other professional issues.	<i>I visit certain websites because they contain information relevant to my industry, both regarding machine manufacturers whose machines our suppliers use and general industry trends. ... Many of these topics can then be addressed in discussions with your suppliers. (K6)</i> <i>I'm looking for news regarding the material group I'm responsible for. I am checking the latest worldwide news. Natural disasters are very important to me, as terrible as that sounds. Many of my suppliers are located in areas prone to earthquakes or flooding. (K8)</i>

Notes: ^a Translated by the authors.

situations (McQuiston, 1989). Novelty is the main explanatory variable used in the BuyGrid model developed by Robinson et al. (1967), which is one of the most popular and most discussed models of organizational buying (Bellizzi and McVey, 1983; Ferguson, 1978; Grewal et al., 2015; Jackson et al., 1984). The contingency approach taken in this paper used these established contingency factors and investigated to what extent these would also help to make sense of a more nuanced understanding of online information search and the role of tacit knowledge. Furthermore, by understanding purchasing manager's online information search on the basis of these contingency factors, we also contribute to recent behavioral literature that seeks to develop typologies of their information processing in buying situations (e.g., Kaufmann et al., 2017; Lorentz et al., 2019; Lu et al., 2019).

As the second contribution, this study provides a more detailed understanding of purchasing online information behavior. As Grewal et al. (2015, p. 203) state, "Little research investigates how [information technology] influences B2B buyer behavior within buying organizations or the related implications for B2B sellers and sales organizations." We develop online search as information source as a key construct, which purchasing managers in this study use to distinguish purchase situations. Our research identifies a number of key channels that purchasing managers use to inform themselves when on the Internet, and also conceptualizes six modes of online information behavior that highlight typical purposes for purchasing managers when collecting information online. Examples are supplier longlisting, problem-related self-education, or supplier shortlisting. This findings complement earlier research that focused on antecedents and consequences of online information use in procurement (e.g., Krijestorac et al., 2021; Mishra et al., 2013; Vaidyanathan and Devaraj, 2008).

This study also provides a greater understanding of the role of tacit knowledge in purchasing situations. Purchasing is becoming increasingly a strategic and knowledge intensive function (Schütz et al., 2020). Using online information search and other e-procurement technology, purchasing managers have ever more information at their disposal. Using that information for decision-making is challenging and this is where tacit knowledge plays a role (Giunipero et al., 1999). Schoenher et al. (2014) define supply chain knowledge "as the use of knowledge resources obtained from supply chain members for economic gain" (p. 121). Crucially, they distinguish between explicit and tacit knowledge and demonstrate that both have an influence in supply chain performance, whereby tacit knowledge has a greater impact. The knowledge-based view of organizations (Grant, 1996) has focused much on the challenges for creating organizational knowledge on the basis of tacit knowledge, which requires translating it to explicit knowledge so it can be documented and shared (Harlow, 2008; Nonaka et al., 2000). Also in the context of supply management, both internal and external knowledge transfer are relevant (Blome et al., 2014). At the same time, it is important to also understand the starting point for the creation of organizational knowledge, namely tacit knowledge of the individual manager. In order to gain a deeper understanding of tacit knowledge, it is important to explore further the barriers and enablers of its existence, to study the phenomenon in its own right, and not just focus on its conversion to explicit knowledge (McAdam et al., 2007).

Specifically, as the third contribution, this study provides a more nuanced idea about different bases for building up the purchasing manager's tacit knowledge. Tacit knowledge is built up within individuals, and it requires time and the accumulation of personal experience to develop. These experiences will often involve interaction with others, but the resulting tacit knowledge resides within individuals. Furthermore, tacit knowledge is context specific (Venkitachalam and Busch, 2012). And so, "people develop tacit knowing by immersing themselves in organizational situations and developing tacit knowing from within" (W. H. A. Johnson, 2007, p. 128). By its nature of not being codifiable and transferrable, there are basically no other ways of acquiring tacit knowledge than by doing it, maybe together with people who can support such doing, because the already have that tacit

knowledge (Harlow, 2008). This does not imply, however, that accumulated knowledge is always tacit. Indeed, experience can also lead to accumulated knowledge that is explicit. Nevertheless, an individual will often gain explicit knowledge through purposeful instruction and knowledge transfer, and that represents a key difference with tacit knowledge. Building on the idea that tacit knowledge is obtained through accumulation of personal experience in a particular context, we add the idea that in an organizational context, it is helpful to distinguish between accumulation of personal experience with very similar tasks and a broader personal experience in the same purchasing context.

This conceptualization of different bases for knowledge accumulation draws on a differentiation of tacit knowledge contents (Nonaka et al., 1994). Tacit knowledge that is based on a purchasing manager's broader experience in the purchasing function can be understood as *cognitive elements* of tacit knowledge. Nonaka et al. (1994) divide tacit knowledge in technical and cognitive elements. Cognitive elements are described as "working models of the world" that are based on analogies that an individual creates and manipulates in their minds. Cognitive elements include schemata, paradigms, beliefs and viewpoints. In the context of tacit knowledge for purchasing decisions, these provide guidance to the purchasing manager to deal with information in a different but related purchasing context. We propose that such tacit knowledge is helpful for the purchasing manager to identify, retrieve, and use information, because these working models are broad enough to be transferable to novel purchase situations. Diverse, broader experience within the purchasing function provides a basis for tacit knowledge consisting of such cognitive elements. However, tacit knowledge that is based on similar purchasing decisions can be understood as *technical elements* of tacit knowledge. Technical elements comprise concrete know-how, crafts, and skills that are applicable to specific contexts. Technical elements are narrower, but an individual can draw on these more straightforwardly. Nevertheless, they remain implicit. We propose that tacit knowledge as technical elements, created through accumulation of experiences in particular purchasing situations, is helpful for the manager to deal with information in parallel purchase situations.

As the fourth contribution, this study provides a more nuanced idea about the kind of support function that tacit knowledge provides to the purchasing manager. The kind of support a purchasing manager's tacit knowledge provides to that manager varies across the identified clusters of purchasing situations. Sometimes tacit knowledge aids speed and efficiency of decision-making, but in other clusters, it helps to deal with large amounts of complex information. Both purposes of decision efficiency and decision quality are typically mentioned in studies on the role of tacit knowledge for decision-making (Giunipero et al., 1999). For example, Brockmann and Anthony (2002) review many studies that find that managers with a larger stock of tacit knowledge are able to make faster and higher quality decisions.

However, we conceptually differentiate two different support functions of tacit knowledge for the purchasing manager as a contribution of the paper. Importantly, these support functions seem to be related to *different* importance of various information sources and to *different* levels of several established contingency factors in purchasing (novelty, risk, complexity, and importance). In the clusters of Simple routine tasks, Simple deal breakers, and New simple tasks, the essential challenge for the purchasing manager is to be selective, fast and efficient regarding their information behavior. Purchasing situations are characterized by low levels of risk, complexity, and importance (with the exception of high importance for Simple deal breakers). Overall information search and use of supplier salespeople as an information source are low/medium. Tacit knowledge helps the purchasing manager to be fast and efficient in identifying, retrieving and making use of information for purchasing situations in these clusters.

However, in the clusters Recurring strategic challenges and Unfamiliar challenges, the essential challenge for the purchasing manager is to be comprehensive and effective in their information behavior. Purchasing situations in these clusters are characterized by high levels of

risk, complexity and importance. Overall information search and use of supplier salespeople as an information source are high. Tacit knowledge helps the purchasing manager to be comprehensive and effective in identifying, retrieving and making use of extensive information.

5.2. Implications for practice

Purchasing managers in the interviews identified online information as important for their decisions, and they could prioritize specific areas to push digitalization and develop tools. For example, online is an important information source for supplier longlisting and shortlisting, and purchasing managers would need to develop guidelines to keep finding a broad and diverse supplier potential, for example by using a variety of channels. Search engines may prioritize nearby located suppliers, which can be beneficial in terms of supporting local communities or marketing towards customers who prefer more regional products. However, when straightforwardly relying on online information, purchasing managers may lose sight of relevant suppliers who are further away. In general, purchasing decision makers need practical support for assessing the quality of information found on the Internet.

On the other hand, digital transformation is not a panacea and online competencies will not completely replace traditional purchasing competencies, so it remains crucial to provide tools, train people, and let them build experience with those traditional competencies such as gathering information from supplier salespeople.

The interviews also offer actionable insights for marketing and sales managers. Purchasing managers are using the look and feel of a supplier's website as a very basic signal of the supplier's quality. They expect suppliers to understand their information needs and seem to use a company's website as a measure of its customer orientation. As C2 bluntly states, "Some claim to be great service providers but have crappy websites. How can they be good service providers? They lack empathy. Those suppliers are dropped." Even though it seems to be a very basic requirement, many suppliers fail to provide decent-looking websites.

Most likely many potential customers, whose buying problem at hand is new and/or who are in search of a new supplier, will visit potential supplier websites. Therefore, supplier websites should be structured such that inexperienced buyers can easily grasp what the company is doing. Websites should be easy on technical details at the first levels and only provide more detailed information at deeper levels. To illustrate, M14 states, "[It is helpful] to begin with technologies or product families without immediately providing every single spec; I am only interested in those at the end." Simple problem-related questions that potential customers might have should be answered to demonstrate the company's competence, helpfulness, and understanding.

Interview participants complain about the lack of detailed contact information. Companies that only provide contact forms or generic email addresses are probably losing potential customers if they are forced to contact a company that way. M5: "It drives me crazy when I look for someone's email address and some stupid contact form pops up. I don't want to use a contact form. I just want to send an e-mail!" Potential customers expect suppliers to enable them to easily find—and get in direct contact with—a person suited to help them. M14: "I find that incredibly appealing. When I see a picture of the person I'm about to call: 'This is my technical consultant for flowmeters.' Basically, I always make that call."

6. Conclusions and future research directions

Despite the pervasiveness of the Internet in our daily lives, the literature on the role of online information search for organizational buying is limited (Krijestorac et al., 2021; Mishra et al., 2013; Steward et al., 2018; Vaidyanathan and Devaraj, 2008). We investigate (online) information search and the role of tacit knowledge in organizational buying situations based on 40 in-depth qualitative interviews with purchasing managers and employing the repertory grid technique.

An important aspect to consider when looking at our research is the generalizability of the results. The method of repertory grid interviews allows us to identify a broad set of purchasing situations and behaviors. Hence the clusters in Table 3 are certainly likely to be prototypes of situations that exist in purchasing practice, but the connected cluster sizes may not reflect the relative importance of these clusters. Moreover, our sample is German and reflects a subset of industries at a specific point in time. Germany seemed to be a good choice for our empirical study and we are confident that the clusters we identify come from a rich set of purchasing situations that will also be relevant in other countries and industries. However, especially the online activities will continue to develop and may as well change over time.

Future research could continue to look for nuanced insights regarding the online behavior of purchasing decision makers in business markets. Our results do not support that a "consumerization" (Lingqvist et al., 2015) of online purchasing is happening. Instead, purchasing managers seem to embed online information search into professional purchasing routines, without becoming "one click" shoppers that shift a substantial part of their purchasing activities online. Future research could investigate buyers' journeys in more detail and consider more and other contingency factors, not only regarding the purchase situation, but also individual buyer characteristics, in analogy to research of consumer online behavior (Chaparro-Peláez et al., 2016; De Keyser et al., 2015; H. Li and Ma, 2020; J. Li et al., 2020). In this context, it could also be a promising avenue for future research to link the search modes we describe in Table 5 to contingency factors (which is not possible using the data we have collected, because the modes have not been developed independently of the buying situations).

Future research could also investigate the use and design of online sources from a sales perspective. Especially the combination of online and offline sources is particularly relevant to consider, such as the use of supplier's employees as information source (e.g., at trade fairs). It is a popular idea that easier access to online information for purchasing decision makers reduces the need for traditional sales force in business markets (Mantrala and Albers, 2022). Buzzwords like "inbound marketing" or "inside selling" similarly emphasize that the role of sales will become more passive, with salespeople merely waiting for customers to find their company on the Internet instead of actively acquiring leads through cold-calling or trade fairs (Shah and Halligan, 2009). Our results imply that these interpretations oversimplify how the use of online information by purchasing managers will change how sales in business markets works. In particular, if the buying problem is complex, risky, and/or important, more "traditional" sales approaches still seem to be quite effective. In such challenging purchase situations, purchasing managers use the Internet for longlisting, but then they engage directly with suppliers to learn more. In less challenging situations, the Internet is used to directly arrive at a shortlist of possible suppliers.

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