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# Information processing perspective on organisational innovation adoption process

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## ABSTRACT

For a long time, the literature on organisational innovation adoption has focused largely on the adoption choice and defined the adopter organisation as a passive information receiver. To portray a more realistic picture of the organisations of today, this study defines the adopter organisation as an active information processor. By the means of a multiple-case study, organisational innovation adoption is defined as a function of information processing activities. The study defines two key attributes of information processing: depth (the intensity of information processing devoted to consider a fit between solutions and the need) and breadth (the number of solutions processed). Depth and breadth are found to be associated with the features of the individuals participating in the process and the elements of the adopter organisation and its key business relationships. Technical education and technical experience define the individual capacity for information processing increasing the depth of these activities. Individual risk aversion and organisational sanctions seem to steer decision-making toward a democratic style that increases the depth and breadth of the activities. A strong relationship with suppliers seems to decrease, whereas the adopter company's other business relationships seem to increase, the depth and breadth of the activities.

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## 1. Introduction

The extant literature connects innovation adoption closely to innovation diffusion research (see Rogers 2003). Diffusion of innovations comprises a perspective that applies communication theory to conceptualise the spread of innovation within a community of adopters. Accordingly, the focus is the communication channels, and their capacity to transmit innovation-related information to potential adopters (Mahajan, Muller, and Bass 1990; Martilla 1971). Within the idea of innovation advantage over the prevailing solutions, exposure to innovation is considered to lead to adoption. This idea manifests clearly in the seminal studies that focus on radically new innovations, such as hybrid seed corn diffusion among Iowa farmers (Ryan and Gross 1943) or tetracycline diffusion among a group of physicians (Coleman, Katz, and Menzel 1966). The focus on radically new and highly advantageous innovations manifests in the deterministic consideration of the adoption process as something that befalls the adopter instead of something the adopter actually does (Rogers 2003). The research on organisational innovation adoption focuses largely on the adoption choice and related variables (see Everdingen et al. 2011; Siamagka et al. 2015).

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The close connection between the diffusion phenomenon and the related prevailing choice orientation in research has largely prevented an understanding of innovation adoption as a process. In terms of today's business environment, the idea of radically new innovation is eroding. Instead, innovations are largely variations of old, known themes, which emphasise active information processing for adoption to assure their suitability for use. Researchers have recently taken steps to enrich our understanding of adoption as an active organisational process. For example, Mero, Tarkiainen, and Tobon (2020) depict adoption regarding effectual experimentation of technology features and causal creation of organisational processes and routines that support its efficient use. Very recently, Gruber (2020) built an evolutionary perspective for further understanding of the adoption process. Similarly, Afolayan and de la Harpe (2020) focus on evaluation as a strategic component of the technology adoption process. Altogether, these recent studies portray innovation adoption as a dynamic and flexible process, rather than a linear and rigid one. This study continues this recently emerging turn in focus from deterministic choice to active process in converting the idea of the organisational adopter from a passive receiver to an active processor of information. The study is guided by the following research questions: (1) How can the functioning of information processing activities for innovation adoption in organisations be defined? (2) What are the key elements that shape the information processing activities, and how can their influence be depicted?

The study provides an analysis of five case studies from the food-processing industry. The study defines the need-solution coupling as the key task of information processing activities and two key attributes of information processing: the depth (the intensity of information processing devoted to consider a fit between solutions and the need) and breadth (the number of solutions processed). Depth and breadth are found to be associated with the features of the individuals as well as the elements of the adopter organisation and its key business relationships. These nuanced considerations are put forward in the form of propositions that contribute to shedding light on the interplay between the actual activities and the structural properties that drive the adoption processes to develop further.

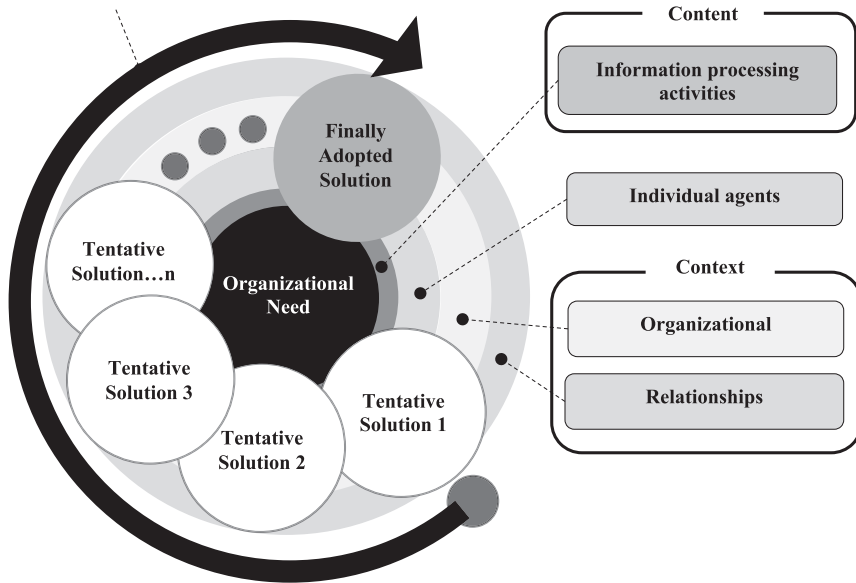
The study proceeds as follows. The second section describes the theoretical background for conceptualising organisational innovation adoption as information processing to identify, evaluate and match potential needs and solutions. The third section presents the methodology, and the fourth the findings. The fifth section presents the discussion and conclusions.

## 2. Organisational innovation adoption as active doing of adopting

In the theory of action (see Davidson 1980; Goldman 1970), action is divided into events and occurrences that befall an actor and intentional active doings the actor completes. According to this classification, the diffusion of innovation defines adoption as something that befalls the adopter through the phases of awareness, persuasion and adoption choice (Rogers 2003). This idea assumes the adopter is a passive receiver of information. The framework in Figure 1 depicts organisational innovation adoption as active doing of adopting. Based on process research (see Pettigrew 1992, 1997; Van de Ven and Huber 1990), the adoption process is depicted on the outer circle of the framework as a composite that comprises the information processing activities (process content) performed by the key individuals who are embedded in the structural context (see Granovetter 1985; Giddens 1984). The context is divided into the intertwined organisational and relationships levels (Makkonen and Johnston 2014; Makkonen, Johnston, and Javalgi 2016).

To conceptualise the adoption process, the framework builds on the conceptualisation of need-solution coupling (see also Makkonen and Komulainen 2018; Makkonen, Johnston, and Javalgi 2016 for the original use of the concept of need-solution coupling). Accordingly, information processing activities target need-solution coupling, that is, evaluate the mutual fit between the organisational need and the available solutions to identify the most viable need-solution coupling for the adoption (see Makkonen and Komulainen 2018). To characterise the information processing activities, we adopt two attributes from previous research, the depth and breadth of information processing. In previous research, depth refers to the information processing devoted to each solution, whereas breadth refers

## INNOVATION ADOPTION PROCESS



**Figure 1.** The research framework.

to the set of alternatives examined (Levin, Huneke, and Jasper 2000). In this study, we adopt these measures and define them for need-solution coupling. Depth refers to the intensity of information processing to consider a fit between solutions and the need. Breadth, in turn, refers to the number of solutions processed. This conceptualisation explicitly moves the focus from the adoption process of a sole innovation to the active organisational behaviour that aims at matching organisational need with the most prominent solution among a set of potential solutions (Makkonen and Johnston 2014).

Various perspectives on information processing have had a key role in organisation and strategic management literature for decades (Simon 1947). A large portion of this research can be divided into the enabling/disabling interplay between information processing activities and organisational structure (Joseph and Gaba 2020). Recent researchers seek to provide balanced accounts of the action-structure interplay in linking information processing with organisational capacity (see Gulati, Lawrence, and Puranam 2005) that comprises a structure to support the action (Hsinchun, Chiang, and Storey 2012; McAfee and Brynjolfsson 2012). Similarly, in this study, we aim at a balanced presentation in considering information processing as an activity embedded in its wider context. We adopt the perspective of embedded agency (Granovetter 1985; Thornton, Ocasio, and Lounsbury 2012) in viewing individual agents and their information processing activities under the shaping influence of structural properties of the context (see also Giddens 1984). Similar to previous researchers, we depict the adopter organisation and the adoption process as embedded in business relationships (Makkonen and Johnston 2014; Makkonen, Johnston, and Javalgi 2016). Thus, we focus on the individual capacity for information processing and the effect of the structural properties on organisational and relationship contexts.

The individual capacity for information processing deals with general cognitive abilities to comprehend, process and build new information (Hunter 1986; Resick et al. 2014). In terms of the organisational adoption of technology innovations, the task of information processing focuses on understanding the technology and its fit with the organisational need. This links to experience- or education-based knowledge (Johnston and Lewin 1996) that provides individuals with sufficient capacity to understand the technology and its use context. However, the use of this capacity

associates with epistemic motivation, that is, the desire to gain and maintain a deep understanding of the problem at hand (see Chaiken and Trope 1999; De Dreu and Carnevale 2003). Epistemic motivation is linked to the perceived sufficiency of the information possessed: The more decision-makers perceive their information as insufficient, the more motivated they are to engage in extensive information processing (Scholten et al. 2007). Experience- or education-based knowledge may facilitate individuals' extensive task-specific information gathering and processing or remove the need for this because of sufficient pre-understanding of the issue and thus, demotivate them from processing further information.

In terms of the organisational context, the organisational structure defines how individuals form cross-functional teams and how they process information for innovation adoption (see Resick et al. 2014). For example, the organisational context may encourage information-driven instead of preference-driven group process and thus, encourage individuals in extensive information processing effort (see Scholten et al. 2007). The organisational context manifested in organisational sanctions and rewards (Johnston and Lewin 1996; Wilson 1996) mediates the potential inter-individual conflict and goal diversity (Ethiraj and Levinthal 2009; Greve and Gaba 2017; Ward and Webster 1991). At the relationship level, we focus on how business relationships facilitate information processing. The idea of the adopter company widens from intra-organisational elements to inter-organisational relationships in which the adopter organisation is embedded (Anderson, Håkansson, and Johanson 1994; Makkonen and Johnston 2014).

### 3. Methodology

The study features a qualitative, multiple-case study (Eisenhardt and Graebner 2007; Yin 2009). The study focuses on adoption processes that best serve the theoretical purpose of further understanding information processing for adopting organisational innovation (Eisenhardt and Graebner 2007). Theoretical sampling was conducted to identify and target such processes (Miles and Huberman 1994; Eisenhardt and Graebner 2007). As the first criterion, we used company size for variation among the studied processes. Company size has been found in various quantitative surveys to be a critical factor affecting adoption (see Frambach and Schillewaert 2002). Second, we sampled processes in which the adopter-perceived newness and risk regarding the innovation were radical. Third, we focused on the processes in which the absolute newness of the innovations was high. Thus, all the adoptions were allocated resources, and instead of reflecting instant adoption choices, they became processes of information processing involving several people within the adopter, supplier and potential third-party companies.

The sampling produced five adoption processes in five different Europe-based food-processing firms: two small adopter companies (Alpha and Beta), one medium-sized company (Gamma) and two large companies (Delta and Epsilon) (see Table 1).

The far-right column lists the informants of the study who were interviewed with the semi-structured interview method (Hesse-Biber and Leavy 2006). These individuals were identified by the snowball technique (Eisenhardt and Graebner 2007), and they were those who had a role in the adoption process, either in the adopter companies or at the suppliers, consultants or other third-party companies engaged in the processes. In total, the interview process produced 52 interviews involving 37 informants (some being interviewed more than once). The interviews lasted from a minimum of 40 min to a maximum of three and half hours, and the transcribed data totalled 850 pages (12 point, single-spaced).

The broad themes of the interviews comprise the events and actions that preceded the adoption, need formation, search and identification of the solutions, evaluation of the solutions, decision-making process and criteria, individual roles and positions, individual features and individuals as information processors, organisational elements and their influence on information processing, relationship elements and their influence on information processing. These broad themes were

**Table 1.** Description of the cases.

Company	Company size	Innovation for the company	Innovation for the world	Interviews
Alpha	ca. 15 employees	Packing machine: largest investment in company history, about 20% of the company's turnover	One of the first sold in Europe, and the first in this country	Five interviews: the two entrepreneurs (interviewed four times together), Project leader at the supplier
Beta	ca. 15 employees	Active oxygen and UVC lighting-based dry disinfection system: a large change in the company's production philosophy and quality assurance	The first application of such technologies in the food-processing manufacturing process	Eleven interviews: CEO/shareholder (interviewed twice), current production manager (interviewed twice), former production manager/shareholder (interviewed twice), maintenance manager, former production assistant, CEO and technical expert at supplier, CEO at cleaning company, microbiologist at consultant company
Gamma	ca. 150 employees	Packing machine: largest investment in company history, was conducted for a new product whose continuation was uncertain, large financial liability	Represents a novel type of packing machine whose sales are limited	Twelve interviews: Production manager (interviewed three times), product development & quality assurance manager (interviewed three times), maintenance manager (interviewed twice), CEO/owner, Board member, CEO of the supplier company (interviewed twice), technology consultant
Delta	ca. 5000 employees	New quality assurance method to assure the quality of over 11,000,000-gallon yearly production	Very first application of the method on this scale in the world	Twelve interviews: Quality & development manager, head of production (interviewed twice), plant manager (interviewed twice), lab assistant & production manager (once jointly), two microbiologists (twice individually), project manager at supplier (interviewed twice)
Epsilon	ca. 8000 employees	Production line automation, replaces the former line with very high production volume, replaces the input of 60 workers, ca. \$12M investment	Very first automation project of this scale in this context in the world	Twelve interviews: Head of project & development organisation, project manager (interviewed twice), production manager (interviewed twice), heads of four adoption sub-projects (IT, Hygiene, Construction, Implementation), project coordinator at supplier, automation engineer at technology consultant (interviewed twice)

added with more specific questions. In addition, all the interviews comprised free reflection and additional questions to deepen the themes.

The secondary data comprised more than 1,000 pages of documents containing general information, such as annual reports, industry reports, media articles and press releases, together with adoption process-specific material, including a massive amount of email correspondence between the adopters, suppliers and third-party companies, meeting memos, technical development plans, project plans and photographs of the technology implementations. This material was used to support the interview data and pinpoint more precisely the different occasions and phases of the processes in a specific time frame, and to confirm and correct the informants' subjective notions of time (see e.g. Miles and Huberman 1994).

The data covered the periods before, during and after the adoption, thus providing an extensive longitudinal account as the basis for analysis. First, we wrote up the key events and actions. This produced nearly 21,000 words and gave a comprehensive picture of the processes in question. Second, we used NVivo software to systematically code the data for each process according to the research themes derived from the research framework and the codes that emerged from the empirical insights. Third, we combined the separate empirical accounts and the coded themes of each process in theorised classes and concepts to analyse and report the information processing activities and their interplay with the individual features and organisation and relationship elements.

#### 4. Findings

This section implements the research framework depicted in Figure 1 into the extensive case studies. To communicate and condense the extensive data set of the article, we first show the summary of key findings in the form of propositions in Table 2.

The propositions articulate the observed associations between the depth and breadth of the information processing activities and the individual features, as well as the organisational and relationship elements. In the following sections, we discuss the key parts of the data and related reasoning that led to the formulation of the propositions.

**Table 2.** The depth and breadth of information processing.

Factors	Association with the depth and breadth of information processing
Individual features	<p><b>P1:</b> Individual technical education seems to positively relate to the depth of information processing activities through enhancing understanding of the technology and its functional principles</p> <p><b>P2:</b> Individual technical experience seems to positively relate to the depth of information processing activities through enhancing understanding of the technology functioning in the production context to be implemented</p> <p><b>P3:</b> Experience of the industry seems to decrease the breadth of information processing through knowledge of the suitable suppliers and options available</p> <p><b>P4:</b> The newness of the innovation seems to increase the depth and breadth of information processing because of the insufficient pre-understanding to solve the focal adoption process without further information processing</p>
Organisational elements	<p><b>P5:</b> Individual motivation seems to positively relate to the depth and breadth of the activities</p> <p><b>P6:</b> Individual risk aversion seems to balance the roles in the adoption unit and steer toward a democratic decision-making style</p> <p><b>P7:</b> Potential sanctions seem to steer toward a democratic decision-making style</p> <p><b>P8:</b> Democratic decision-making seems to increase the depth and breadth of information processing</p> <p><b>P9:</b> Formal policies for adoption processes seem to increase the depth and breadth of information processing</p>
Relationship elements	<p><b>P10:</b> A previous, well-working relationship with technology supplier seems to decrease the depth and breadth of information processing</p> <p><b>P11:</b> The business relationships seem to offer sources of detailed information about the solutions and increase the depth of information processing</p> <p><b>P12:</b> Interdependence of user companies seems to increase the depth of information processing through increasing collaboration between the companies</p>

#### 4.1. Individual features

An individual's technical education and technical experience comprise the individual's capacity to process technical information for evaluating potential solutions. Individuals' experience of the industry guides information processing to the most promising suppliers and solutions. Furthermore, epistemic motivation for information processing is shown in the effort individuals put into information processing and was related to the newness and complexity of the innovation and individual risk aversion.

Technical education with technical experience of similar kinds of technologies and production circumstances facilitated the depth of information processing. This is because the individuals concerned understood the principles of different technologies as well as the requirements for the innovation in its targeted production environment (P1 and P2 in Table 2). For example, individuals at Delta and Epsilon, in particular, had a broad technical education and extensive technical experience, and thus, were capable of analysing potential technical solutions in depth. A microbiologist at Delta stated:

You can't believe rumors. You have to get the hard facts. That's the role of the expert, to go through the information and dig out the facts. ... and this capability boils down to the experience of this use context as well as the understanding based on the microbiology in which we both hold doctorates.

The individuals at Alpha did not have as extensive a technical education or technical experience. Thus, gathering and processing information was largely impossible:

We couldn't assess the technical performance or details ... thus, we could not much evaluate the selected option (Owners, Alpha).

In addition to technical experience, individuals' experience of the industry seems to be associated with information processing activities in decreasing their breadth (P3). Individuals with industry experience are able to take some seemingly suitable suppliers off the shortlist and focus on those with the most potential. This was emphasised extensively in interviews with Delta and Epsilon employees. In contrast, the owners of Alpha, a small player, were quite puzzled:

We do not have such an overview of what is there for us. We do not have time or money to visit places and exhibitions, or keep up with the fellow companies, or suppliers. ... and that's how it is then, you find yourself figuring out how, where and with whom to start with this type of process.

The production manager at Epsilon agreed:

That's a thing that comes along as you have been in the industry for long, and know who has something into this and particularly who doesn't. There's massive number of, so to speak, potential suppliers and solutions, but factually, it is very limited with this type of needs. To opt-out is really needed, and to do it wisely, you need this experience and perspective on the industry.

Epistemic motivation, individuals' desire to gain and maintain a deep understanding of the problem at hand, seems to be related to the newness and complexity of the innovation in the studied cases. Given that the innovations under scrutiny were technically complex, and radically new to the adopters, neither technical education nor technical experience was sufficient to provide the individuals with sufficient pre-understanding. The production manager at Gamma stated:

I realize that this was very different from other purchases we've made just because of the lack of solid knowledge and experience on it. ... to fight this lack of understanding we worked intensively to gain information where we could, and really put ourselves in to understand who are the relevant actors in the field as well as evaluate and compare the solutions.

This pattern of intense information processing activities because of the new and complex nature of innovation was also explicit in the cases of Epsilon and Delta. Thus, it seems the newness of the innovations increases the depth and breadth of information processing activities (P4).



## 4.2. Organisational elements

Individual agents are embedded in their organisational contexts, which manifests in the social setting between the individuals and in the formal guidelines that shape the adoption process. The social setting is reflected by the risks the individuals feel as members of the organisation. The perception of risk featured in individual and team behaviours of the key individuals involved. Alpha and Beta were different from the other firms in that the owners made the decisions, and they seemed to be less risk averse as they were free of organisational pressures in this sense. The potential risk of failure for the company was recognised, but these individuals did not much care about it. This allowed low depth and breadth of information processing activities at Alpha and Beta:

It was a completely new business. In fact, they had nothing. The rational reasons were not very good, knowhow was lacking and there was no strong entrepreneurial base or experience, the equipment wasn't all that great either. ... however, I had a strong feeling that this is something that may help us to take steps further, and thus, it was an easy decision. (Production manager, Beta)

Taking risks is necessary in business; without risks, it is quite difficult to progress ... In terms of this machine, we believed that it is good enough, and we need it. ... we did not want to have unnecessary delays and wanted to implement it soon. (The owners, Alpha)

In contrast, at the big companies, due to the individuals' roles and responsibilities as members of the organisations, individuals were more risk averse and felt the potential sanctions, if the adoption failed:

We didn't, in a way, need to compete over who makes the decisions, and probably no-one wanted to make the decision alone, that's the truth ... No one's head is on the block, but (Maintenance manager, Gamma).

This seems to balance the roles in the adoption unit and steer to democratic decision-making (P6 and P7). The goal that guided all the studied processes was to find a solution that would meet the defined organisational needs derived from organisational purposes. The organisational purposes and the individual perceived risks in terms of failure in meeting them prevented the rise of individual personal preference-driven activities and thus, disabled goal diversity in the processes. For these reasons, the decision-making was largely democratic at Epsilon, Gamma and Delta. The head of the production at Delta stated:

Of course, afterwards, if then someone from the upline of the organization has a look at what we have been doing here, it is important that it (the process) reflects the business objectives have been the primus motor, not what we personally think or feel about this. ... this turns this very neutral, and so to speak, even or democratic, how we drove the process.

The informants at Gamma, Delta and Epsilon discussed explicitly in the interviews how the process and the individuals' inputs would be perceived by management if they examined the process afterward, and if the case failed, what kind of sanctions would be imposed. For example, all the individuals at Gamma recognised the eventual solution as being the best from the early stages of comparing the alternatives, but through the formal evaluation process, the decision-making unit members covered themselves in case the adoption failed. At Epsilon, the adopted technology was in a key position in terms of affecting the section's total performance. In this sense, the production manager was very active and engaged in extensive information processing activities to do his utmost to avoid the various risks related to the project from materialising. Similarly, at Delta, the microbiologists felt that the success of the adoption was largely dependent on them, and thus, it was their fault if the process failed. This motivated them to engage in extensive information processing.

The democratic composition facilitated the individuals to act in their expert roles based on their contribution to the process, not in their roles based on the organisational positions. The information processing activities reflect a composite of the individuals working on the current tasks and not a result of forced authority or political gaming for one's individual benefit. Thus, the democratic setup increased the depth and breadth of the activities (P8).

The existence and normative power of company policies covering how to run this type of process largely determine the existence and composition of the decision-making unit. The small firms, Beta and Alpha, had no formal policies guiding the processes, and the owners made the decisions. In the big firms, formal policies affected the existence and composition of the decision-making units. Gamma had a group called the Equipment Group, which handled the company's large production-related investment processes. The decision-making units at Delta and Epsilon reflected the organisational sections concerned, the required expertise and official procedures (ISO 9001) for handling this type of process. Formal policies with pre-determined stages and structures that guided the minimum of how many options should be evaluated (breadth) and how they should be considered (depth) tended to make the processes more systematic and thorough, and thus, to increase the depth and breadth of the activities (P9).

### 4.3. Relationship elements

The adoption processes and the information processing activities are located in the wider context of inter-organisational relationships between the adopter organisations and their suppliers, fellow companies as well as potential third-party companies. The previous well-working relationships between the adopter and supplier organisations demotivate the adopters from finding other potential options, which decrease the breadth of information processing (P10). This is because the trust in the performance of the well-known supplier and the issue of incompatibility regarding technologies from various suppliers: 'The benefits of choosing the same supplier were so evident. And the first one machine has functioned well and the maintenance engineer who comes once a year is perfect' (The owners, Alpha). The head of the project and development organisation at Epsilon stated:

The boundaries between technologies supplied by different suppliers is always difficult because of liabilities. For example, at the moment we have an ongoing case on which we have invited three suppliers to a meeting to solve an issue that relates to section of production on which all these have supplied their technologies. ... So, if this type of situation of unclear roles and responsibilities can be avoided by choosing the same technology supplier for new adoption it is an important issue.

In addition to the supplier relationship, the other relationships of the adopter companies seem to offer sources of detailed information and are associated with the information processing activities (P11). Epsilon, Delta and Gamma had been using third-party companies to assist in information processing activities. For example, Epsilon used a particular technology consultant that increased the depth of information gathering and processing:

It's our job to evaluate the automation side of it, to go through the software and hardware of the machines ... and not only to assess their technical feasibility but to communicate and make sure that the customer's (Epsilon) requirements are down there. In a way, we have a gatekeeper role, as we make sure that on the technical side the customer gets what it actually needs. (Automation engineer at the consultant company for Epsilon)

In addition, fellow companies are important sources of information. For example, in the case of Delta, its major rival was using the innovation. Through personal contacts, the microbiologists obtained specific laboratory test results and reports from when the innovation was in trial use at the competitor. A microbiologist at Delta stated:

Because I had heard that they had been doing this, and I knew their head of development, I asked him what he thought about it and whether or not it had gone well. And I even got an e-mail afterwards with the results and comments.

This type of individual-level relationships comprised a significant layer within the formal organisational relationships with other food-processing firms in all the cases. However, informal collaboration seems to be inherent feature of the food-processing industry and manifested in formal organisational relationships. This is largely because of the joint interest in fighting quality

hazards and problems that get a lot of public interest and thus harm the industry. This interdependence turns toward a collective mindset and collaboration that increase the depth and breadth of information processing (P12). The product development and quality assurance manager at Gamma stated,

The food-processing business is so small that even though we are competitors, when it comes to technology purchases, if someone has a machine you can usually get to see it.

A microbiologist at Delta said:

Among other forums we have, I belong to an unofficial international discussion group, where people in the industry, representing ten or so companies, meet to discuss hygiene and product safety, analytics and that sort of thing ... It's cheaper for all concerned to listen to other people's experiences and to exchange ideas instead of everybody going it alone.

The head of project and development organisation at Epsilon said,

In a way it would be strange if someone (a competitor company) tried to develop something similar without knowing what others were doing, and put loads of money into it.

Large companies tended to have more partners and resources, enabling them systematically to build their networks. For years, Delta and Epsilon had enjoyed close and systematic co-operation with key technology suppliers and food-processing firms in the search for new industry-level solutions.

## 5. Discussion and conclusions

### 5.1. Theoretical contribution and further research

In this study, we explicate the organisational innovation adoption process as active information processing. We identified the depth and breadth as attributes of information processing activities. The analysis showed how individual features and organisational and relationship elements were linked in depth and breadth. This analysis was summarised in a set of propositions in Table 2.

The approach presented in the study links to the recent research that has depicted organisational innovation adoption as active organisational process (Mero, Tarkiainen, and Tobon 2020; Gruber 2020; Afolayan and de la Harpe 2020). These previous studies have shown the clear need for the consideration of the adoption process in the wider context of organisational behaviour. The focal study concretises and continues these recent studies in building towards an information processing perspective on organisational innovation adoption. The perspective of the article builds on three key principles. First, innovation adoption process is depicted as interplay between information processing activities (content) and organisational and relationship elements (context) as mediated by individual agents and their actions. Second, the need-solution coupling is the key outcome of the information processing activities. Third, the depth and breadth of the information processing activities associate with the individual, organisational and relationship elements. These principles facilitate consideration of the links between past, present and future through their reflection in individual features and organisational and relationship elements. Thus, the depicted perspective moves beyond black-and-white levels thinking to balanced consideration of the context and its interlinked levels with reference to individual actions.

The propositions provide an agenda for further research on the organisational innovation adoption process. Further explorative studies are necessary to examine the ideas in other empirical contexts to shed further light on the activities and individual features and organisational and relationship elements that are pertinent to adoption and to translate their mutual interplay into measurable constructs and testable models. This type of approach would extend understanding of the dynamics and mechanisms of the adoption process beyond the descriptive phases dominant in the extant literature.

## 5.2. Managerial implications

The results of the study reflect the fundamental managerial activity of identifying opportunities and threats in the operating environment and reconfiguring the organisational resource base accordingly. When a company aims at developing its adoption processes, the results of this analysis suggest sketching a broad picture of the current adoption practices at the organisation, categorising the needs and solutions, and defining a process playbook for managing each type of need- and solution-driven innovation process.

The analysis of current practices includes mapping the key information processing activities and demonstrating how and by whom these activities are undertaken in technology adoption processes. This analysis identifies the key individuals and organisational routines which then enables to engage these individuals to build a more fine-grained view on the most influential organisational and relationship elements that affect individuals' work in the adoption process. This type of mapping is likely to show the current bottlenecks and weaknesses in the adoption process, as well as to explicate the practices that support innovation processing that performs well.

To develop the prevailing organisational adoption processes, the typical needs of the organisation that can be solved with technology adoption must be characterised. Needs may be categorised based on, for example, the level of the purpose (operational, tactical, strategic), the organisational section in which the innovations is to be implemented, the urgency (a short short-term must vs. long-term development), the organisational understanding of the need, potential sources of information (fellow companies, consultants, etc.) to develop the need and the company's understanding of it. Another dimension for development comprises characterising the solutions that may match an organisational need. Solutions may be categorised based on, for example, the status of the technology (emerging, diffusing, established), the risk or newness of the innovation, the monetary value or the relationship with the suppliers of the area of the innovation.

Categorising the needs and solutions helps the company create a process playbook for managing each category of need- or solution-driven innovation processes. The process playbook should be flexible enough to accommodate necessary variation and understanding regarding the process phase and its trajectory. The playbook should provide support for strategic need-driven innovation adoption processes that are still in the pre-phase and be actualised in the future for the specific information processing and decision-making phase. Similarly, the process playbook must offer a specific structure for actual processes in guiding and assuring their information processing meets company standards.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Notes on contributor

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