

Managing Decision Complexity of Post-Merger Information System Integration

Ksenija Lace¹, Marite Kirikova¹

¹ Riga Technical University, Faculty of Computer Science and Information Technology, 6A Kipsalas Street, Riga, LV-1048, Latvia

Abstract

One of the important activities after the decision to merge organizations is made is the post-merger integration (PMI) of organizations, including the integration of their information systems (IS). This research focuses on the decisions and plan phase in the post-merger integration and aims to answer the following question - how decisions on PMI IS integration should be organized for better M&A results? In this research, merger and acquisition (M&A) context and PMI are integration-related literature is reviewed to determine factors that can impact PMI IS integration decision-making and correspondingly M&A results. Based on findings, the PMI IS integration decision requirements model is created and applied to the previously created PMI-specific requirements engineering, knowledge management, and enterprise architecture-based framework, uncovering required adjustments to the previously defined PMI IS decision-making process.

Keywords

Mergers and acquisitions, post-merger integration, information system integration, decision-making

1. Introduction

Mergers and acquisitions (M&A) became a popular strategy for company growth, as it can help to grow faster and wider [15]. Increasing competition and high market expectations force organizations to grow by acquiring other organizations rather than naturally [16]. But based on the available statistics, many M&A initiatives struggle to achieve defined goals [17].

One of the important activities after the decision to merge organizations is made is the post-merger integration (PMI) of organizations, including the integration of their information systems (IS) [1, 18]. If we look at PMI IS integration as one of the activities in IS management, the main objective for it should always be the same – supporting the organization in achieving its goals [4]; specifically, in the PMI case – supporting goals stated for M&A initiative, such as growing market share, strengthening resources, expanding product portfolio, reducing costs and others [14]. Research confirms that PMI IS integration impacts M&A's overall outcome [6, 9]. In the previous research, we studied the importance of knowledge management [10], requirements engineering [11] and enterprise architecture [13] for better PMI results. Based on research findings the PMI-specific requirements engineering, knowledge management, and enterprise architecture-based framework were introduced. The framework includes three phases (initial assessment, decisions and plan, and plan execution) of PMI. This research focuses on the decisions and plan phase and aims to answer the following question: How should decisions on PMI IS integration be organized for better M&A results?

To understand how decisions on PMI IS integration are related to M&A results, we should start with PMI IS definition. In a generic case we can look at IS integration from the perspective of IS management [4] – IS integration is the process to make IS integration-specific decisions and implement these

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EMAIL: ksenija.lace@edu.rtu.lv; marite.kirikova@rtu.lv

ORCID: 0000-0001-8196-1836; 000-0002-1678-9523



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decisions. In the scope of PMI, IS integration is the process to make PMI IS integration-specific decisions and implement these decisions to achieve M&A goals. We can see that PMI IS integration decisions have an impact on the overall PMI IS integration [1].

If we want to understand how PMI IS integration decisions can be organized for better M&A results, we should explore the PMI IS decision-making process. Using IS management analogy, we can split PMI IS integration decision-making into three main activities [4]:

1. Identify possible integration options
2. Evaluate integration options and select options that better contribute to M&A goals
3. Implement made decisions

We can see that in the same PMI IS process with the same IS integration decisions can lead to different results in different contexts [6]. Based on this observation we can assume that the decision context has an impact on the decision outcome. Moreover, we can see that the M&A context can affect overall M&A success [1]. As the M&A context can impact both - PMI IS integration decisions and M&A outcomes (Figure 1), the M&A context should get more attention in PMI IS integration decision-making process.

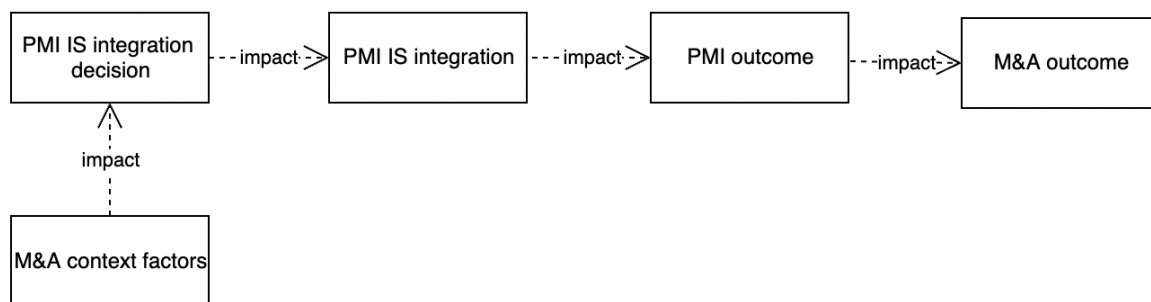


Figure 1: PMI IS integration decision dependencies with M&A context and M&A outcomes

In this research M&A context and PMI IS integration-related literature was reviewed to determine factors that can impact PMI IS integration decision-making and correspondingly M&A results. Based on these findings PMI IS integration decision requirements model is created and applied to the previously created PMI-specific requirements engineering, knowledge management and enterprise architecture-based framework, uncovering required adjustments to the previously defined PMI IS decision-making process.

2. State of the art

In this section, we very briefly amalgamate factors frequently mentioned in the context of IS integration we have found in related work. As one of the important factors is mentioned effective decision-making. Additionally, for serial acquirers' knowledge management is highlighted as an important success factor for improving PMI results in the series of PMI initiatives. and aspects of proactivity and optimization in decision making. With this we explore reported approaches for better knowledge management during and after PMI IS integration to improve PMI IS related decision-making.

In the existing research we can find the factors frequently mentioned in the context of IS integration decisions. One of them is the lack of ISI expertise. As in many other similar disciplines, without prior experience, many first-time decisions are not correct. But any made decision can be a lesson learned for future similar decision-making cases [1]. Another factor is the integration complexity. The more complex IS integration is, the more difficult it is to make decisions. Complexity can be related to the scope of the integration, the extent of the integration or the interdependencies between integrated systems [6]. Lack of leadership also can impact IS integration results. Decision-making requires the involvement of motivated decision makers, as well as a clear authority between them [1, 6]. One more mentioned factor is the lack of information. It is harder to make decisions in uncertainty. However, PMI are heavily related to the need to make decisions in situations when there are many known unknowns,

or even unknown unknowns [2]. Social aspects also play important role in ISI success. Decisions are based not only on facts but also on perceptions and personal opinions, which can impact made decisions [1, 6]. Finally, time pressure is also very impactful. In case of lack of time it is harder to prepare for the decision, evaluate all available information and define all possible options [1, 6].

It is noticed that these factors have a smaller impact on more experienced organizations, as through several diverse acquisitions they can accumulate knowledge and get expertise [5]. This knowledge and expertise can be later applied in the next acquisitions. There is even an assumption that even unsuccessful M&A fulfil their learning function [5]. Novice acquires could have external resources that can bring expertise, but with the M&A context being unique and important, external resources cannot be efficient without in-depth contextual knowledge [5]. With serial acquires being a big part of all acquisition cases [5], this research focuses on the problem of how acquirer beginner can establish PMI IS integration decision-making process handled by organization internal resources and organized in a way, that PMI IS integration related organizational knowledge is accumulated and applied through series of acquisitions, leading to better PMI IS integration results.

In order to understand how PMI IS integration related organizational knowledge can be accumulated and applied for decision-making we can perceive it through two perspectives [5]. One perspective is the organizational processes, which are based on the tacit know-how and repetitive practices. Another perspective is the organizational expertise, which enables the ability to interpret M&A context and act accordingly. For each of the perspectives we can find recommended practices for PMI IS integration decision making.

Organizational routine view focuses on the different aspects of proactivity and human factor in decision-making:

1. Value tacit knowledge over explicit knowledge. There is always not enough explicit knowledge and PMI extreme timelines do not allow to spend time on gathering it. Additionally, explicit knowledge becomes obsolete too quick, but serial acquirers will need to reuse it during the sequence of M&A initiatives [1, 2]
2. Value culture and people over autocracy. M&A initiatives are heavily related to cultural clashes and negative pessimistic attitudes. It is important to spot and manage personal attitudes [1, 6]
3. Be ready to make decisions in uncertainty. PMI IS integration-related decisions should be made during a very short period and without the ability to gain the required information. But decisions should be made quickly to show M&A results. In this case, required assumptions should be defined together with the made decision. This allows to make decisions faster, but revisit decisions later if required [2, 6]
4. Take risks and manage risks. Each decision brings value and risks simultaneously. PMI IS integration decision-related risks should be identified and reviewed before making a final decision [1, 3]
5. Build PMI IS integration capability. PMI IS integration decisions should be based on the previously gathered experience [1, 2, 5]
6. Structure and partition PMI IS decisions. To manage PMI IS integration complexity and time address the lack of time, it is important to prioritize required decisions and start with the ones with higher value potential compared with related risks [1, 6, 8]

Organizational expertise view focuses on the incorporating wider contextual knowledge in the decision-making:

1. Detect M&A goals to be able to evaluate possible decision options [1, 4]
2. Explore M&A context to base PMI IS integration decisions on the current organization integration state [1, 4]
3. Acknowledge organizational context to see IS interdependencies with business functions and business function integration-related decisions [1, 4]
4. Master IS context to know the required IS integration scope and see IS interdependencies [1, 4]

PMI IS integration process has been researched and discussed in the related work, however, the findings are available in scattered ways and their integration is needed to see the relationships between them that can help to manage decision-making complexity. This work aims to structure existing research as the proposal for PMI IS integration decision support process.

3. Research methodology

Research started with a literature review related to the M&A context and PMI IS integration. Authors used “ScienceDirect”, “SpringerLink” and “ResearchGate” databases, additionally also “Google Scholar” was used. Initial question was to test the hypothesis that PMI IS integration-related decisions have an impact on the overall M&A results. Key words “M&A success”, “PMI success”, “PMI success factors”, “PMI IS integration”, “PMI IT integration” and “PMI decisions” were used. Authors also explored additional works by authors exploring the corresponding topics. After confirming evidence was found, the next research question was to identify factors impacting PMI IS integration decisions, as well as recommended approaches to address these factors. As two high-level strategies were selected establishing organizational routines and gaining organizational expertise. Each of the strategies was detailed through specific contributing approaches. All identified approaches were transformed into PMI IS integration decision requirements models based on the decision requirements model and notation standard. The created model was used to review the previously proposed PMI IS integration decision support process and identify required changes. The research process schema can be seen in Figure 2.

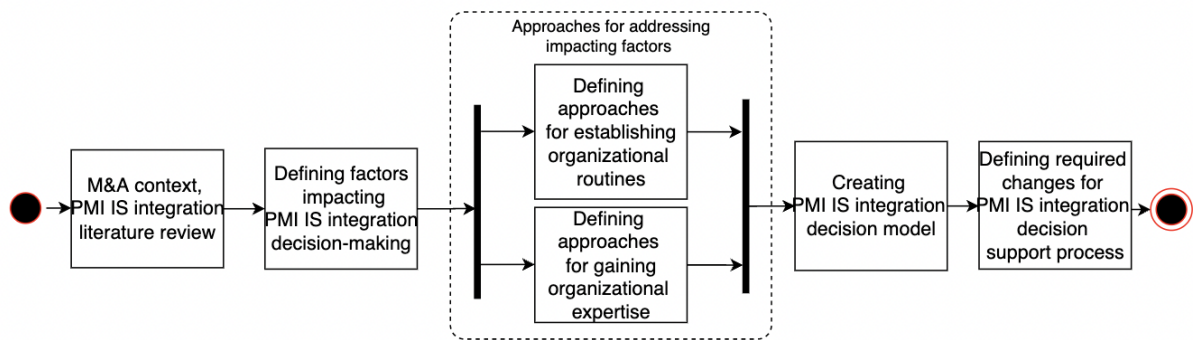


Figure 2: Research process

4. Knowledge availability supporting framework for information systems integration decision making in the scope of post-merger integration

This research proposes the PMI-specific framework to support the required information available for decision-making on information system integration in the scope of M&A.

4.1. Information system integration decision requirements model

Combining findings for better PMI IS integration decisions discussed in Section 2, the PMI IS integration decision requirements model is created (Figure 3). Model shows the complexity of the PMI IS integration decision using elements of decision requirements diagram [19]. Main elements of the requirements model related to the organization routines:

- R1 – PMI IS integration decision should be based on tacit knowledge rather than on explicit knowledge [1, 2]
- R2 – Each PMI IS integration decision should involve stakeholders representing business, information system and M&A domains. Additionally, PMI IS integration decisions should consider human intentions and reactions, as well as mechanisms how to manage them [1, 6]
- R3 – PMI IS integration decisions should incorporate assumption management [2, 6]
- R4 – PMI IS integration decisions should incorporate related risk management [1, 3]
- R5 – PMI IS integration decisions should apply PMI IS integration organizational routines and expertise [1, 4]
- R6 – Decision hierarchy and interdependencies [1, 6, 8]

Main elements of the requirements model related to the organization expertise:

- E1 – PMI IS integration decisions should be based on extensive knowledge about synergetic potential [1, 4]
- E2 – PMI IS integration decisions should be based on extensive knowledge about organizational integration [1, 4]
- E3 – PMI IS integration decisions should be based on extensive knowledge about organizational architecture [1, 4]
- E4 – PMI IS integration decisions should be based on extensive knowledge about IS ecology and integration architecture [1, 4]

The model in Figure 3 shows the spectrum of different issues that have to be respected when making PMI IS integration decisions. Once the issues are explicitly shown, it is possible to define the support process for decision-making that is described in the next section.

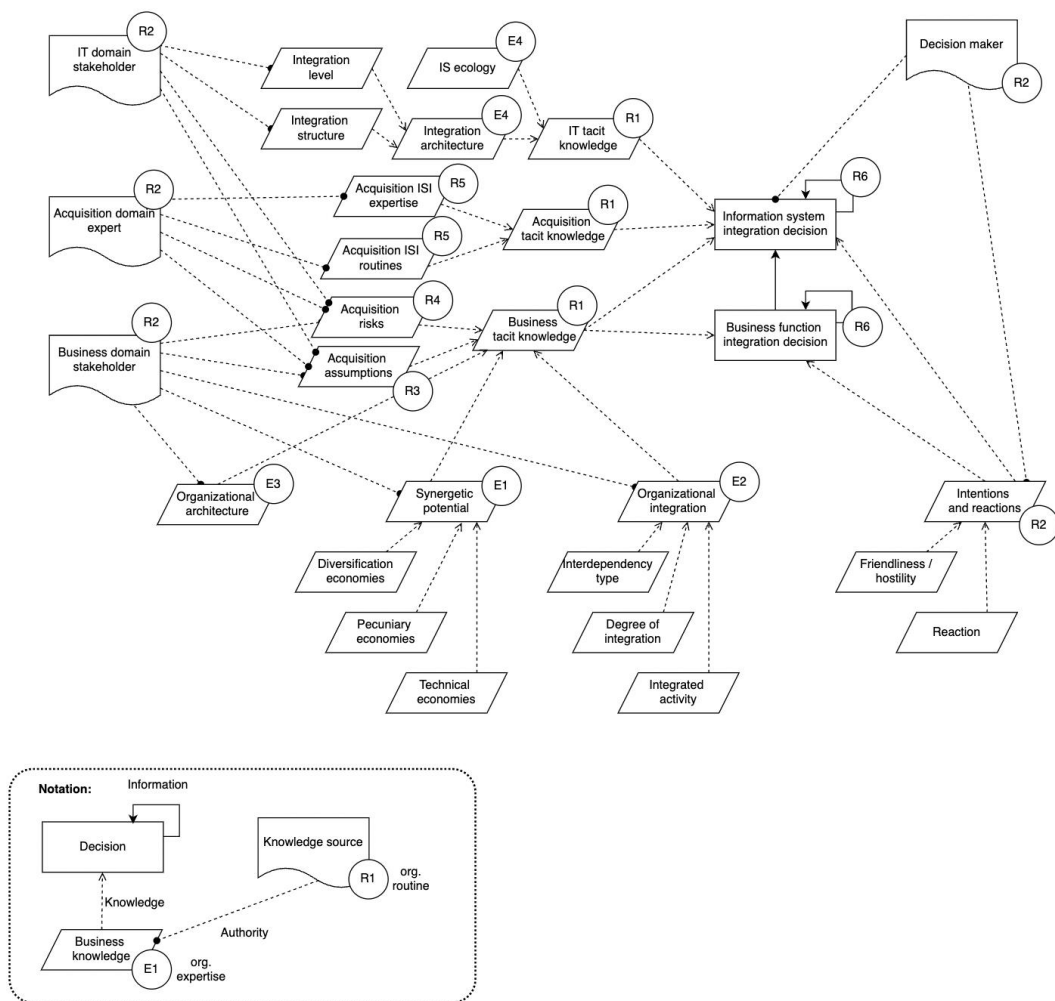


Figure 3: PMI IS integration decision requirements diagram

4.2. Information system integration decision-making support process

The high-level decision-making support process was initially identified and described in the previous research [11, 13] (Figure 4). The process model in Figure 4 shows activities and artefacts related to these activities. The process can be divided in three main phases – prepare for decision-making, make decisions, document decisions. In the diagram are depicted process steps as well as comments are provided illustrative examples. As can be seen, the core activity is “Make PMI IS integration decisions”, but this activity requires support to get prepared for decision-making and to

document decisions. All issues reflected in Figure 3 should have been addressed by decision support activities that preceded the “Make PMI integration decisions” activity.

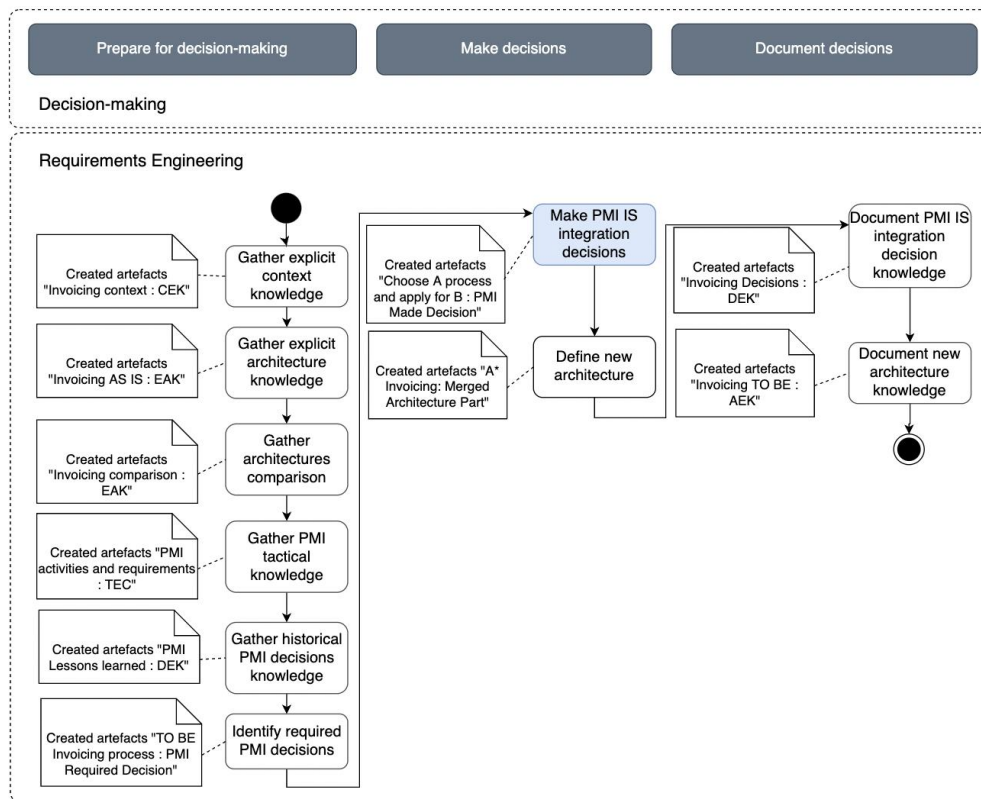


Figure 4: PMI IS integration decision-making support process

The process reflected in Figure 4 was created based on the state of art in enterprise architecture, knowledge management, and requirements engineering. However, the complexity of decisions on PMI IS was not then analyzed. Considering PMI IS integration specifics described above, as well as PMI IS integration decision requirements model, the following needed adjustments to the decision support process were identified:

1. Tacit knowledge should be valued more than explicit knowledge
2. Required knowledge should be revisited to support all identified contextual knowledge that is required for PMI IS integration decision making – M&A goals and context, organizational and IS context
3. Business function architecture and IS architecture for each integrating organization should be used as a foundation for PMI IS integration decisions
4. To get and apply tacit knowledge, more comprehensive stakeholder management is required For each business function and IS, stakeholders and knowledge sources should be identified
5. An iterative decision-making approach should be used
6. PMI IS integration decisions should be based on business function integration decisions
7. Risk management should be incorporated into decision making
8. Decision-making should tolerate uncertainty by applying assumption management
9. The decision process should be defined as a selection between several possible IS configurations
10. Documentation of made decisions should be accompanied by gaining tacit knowledge and organizational expertise for future acquisitions

The adjusted support process, thus, should be focused on creating business and IS architectures for each of the integrating companies, going iteratively through specific business functions and making decisions about supporting IS integration. Alternatively, this process can be initiated on IS function level and require bottom up iteration to identify corresponding business functions and decisions. This process should be based on tacit knowledge, meaning involving stakeholders in decision-making and relying on expertise. Stakeholders participating in decision-making should represent all three knowledge

perspectives – business, IS, and M&A. They also should consider business function integration decisions, manage risks related to specific IS integration options and maintain assumptions about uncertainties to be able to reevaluate decisions later if some of the assumptions change.

To achieve identified adjustments appropriate artefacts of a support process are needed. An example of business and IS architectures, that incorporate some adjustments, for two integrating organizations can be seen in Figure 5 and Figure 6. The figure lets to see the differences in how “Develop Vision & Strategy” are addressed by the two companies, and it also shows where knowledge about this is available. This architecture is created in step “Gather explicit architecture knowledge” in Figure 4 and is supported with specific means for relating explicit knowledge to the sources of tacit knowledge. For example, we can see that explicit knowledge about “Develop Vision & Strategy” can be found in planning guidelines for one organization, but in planning processes and templates for another organization. Related tacit knowledge can be gathered from listed stakeholders. As this is only illustrative example, for simplicity stakeholders are identified through their roles only, without specifying names. These stakeholders should be involved in both business and IS integration decision-making. Business functions are decomposed to show more granular representation of specific function realization. As can be seen, for one organization three business sub-functions contribute to strategy & vision – plan projects, plan products, and follow process. But follow process is not present in the other organization. Finally, for each of business functions supportive IS can be seen. We can notice, that plan implementation is supported by JIRA tool in both companies, but for sharing information MS Teams and MS Office tools are used only in one company.

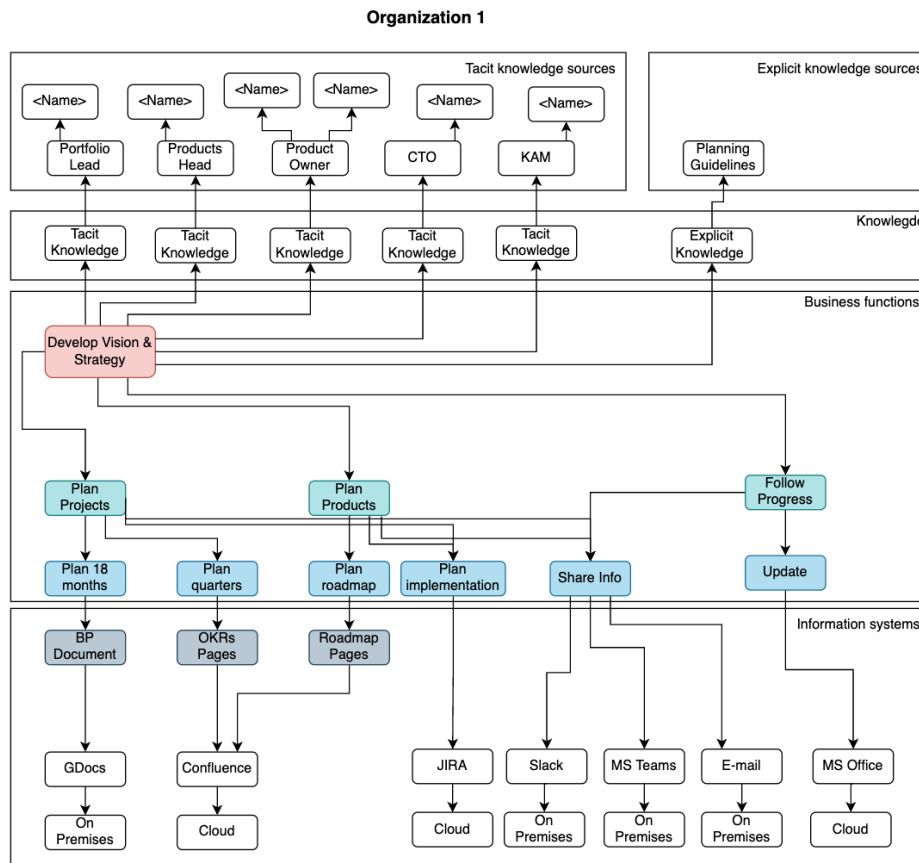


Figure 5: Example of business function and IS architectures for integrating organizations – Organization 1

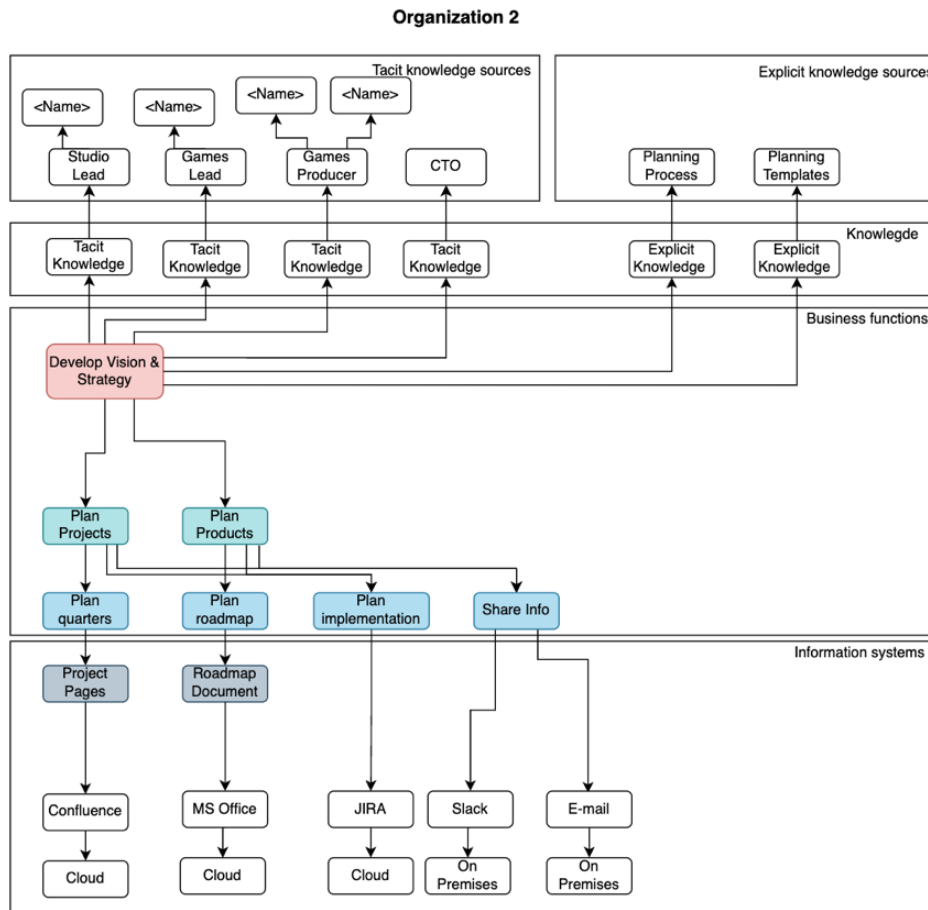


Figure 6: Example of business function and IS architectures for integrating organizations – Organization 2

Dependencies between business function integration decisions [4] and IS function integration decisions [3] have been researched and can be seen in Figure 7. Holding strategy on business level is more related to Keep strategy on IS level. Symbiosis on other side may require Start over strategy in IS. Absorption of business functions is usually supported by Rip and replace of IS. And Preservation is often accompanied by IS Sculpting. Combine IS strategy could be applied in some cases for business Symbiosis or Absorption, when existing systems of acquirer and acquired companies are mixed. Bolt on strategy can be applied for business Preservation or Holding, when some additions to acquirer company IS are required. During the next phases of the research interdependencies between decision options on different integration, levels should be examined and described.

An example that illustrates how the artefact in Figure 5 and Figure 6 can support PMI IS integration decision regarding IS support for “Develop Vision & Strategy” can be seen in Figure 8. Step-by-step decision activities show how for each IS integration decision previously made business function integration decisions should be identified as they define possible IS integration options. Moreover, for IS integration decision several options should be considered. In the provided example, even if on high level business decision was to absorb function of one company into another company, lower-level functions for product and roadmap planning were preserved – partially integrated. On IS integration level it allows three possible options – keep, sculpt and bolt on. On the lower IS levels, sculpting and bolt on allows also keeping some IS in place. In future research, option selection mechanisms should be defined in more detail. This process not mandatory starts with business function level and goes top-down. It can be triggered on IS level and go bottom up to identify corresponding business level decisions and then decide on possible IS integration options.

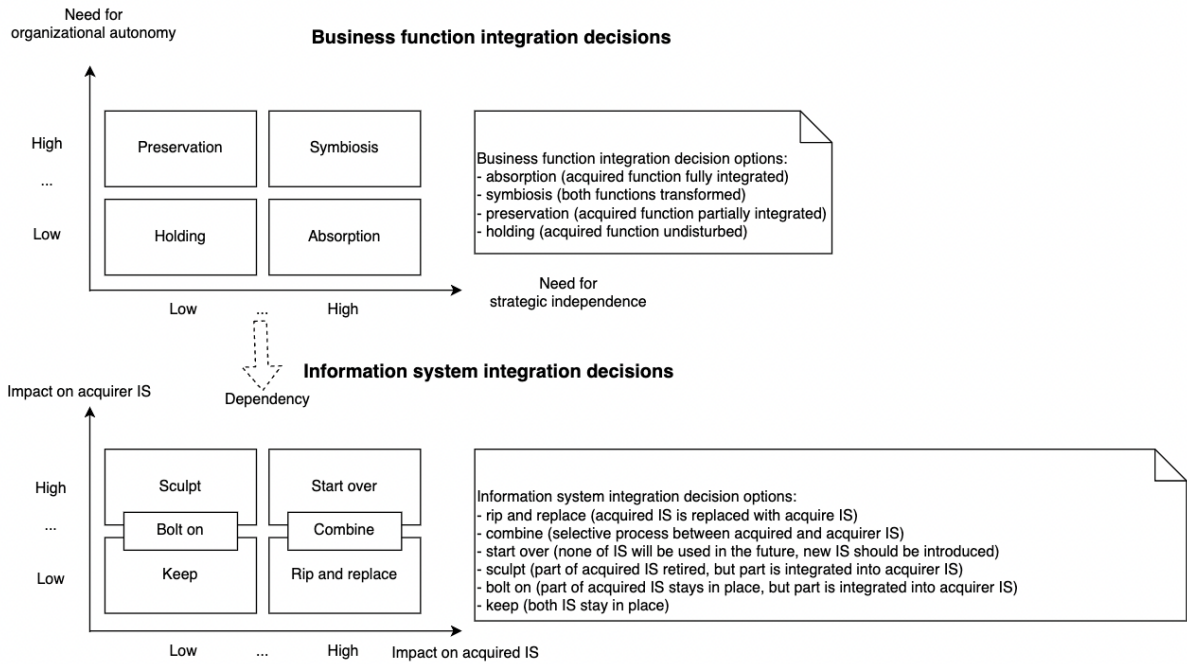


Figure 7: Business function integration and IS integration decision options

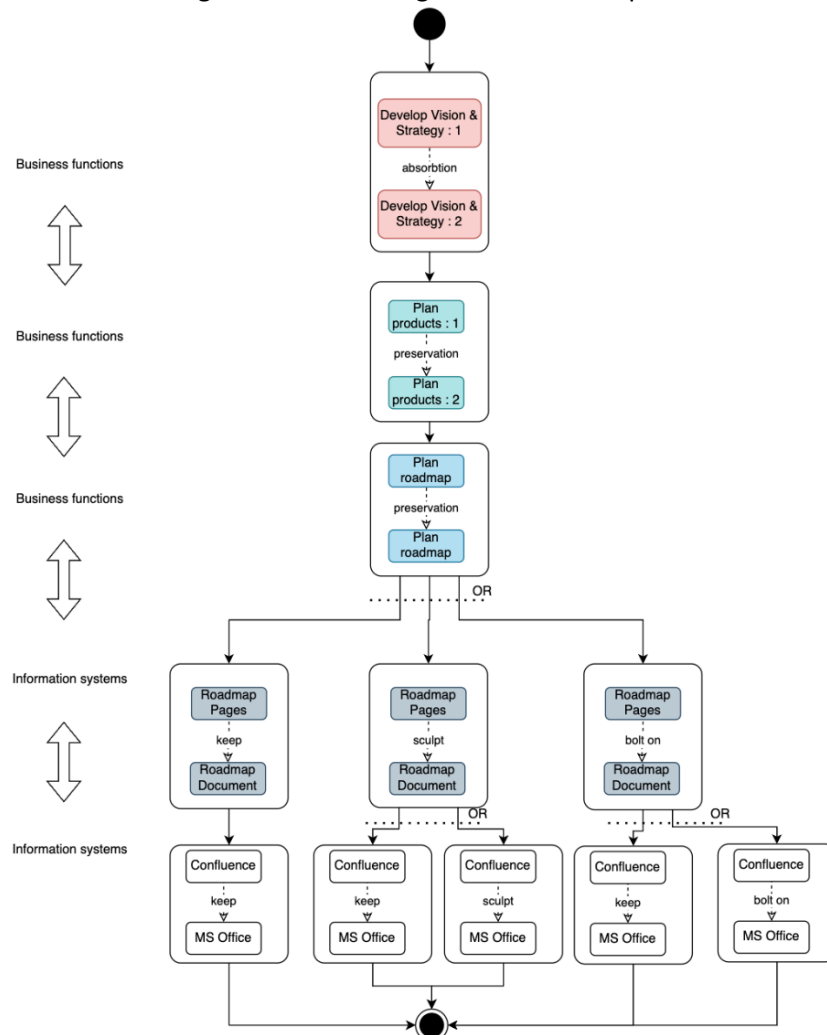


Figure 8: Example of PMI IS integration decision-making process

As a next step of the research, the initial decision support process model (Figure 4) should be further elaborated to include all needed adjustments for better PMI IS integration decision support. Additionally, illustrated artefact examples should be transformed into generic proposals and incorporated into the process model.

5. Conclusions

This research highlights the importance of the PMI IS integration decisions for overall M&A results. Research identifies the main factors that can impact PMI IS integration decisions and recommends approaches to address the impact. Based on the recommended approaches, PMI IS integration decision requirements model is created and used to validate PMI IS integration decision support process, which was proposed in the previous research. As the result, required adjustments in the process were defined and incorporation of some of them in the decision support process was shown.

The created PMI IS integration decision requirements model can serve not only in our research in progress on supporting PMI IS integration. It can already be also useful for practitioners involved in IS integration processes as it amalgamates and illustrates different issues to be respected in IS integration decision-making and thus helps to manage the complexity of these decisions.

6. References

- [1] Henningsson, S., Yetton, P. W., & Wynne, P. J. (2018). A review of information system integration in mergers and acquisitions. *Journal of Information Technology*, 33(4), 255–303. <https://doi.org/10.1057/s41265-017-0051-9>
- [2] Wynne, P. J., & Henningsson, S. (2018). The paradox of post-acquisition IS integration preparation: Preparing under incomplete information. *Proceeding - 2018 20th IEEE International Conference on Business Informatics, CBI 2018*, 1, 50–59. <https://doi.org/10.1109/CBI.2018.00015>
- [3] Henningsson, S., & Kettinger, W. (2016). Getting What You Bargained For: Managing Acquisition IT Integration Risk. May.
- [4] Henningsson, S., & Carlsson, S. (2011). The DySIIM model for managing IS integration in mergers and acquisitions. *Information Systems Journal*, 21(5), 441–476. <https://doi.org/10.1111/j.1365-2575.2011.00374.x>
- [5] Henningsson, S. (2015). Learning to acquire: How serial acquirers build organisational knowledge for information systems integration. *European Journal of Information Systems*, 24(2), 121–144. <https://doi.org/10.1057/ejis.2014.18>
- [6] Henningsson, S., & Kettinger, W. J. (2016). Understanding Information Systems Integration Deficiencies in Mergers and Acquisitions: A Configurational Perspective. *Journal of Management Information Systems*, 33(4), 942–977. <https://doi.org/10.1080/07421222.2016.1267516>
- [7] Henningsson, S., & Yetton, P. (2013). Post-acquisition IT integration: The sequential effects in growth-by-acquisition programs. *ACIS 2013 Proceedings*, 114.
- [8] Brunetto, G. (2003). Integrating IS during mergers: Integration Modes, Typology, Prescribed vs constructed implementation process. *University of Montpellier II*, 1–12.
- [9] Lace, K., & Kirikova, M. (2020). Importance of IS in mergers and acquisitions. *CEUR Workshop Proceedings*, 2749, 127–132.
- [10] Lace, K., & Kirikova, M. (2021). Knowledge management for M & A Performance. *Proceedings of the 13th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management (IC3K 2021)*
- [11] Lace, K., & Kirikova, M. (2021). Post-merger Integration Specific Requirements engineering Model. *Lecture Notes in Business Information Processing*, 430, 115–129. https://doi.org/10.1007/978-3-030-87205-2_8
- [12] Lace, K., & Kirikova, M. (2021). The Models for Knowledge Acquisition in PMI Specific Requirements engineering. *Lecture Notes in Business Information Processing*, 432 LNBIP, 34–47. https://doi.org/10.1007/978-3-030-91279-6_3
- [13] Lace, K. (2022). Enhanced Enterprise Architecture Framework for M&A PMI. *Baltic DB&IS 2022 Doctoral Consortium and Forum*

- [14] Bodner, J., & Capron, L. (2018). Post-merger integration. *Journal of Organisation Design*, 7. <https://doi.org/10.1186/s41469-018-0027-4>
- [15] Hossain, M. S. (2021). Merger & Acquisitions (M&As) as an important strategic vehicle in business: Thematic areas, research avenues & possible suggestions. *Journal of Economics and Business*, 116, 106004. <https://doi.org/https://doi.org/10.1016/j.jeconbus.2021.106004>
- [16] Galpin, T. J. (2021). As another M&A wave begins: three keys to success. *Strategy & Leadership*, 49(2), 14–21. <https://doi.org/10.1108/SL-01-2021-0008>
- [17] Peta, J., & Reznakova, M. (2021). Assessment of the Performance of Mergers: Revisiting Results after a Prolonged Period. *SHS Web of Conferences*, 92, 07047. <https://doi.org/10.1051/shsconf/20219207047>
- [18] Satu Teerikangas, Ioannis C. Thanos (2018). Looking into the ‘black box’ – unlocking the effect of integration on acquisition performance. *European Management Journal*, Volume 36, Issue 3, Pages 366-380
- [19] OMG. (2021). Decision Model and Notation. *Omg.Org*, March, 172. <http://www.omg.org/spec/DMN/1.0/Beta1/>