Mergers and Acquisitions - Elaborating Factors for Enterprise Interoperability in an ERP context

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Abstract

In this paper, the authors discussed Enterprise Interoperability (EI) in Mergers and Acquisitions (M&A) transactions focusing on ERP systems. Essential connections to practice are drawn through a discussion of use cases with experts from the fields of M&A, IT, and ERP. The research question is defined as: What are the core influencing factors determining interoperability profiles, and what will the future look like regarding the ERP dimension? Based on eleven experts and qualitative content analysis, relevant findings on EI implementation scenarios are extracted. There are different approaches to achieve Enterprise Interoperability, depending on the context of the M&A transaction. Finally, the crucial decision factors are given in the findings and show the future development of ERP systems integrations. Current results suggest that fast and easy EI is a critical requirement to meet the increasing need for flexibility and ERP systems are at the core of these developments.

1. Introduction

In a digital world with increasing demand for flexibility and collaboration between companies, interoperability is a core topic of interest. Hermann [1] even describe it as the main enabler of Industry 4.0 based on an extensive literature review. To be able to stay competitive in an industry, Enterprise Interoperability needs to be created faster, cheaper, and more effectively.

The term Enterprise Interoperability (EI) is used for the management of interactions between enterprises on an operational level [2].

Enterprise Resource Planning (ERP) systems are at the core of enterprise architectures and map the main operational processes. Therefore, when managing interactions on an operational level, ERP systems are usually involved. The original purpose of these systems is to optimize processes and data [3]. Although their features are nowadays expanding, the core functionalities stay the same [4]. Thus, the focus of this research is on the process and data level in ERP interoperability projects independent of the specific used company ERP system and version.

As the two merging entities come with individual systems, a harmonization of the ERP infrastructure is crucial for a joint future operation. The interoperability dimension is particularly interesting in Mergers and Acquisitions (M&A) transactions, due to the fact that it does not grow organically here but managers are facing a variety of interoperability issues at the same time. Therefore, a structured process is required to deal with these issues. IT plays a role of increasing importance in the M&A process. In their survey Accenture [5] concludes that only 30% of the involved managers in such a transaction believe that the IT system integration was successful. This is often due to the fact that information systems have not been sufficiently taken into consideration when planning mergers [6].

The first step when approaching enterprise interoperability in the context of M&A is to determine the desired level of integration. The more detailed the picture of the desired integration on different levels of the IT infrastructure, the better managers can judge the situation. In some cases, it is not the best decision to fully integrate a well running system or sometimes it might not be worth the necessary financial resources. Therefore, making an informed decision on the desired level of integration is a key challenge for M&A transactions. Also, since technology is evolving rapidly, it is also important to analyze how the future of enterprise interoperability will look like. Due to the core position of ERP systems in Enterprise Architectures, the main trends and developments in ERP play a crucial role here. Therefore, the following research questions have been defined: What are the core influencing factors defining interoperability profiles? What will the future look like, regarding the ERP dimension?

To answer these research questions, an extensive literature review has been conducted. The established

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theoretical groundwork has then been checked for its validity by interviewing experts. By combining the two approaches, important findings could be made regarding the connection between the scenarios, as well as future implications.

2. Theoretical Background

Due to the complexity of enterprise interoperability, frameworks are useful to break the topic down into smaller, more tangible segments [7]. This also helps managers deal with the topic in practice. They offer a guideline to categorize issues and identify the domain that should be addressed [3]. Some examples are the RAMI 4.0 framework, the ATHENA framework, the INTEROP Network of Excellence framework, and the IDEAS interoperability framework. This research will be based on the framework for Enterprise Interoperability developed by [2]. Besides including the dimensions of Data, Service, Process and Business, the model also treats conceptual, technological, organizational barriers. Thereby, the framework comes with the advantage that it deals with interoperability approaches. These refer to the desired level of interoperability or integration. An integrated approach would be using one application, process or data base for both companies. A unified approach means that there is a common format, but this only exists on a meta level and individual applications are still run independently. The federated approach refers to the coexistence of independent systems and the building of interfaces to provide communication between the two. In order to focus on topic relevant aspect, the framework by [2] was reduced to the data and process level (see figure 1). Those are at the core of ERP systems and EI [3, 8, 9, 10]. Additionally, the framework spans the dimensions of federated and integrated.

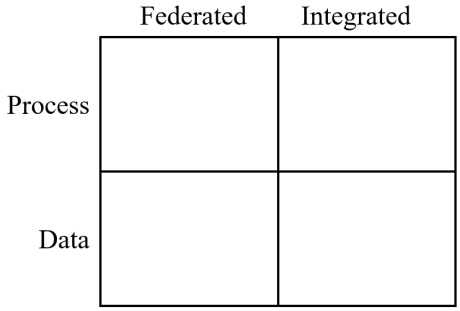

Figure 1. Reduced Enterprise Interoperability Framework [2]

When talking about interoperability, it is important to distinguish the term from integration. Hereby, interoperability usually refers to the communication of two coexisting, autonomous systems, whereas integration indicates the combination of the two systems into one entity [11]. The borders are quite blurry and in the literature the terms sometimes used interchangeably. The term enterprise interoperability refers to all interactions on an operational level and can therefore be used as an umbrella term for interoperability and integration issues in M&A scenarios.In practice, Enterprise Interoperability shows a variety of facets and not in every scenario a full integration is the best solution [12].

2.1. Environmental Factors

The first important influencing factor is the environment the two companies are operating in [13]. Some industries show a higher degree of e-business maturity than others and focus on different areas of development [14]. For example, manufacturing companies put a strong focus on supply chain integration initiatives, whereas companies in the tourism sector rather focus on customer relationship management (CRM) systems. This can also be translated to the focus on certain interoperability issues. Furthermore, the maturity of companies and industries influences the way how interoperability is approached. In industries with comparably low e-business maturity, such as the construction industry, there might be a lack of combined efforts to create industry-wide standards, which are key for enterprise interoperability [15]. Respectively, in industries of high e-business maturity, such as information and communication technologies, there is a great common interest in the standardization of information exchange.

2.2. Internal Factors

The e-business maturity of individual companies significantly influences the ability to integrate information systems. If companies carry a vast number of legacy systems that nobody dares to touch, it is more difficult to pursue an integrated approach. On the other hand, a frequently updated, flexible information system architecture can more easily be connected with other companies [16]. Moreover, the available internal IT staff and the willingness of employees to adapt to new systems is likely to influence the choice of a certain enterprise interoperability profile.

2.3. Types of Mergers

The goal of a M&A transaction in general is to improve the competitive position and performance

[6]. How that can be achieved varies from situation to situation, which results in diverse enterprise interoperability strategies. Traditionally, there are five categories of mergers, originally defined by the Federal Trade Commission (FTC): horizontal, vertical, product-extension, market extension and conglomerate mergers [17]. To elaborate which part of the information system architecture is mainly involved in the different types of mergers, the involved category of processes is identified first. Horizontal mergers are referring to the acquisition of a direct competitor. The goal here is to increase market share and power [17]. Due to a similar positioning in the value chain, most core processes are subject of Enterprise Interoperability discussions. In vertical mergers two companies along the supply chain are involved. That means the focus is on a customer or a supplier [18], therefore CRM and Supply Chain Management (SCM) systems are mainly involved in the interoperability process. A market extension merger relates to two companies providing the same product or service to a different market. In comparison to the horizontal mergers, markets are independent [19]. The interoperability profile is similar to horizontal mergers; however, the information systems are likely to be coupled more loosely since the companies operate in different environments. In product extension mergers, a company selling related products or services to the ones already being offered by the company is acquired [19]. Hereby, the focus is on collaborative product development which is why research and development (R&D) processes are largely involved. In conglomerate mergers, the two merging companies are often seemingly unrelated. The goal is often a diversification of goods and services or simply to take an investment [20]. Due to their different nature of business, information systems are usually not integrated intensively. Literature on mergers indicates that the intensity of the desired level of enterprise interoperability decreases from the horizontal to the conglomerate merger [21]. This implies that the IT infrastructure of horizontal mergers is likely to be coupled intensively, whereas loosely coupled infrastructures are more common in conglomerate mergers. However, this cannot be considered a strict linear relationship.

2.4. Company Size

Another important factor influencing interoperability scenarios are the size and relevance of both merging companies. A big enterprise acquiring a small one usually sets the standards for processes and data integration and interoperability. Accordingly, these big merging partners are also referred to as focal partners [9]. In more balanced merger scenarios, standards and systems might be determined by the enterprise with the comparably better-running technology

2.5. Collaboration Intensity

By determining the type of merger, we can already make some statements about the intensity of collaboration between the merging companies. However, when creating concrete enterprise interoperability profiles, the desired level of collaboration must be defined more in detail, from affected business units and processes down to related software and data [2].

2.6. Linking to the Framework

To create a better understanding of the potential usage of the interoperability framework by Chen [2], a top-down approach is followed. After the core processes and activities that should be linked, it will be explained how the Enterprise Interoperability profile might look like more in detail. The influencing factors mentioned before strongly shape the outcome here.

2.7. Core Processes and Activities

As mentioned previously, there are various M&A scenarios which indicate different profiles of coupling IT systems. Porter [22] has developed the probably most widely used model for defining activities that create value within a company. This model is a suitable starting point for strategic decisions which core processes and activities should be interlinked and how. Since ERP systems are at the core of enterprise process and data integration [23], the main value creating activities should be represented. Those are: human resources (HR), Inventory, Sales, Purchase, Finance & Accounting, CRM, Engineering/ Production and SCM. As such, they overlap largely with generally accepted value creating activities defined by Porter [22]. This justifies the core value creating processes of a company as a good starting point for ERP interoperability. Certainly, the importance of these functions varies depending on the specific situation. For example, a vertical merger requires a link between the SCM module of one company and the CRM module of another, which other mergers might not.

2.8. Mapping Processes

Once the main process categories relevant for the enterprise interoperability scenario are identified, the desired approach can be mapped in the framework. Chen [2] defines three approaches: the (1) federated, the (2) unified and the (3) integrated approach. We can thus identify the desired approach for each process category. Then, it is possible to go more into detail and think about approaches for single processes and the implications on a technological level. The more information is collected, the clearer the interoperability profile will be structured.

3. Methodology

In this research, a deductive combined with inductive qualitative analysis is conducted in the form of interviews. The process of data collection and evaluation will be explained in the following. To exclude the subjective influences in qualitative research the quality assurance principles are taken into consideration (e.g. inter-coder reliability was calculated with 82%, a qualitative research diary was filled parallel to the research project) [24]. A non-probability sampling approach was applied to try to get access to people that show the most expertise in the field (Intensity Sampling). Experts were selected based on their expertise in one or more of the following domains: M&A, ERP or IT-Architecture alignment. All experts have participated in M&A projects in the last 10 years. Based on their main expertise (see table 1) in M&A project management, ERP system integration or management of IT architectures, they have specifically built up know-how in these areas with regard to M&A challenges. In total, eleven interview partners contributed to this research, providing very interesting insights into reality and practice. An overview of the participants is given in table 1.

Table 1. Overview of participants

Expert	Background	Interview
A	M&A	February 3, 2020
B	ERP and M&A	April 24, 2020
C	IT and M&A	April 29, 2020
D	ERP	May 4, 2020
E	M&A	May 11, 2020
F	IT and ERP	May 18, 2020
G	M&A	May 19, 2020
H	IT and M&A	May 20, 2020
I	M&A	May 21, 2020
J	IT	May 25, 2020
K	ERP	May 26, 2020

The selection of partnering companies was not limited to a certain industry; however, most experts were from the manufacturing industry companies (3x medical device producers, 3x plant engineering, 2x paper producer, 1x wood industry). Hence, the interviewed experts from other industries allowed for a good distinguishing between industry-specific and generally applicable factors. All of the participating companies had at least one part of the merged participants in the DACH (Germany, Austria, Swiss) region and all of them except one company in the medical device producer industry are described as big companies (more than 250 employees, higher than 50 Mio. EURO turnover or more than 43 Mio. Euro balanced sheet total) following the EU guidelines. [1] A semi-structured questionnaire served as guideline for the interviews. Since the experts were more willing to share their expertise in their native language, all conversations were carried out in German. The analysis of the interview data followed the qualitative content analysis approach described by Mayring [25]. First, all interviews were transcribed, and important facts marked. Then, suitable codes were identified based on the research questions, literature, and previous interviews.

Quantitative measures (such as frequency analysis) were also included at those points where it made sense. Furthermore, the data was constantly checked on its validity in comparison to other members of the study, the research question, and the literature. Once the data was meaningfully structured, conclusion could be drawn based on the research questions.

4. Findings

After the presentation of the used methodology, the findings will be presented based on two different viewpoints. The first part in subsections 4.1.1 - 4.1.7 explains all the mentioned success factors from the interviews, and some transcribed texts underpin them. This is how the approaches to M&A are explained in more detail and the influencing factors of interoperability profiles are further touched upon. The second part of the interviews dealt with the future developments regarding ERP trends and interoperability given in the subsections 4.2.1 - 4.2.6.

4.1. Approaches to M&A

In this chapter, the general approaches to M&A transactions mentioned by the interviewees will be summarized. Furthermore, the critical factors on how

[1] definition by European Commission: https://ec.europa.eu/growth/smes/sme-definition_en

decisions were made will be mentioned, especially decisions on the desired level of integration. Particularly interesting here was the role of IT in the process.

4.1.1. Time Horizon One factor mentioned by many interviewees was the time horizon. What is the long-term plan of the merger? Are companies only planning to acquire a company short-term, build it up and resell it, or are they planning to work together in the long run? These are critical strategic question and determine the level of integration on IT level. Expert E mentioned that proper integration takes from two to five years, which is only rational if the required transition costs amortize themselves through sufficient benefits of the integration. Furthermore, most experts agreed that full integration is very costly and complex and makes sense if both companies are focusing on the long run.

4.1.2. Critical Factor: Speed Although the time horizon is critical, fast acting is crucial in M&A transactions, especially after the deal has been made. There is often no time to create a perfect solution, which was confirmed by most experts. The transaction costs a lot of money and the sooner the company can operate jointly, the better. Companies often rely on networks and solutions from the enterprises that previously owned them, which is then regulated in so-called TSAs (transition service agreements). These can be costly, and a company would try to get out as soon as possible. This was particularly relevant in the case of Expert G.

4.1.3. The 80/20 Rule As mentioned before, there is often not enough time to create a perfect result. Furthermore, companies have distinctive requirements, which simply cannot all be mapped in one common solution. The 80/20 rule is a good approach. This means finding a best suiting common denominator and creating a workaround for specific requirements (Expert E). Further, Expert C stated that it makes sense to focus on the common delta and not on single transactions in the ERP system.

4.1.4. IT Due Diligence Expert I mentioned that the process before closing the deal is a very tactical one. Only limited amount of information is shared and there are certain negotiation structures to be followed. If many disagreements or different understandings are found, the M&A process as well as the integration afterwards will take longer. Expert I also explained the company's due diligence process more in detail. There are many process streams, for example Finance, Law, or IT. The importance of the IT stream depends largely on the industry. At the beginning, only limited information is available, which becomes richer and richer along the way, leading to a rather accurate estimation of integration efforts when the deal has been made. During this process of IT Due Diligence, a company's applications are evaluated more in detail. The age, innovation potential and cost structure of applications are critical factors as well as questions such as: How much would the integration cost? Is the application treated/integrated well? And where are critical points that could make integration difficult (Expert A)? Speed is also a critical factor here, therefore he stated that it should not take longer than one or two months, even for bigger companies.

4.1.5. Chance to Improve Most experts agreed that a merger can be a chance for improvement. If process and data restructuring is necessary, it might as well be done right to meet the pulse of time. Expert A stated if data must be migrated why not directly in the cloud? Or if processes must be united, why not try to make them more efficient overall (Expert C)? The problem is that a lot of different facets need to be taken into consideration here. Most of the time, managers do not have much time to think about further improvements and only try to make sure that everything works somehow (Expert G). It would cost time to analyze the pros and cons of companies A and B to find common potentials for improvements (Expert H). Therefore, such not immediately "needed" improvements are sometimes carried out in a second step after successful integration. One important chance for improvement are redundancies. Especially in horizontal mergers, many applications or processes carry out similar tasks. In that case, the question is which should become the new standard, process A, B or a new one (Expert A)? The company size is an important influence here, but also other dimensions established in the IT Due Diligence are critical decision factors.

4.1.6. Federation vs. Integration When asked which approach, federation or integration, was better, experts were not able to give a clear answer. It depends on the situation, namely which operative areas should be integrated or federated. One point they were certain about was that once a M&A transaction has taken place, a certain amount of financial data must be integrated. It is an external requirement for enterprises

to report their unified financial data, therefore this is the one must-have for M&As and often the first step. The advantage is that financial data is only reported periodically, therefore interfaces can be created rather easily (Expert B). For operative areas, first it needs to be assessed where there is a necessity to integrate based on external requirements (Expert K). Then, a cost-benefit analysis can be conducted for other areas. Processes or systems can be assessed individually. The individual cost of integration is compared with benefits of the integration. It makes sense to start with the areas with the greatest benefits and lowest cost. Such a cost-benefit calculation, however, is often not that simple due to the many influencing factors. According to Expert H, companies are only truly merged if they are integrated on an operational level. In the case of this expert, both companies offered similar products/services to similar customers though. In the case of Expert B, the companies operated in very different areas. Here, a merger is more loosely coupled. Therefore, the benefits of integration can be analyzed with questions such as: Do we have similar processes? Do we use same data? Do we really need real-time data exchange? Strategic factors also play an important role since M&As are often a strategic investment. Sometimes, it makes sense to leave companies their individuality, sometimes however it can be better to fully integrate and standardize. The decision is usually a top-down one, starting with the strategic goal and ending at individual process and system level (Expert F).

4.1.7. The role of IT Some interviewees mentioned that IT does not play a big enough role in M&A transactions, and that IT departments are not able to push their interests, which would be beneficial in the long run. This might be due to the fact that IT is often not yet rooted well enough in the companies' strategies. Another explanation could be that main issues of an integration are often not on a technological level. Expert H even stated that IT systems do not help at all here, the only useful thing is a personal conversation. Other experts agreed that the main problem of a merger was not the technological side but earlier at the organizational or process level. Consequently, solutions must also be found elsewhere than in technologies.

4.2. Trends in ERP and Interoperability

Participants were asked how they see the future of the interoperability dimension in the field of ERP. Many mentioned general trends in ERP systems and combined these with implied improvements in the field of interoperability. Current trends and developments were also discussed here.

4.2.1. Cloud The push towards the cloud in the field of ERP can be seen everywhere and was mentioned at some point by all interviewees. Expert B, stated that the future of ERP is cloud, everything else would simply not make sense. That is due to many reasons: scalability, flexibility, velocity, and cost. The cloud simply matches modern business needs way better. Expert A stated that SAP announced that they will stop support for on-premise ERP system by the year of 2025 and basically force customers to move to the cloud.[2] Microsoft push to the cloud with Office 365 and Teams was also mentioned by Expert D. Most experts also agreed that by bringing ERP systems to the cloud, interoperability can be guaranteed faster and easier, since the physical component of moving data from A to B is simply not there anymore. The cloud migration is not always easy though, Expert C said that some machines can be very old and simply not able to move to the cloud.

4.2.2. Standardization The second biggest trend mentioned was the push to standardization in ERP. Many companies realised that their highly individualized solutions are very rigid and sometimes not even integrateable with others. Furthermore, maintenance efforts of individualized solutions increase tremendously over time (Expert E). Expert D addressed that sticking to the standard saved a lot of money and made interoperability projects easier. Nowadays, ERP provider offer more variety of "standard" processes, better tailored to business needs. Salesforce for example offers 10 to 15 cloud process models companies can choose from, and Expert K mentioned that it really makes sense to adapt a process to one of these and stay in the "protected" world of standards. Further individualization would simply not bring enough competitive advantage to justify the costs in the long run. Expert A and Expert B expressed their doubts if full standardization on a business level is the way to go. They mentioned that companies might lose their individual touch, which can be important for fully exploiting opportunities. One point they mentioned is that IT-architectures for sure become more visible and comparable, also regarding the transparency in the cost structure.

[2] remark authors: SAP will stop supporting the ECC (ERP central component) system by 2025 and recommends moving to the SAP S/4HANA platform which will be cloud-based or on-premise

4.2.3. Platform ecosystem Expert H explained that the term "Enterprise Resource Planning" is not fully up-to date and rather moves to "Enterprise Capability Planning". These capabilities are also at the core of the platform project from Expert F. Both agreed that current ERP providers are key in the developments towards more open and easier connectable capabilities of companies, a push that would make EI a lot easier in the future. They should realize the opportunity if they want to extent their power in the market, otherwise players like Amazon might take the chance and define standards of interaction. Furthermore, Expert C said that companies are moving from a traditional 1:1 world in M&A transaction to more networked models, where it is easy for modern companies such as Google to add new companies to their network. There is great interest in new platform models on a technological level as well as on the level of new business models. Expert A mentioned an interesting example: A back-office was bought out through an M&A transaction, the IT was modernized and then leased back to the original company.

4.2.4. End-to-End Processes Expert I confirmed the trend of mapping processes into one big enterprise-wide system. This would help to unify data structures and systems and increase synergies between branches and for future M&As. Furthermore, Expert D as well as Expert H mentioned that a process should be considered as a whole in the future. For example, an order process does not start when it is entered in the ERP system, but when the first e-mail was sent from company A to company B. If all these interactions are mapped, the process is documented more holistically which enables better design of interactions and integrations.

4.2.5. Additional Features Expert D mentioned that the basics of an ERP system are not that complex anymore and it is the additional features and GUIs that create value in the future. Expert H compared ERP itself to an iOS on an iPhone, crucial but basic. ERP providers then create value by developing apps on top which match the business needs. One important need is to connect fast to other companies for M&As or other collaboration scenarios, therefore fast interoperability is a valuable feature for ERP systems.

4.2.6. Covid-19 Crisis Expert I mentioned that the difficulties due to Covid-19 situation make measurement of post-merger integration success a lot more difficult. If KPIs are lower than predicted, it cannot really be traced whether this is partly also due to poor integration efforts. The traceability of KPIs is a general problem of measuring EI projects. In times of Covid-19, flexibility has become more valuable for companies, especially regarding supply chain interactions. The lock-down has led to many shortages in supply chains in certain regions. If interactions between companies were more flexible, the connection to other available suppliers to overcome the shortages would be easier (Expert F). Connecting fast and easy to new partners becomes vital in times of change, which pushes the field of interoperability.

5. Discussion

In the literature review, the success factors for a M&A transaction were touched on a more general basis. Through the variety of cases discussed in the interviews, it became clearer which interoperability approach should be pursued in which situations and why. By combining different situations, a more general guideline can be derived. As mentioned before, a company's core activities can be defined as processes. It was confirmed by the experts that process thinking is a valid and very important approach to tackle these problems, especially for ERP. In the theoretical background, it was only outlined that decisions must be made whether processes should be federated or integrated. Combining this with the empirical results, more sound influencing factors for defining the desired level of process integration were defined, shown in Table 2. It should be noted here that the situation is not always black or white and individual factors should rather be seen as a spectrum. This seems appropriate with the knowledge that a combination of federation and integration is common.

Since the data layer was also examined more in detail in literature as well as in the empirical study, four key influencing factors on this level were also identified. Decisions are usually made top-down, we start with the process and then proceed to the supporting data. The decisions on both these dimensions are often related but not necessarily equal. Therefore, they are combined in a created matrix, intended to help identify which approach brings most benefit for a specific process. That does not guarantee that it is always the right way to go, since issues that may occur and which can be translated into costs also have to be considered.

Table 2. Influencing factors for the desired level of integration

	Federation	Integration
Desired level of process integration	Consecutive, Few equal external requirements, Crucial differences, Short-term collaboration,	Simultaneous, Many equal external requirements, Many similarities / redundancies, Long-term collaboration,
Desired level of data integration	Independent master data, Heterogeneous semantics, Low no. of interactions, Batch processing,	Use same master data, Similar semantics, High no. of interactions, Real-time access required,

6. Conclusion

In this research, Enterprise Interoperability in the context of M&A transactions and ERP systems was discussed. First, the resulting EI profiles from different M&A transactions were established. Afterwards, the current and future developments of EI and ERP were addressed. The topics were first analyzed on a theoretical basis and then discussed with practitioners as part of a qualitative analysis. The variety of discussed use cases helped draw connections between different profiles, occurring issues and solutions. Furthermore, trends could be identified by collecting different opinions. The first main finding is that M&A are usually a strategic action and therefore postmerger interoperability needs to have the strategic goal in mind. Although the term Enterprise Interoperability is of technological nature, the focus is on the organizational level. The strategic decision on which level the enterprise should be integrated needs to be based on the motive behind the M&A transaction. Since ownership is joined, a certain degree of financial data needs to be shared anyway in M&As. The question is how deep the integration should go and where true interoperability is required. These decisions are usually made based on a cost-benefit calculation where each process or application is looked at individually in a top-down approach. Full operational integration should only be carried out if it brings sufficient benefit to the enterprise in the long term, since it is a costly and difficult matter. Process or data federation is a valid approach if the operational contexts of the companies are very different. Therefore, the decisions largely depend on the nature of the two companies coming together in an M&A transaction. In the future, EI will become of more and more importance. The increasing need for flexibility in collaborations forces companies to create interoperability faster. M&As are quite an interesting starting point since time pressure is very relevant. If it becomes easier to connect companies on a 1:1 basis in the future, we can move towards more networked models or even n:n connections. The future of EI is crucial for shaping industries and ERP systems will play a key role in the development. This is how the leading research questions (see introduction) are answered.

7. Limitations and future research

This section presents the limitations of the work shown by the authors and explains the next necessary steps for more in-depth research in the given field.

7.1. Limitations

M&A transactions are very complex scenarios. So many facets play a role here that it is impossible to incorporate all influencing factors. Focusing on the process and data level makes sense in the ERP dimension. However, more general organizational and software structures also must be considered. In addition, IT architectures are complex, making it hard to cover all areas, especially if two architectures are combined. Even within the areas of focus, a more detailed analysis is necessary. However, due to the variety of use cases in the empirical study, exciting connections could be found. Each case showed unique characteristics, but specific issues and solutions can only be derived when looking at each situation more. Additionally, the researchers started with a bias of having specific scenarios and industries (e.g., manufacturing industry) in mind when collecting the material. Therefore, implications might not be equally well suited for all types of M&A scenarios since those can show very different characteristics. In general, ERP interoperability in M&A receives great interest in practice, which is not covered by equal availability of academic groundwork. Therefore, further research is necessary to establish holistic guidelines for tackling such complex problems. All interviews were carried out in German and hence the semi-structured guidelines would have to be translated for future expanded interview studies.

7.2. Future Outlook

The attention on the field of enterprise interoperability has been steadily rising over the last years. Especially in changing circumstances, such as the unforeseen crisis of the Covid-19 virus, the increasing need for flexibility in collaborations becomes apparent (e.g., supply chains). M&A scenarios are a good starting point for collaboration development under time pressure. However, they are still representing the 1:1 world: Both sides have their specific processes and data. If the 1:1 collaboration is connected faster, we can start thinking of 1:n models or even n:n models. With new cloud-based technologies and an increasing push towards standardization, the groundwork has already been laid. However, enterprises are still reluctant to adapt to this development since it is hard to see the return on investment (ROI) and rigid organizational structures. The authors will tackle the questions in future research: Will new companies be cannibalizing the others, an ERP provider, or a new independent power? Will ERP providers expand their power in the market by moving towards managing capabilities and pushing interoperability? In more traditional industries such as manufacturing, the road to platform economy will take longer, simply due to the complexity of interactions. However, the literature suggests, and experts agree that it is the future of cross-border enterprise interoperability.

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