Pre-evaluation of Post-Merger Information System Integration Strategies

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Abstract

Mergers and acquisitions (M&A) are frequently used tools for company growth. With M&A, companies can grow bigger and faster by creating a new organisation with more resources to achieve M&A goals. However, there are still ongoing discussions if M&A can achieve its stated goals and assure sustainable performance. One frequently mentioned reason for this is the inability to transform merging organisations. As information systems (IS) play an essential role in organisational architecture, the transformation of IS should take more attention in transformation planning and implementation. There are different possible strategies to transform existing IS; each brings specific value and requires particular circumstances to be realistic and efficient. This research focuses on the decision of a specific IS integration strategy for selected IS by applying a practical approach which evaluates each strategy from several perspectives - contribution to M&A goals, stakeholder support, user satisfaction, cost, risk and time. The process is verified by applying it practical case study.

Keywords

PMI IS integration, IS integration strategy, PMI, IS integration decision, M&A

1. Introduction

Despite its immense popularity, mergers and acquisitions (M&A) show questionable results [1]. The whole idea of M&A is to create one new organisation by merging several organisations. This new organisation should be able to achieve the goals stated for M&A, which were not possible for each organisation on its own [2], [3]. This new organisation is created during the transformation process, often called the post-merger integration (PMI) of organisations [4], [5]. The outcome of PMI impacts the result of M&A [6]. A significant part of PMI is related to IS integration, through which future IS architecture should be created to support newly created organisation needs [7]. Existing research identifies many factors in the PMI context which can impact the decision on PMI IS integration strategy and the outcome of selected strategy implementation [5]. Different IS strategies, such as co-existence, absorption, bets-of-breed, and new build, contribute to specific M&A goals and bring more value to specific PMI contexts [8].

The main questions for this research are what factors in the PMI context could impact the efficiency of different PMI IS integration strategies and if it is possible to compare different strategies and identify the one which fits the PMI context the most.

2. Research Method

To identify different factors impacting PMI IS integration literature review was executed. Authors used “ScienceDirect”, “SpringerLink”, and “ResearchGate” databases. Keywords “PMI integration”, “PMI IS integration”, “PMI IT integration”, “PMI integration factors”, “PMI integration factors”, “PMI

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IS integration outcome", "PMI IS integration efficiency", and "PMI integration decisions" were used. The initial time frame for the research papers was set in the 2010 year or later. But entire research history was explored for the authors whose articles were closely related to the research topics. During the research review, closely related references were included in the literature review scope. Based on the literature review, we distinguished six main factors impacting PMI IS integration – alignment with M&A goals, IT staff and internal stakeholder reactions, user satisfaction, integration process complexity, integration process maturity, and integration process uncertainty.

To transform identified factors into a practically applicable evaluation approach, the project management triangle was selected as a framework with the following perspectives – quality perspective represented by M&A goals, stakeholder support and user satisfaction, and project costs, timeline and risks perspective. Using this analogy, PMI IS integration value formula was proposed as a ratio between achievable quality and a related combination of costs, timeline and risks. The next step for each formula element was to define a formula for evaluating the value of this element for a specific PMI IS integration strategy in a particular context. As the last step, PMI IS integration evaluation process was defined, describing the required steps to make all necessary calculations. The illustrated process was verified by application for the specific case study.

3. State of the art

IS integration decisions should consider integration context specifics and contribute to the best possible post-merger integration result. PMI IS integration context factors are all factors that impact either IS integration decision or the outcome of this decision [5]. Based on the proposed framework for IS integration value analysis [9], we can perceive IS integration decisions as finding the optimal proposal between several possible options. Finding the optimum considers two perspectives – minimising the cost and maximising the value of the IS integration.

In the existing PMI IS integration-related research we can find the following main groups of impacting factors:

- Alignment with M&A goals [5], [8], [10]–[14] – IS integration should contribute to M&A goals as much as possible
- IT staff and internal stakeholder reactions [5], [8], [10]–[12], [14]–[16] – IS integration should motivate IT staff and other stakeholders involved in the PMI IS integration
- User satisfaction [5], [10], [16] – IS integration should provide the best possible user experience
- Integration process complexity [5], [8], [11], [12], [15], [17]–[20] – IS integration should consider current organisational and IS architecture and interdependencies
- Integration process maturity [5], [10], [15]–[17], [21], [22] – IS integration should be realisable in a current organisational process and with available resources
- Integration process uncertainty [8], [15], [22], [23] – IS integration should have an acceptable risk level and be justified with a previous positive experience

Existing research characterises IT integration strategies by effort, risks, time, budget, business alignment, etc. [8]. But it is provided at a high level of abstraction and does not review specific IS integration strategies. The following subsections discuss specific decision-impacting factors on the IS integration level listed in the current research.

3.1. Alignment with M&A goals

PMI IS integration strategy should contribute to M&A goals. Each project has its own specific goals and motives, but we can see frequently used goals mentioned in M&A-related research. The principal motivations for M&A initiatives are lack of internal resources, growth in the global market, gaining competitive advantage, avoiding competitive edge, and cost-saving synergies through consolidation/economies of scale [11]. M&A goals often are linked with synergies. Synergies are expected in different organisational perspectives, such as functional, business model and strategic [13], or technical, pecuniary or diversification [12], [14]. In [5], besides high-level M&A motivations,

organisational integration objectives and IS integration objectives are mentioned as factors impacting IS integration decisions.

We can see that each of the PMI IS integration strategies is focused on different M&A goals [8]. Co-existence contributes to diversification, absorption is more focused on economies of scale, best-of-breed is linked with acquiring strategic skills, and new build supports innovation. Depending on the specific M&A goals, different PMI IS integration strategies can be effective. So, while deciding on the best PMI IS integration strategy, we should evaluate how each of them contributes to defined M&A goals.

3.2. IT staff and internal stakeholder reactions

Recent research highlights that the human factor can play an essential role in PMI IS integration. We can see several repeating trends regarding internal employees and another internal stakeholder impact on IS integration success. An efficient IS staff integration is proposed as one of the M&A success evaluation criteria [10]. This includes avoiding people loss, recruiting more competent people, avoiding demotivation and reducing productivity problems. Demotivation and productivity are linked to lack of executive support, business unit resistance, as well as inadequate stakeholder participation [5], [12], [14], [15]. Senior management support and focus are also mentioned in [11]. Power and politics in merging organisations and the power differential between merging companies can impact PMI IS integration [5]. Emotionally distressed employees and exhausted and overwork employees and managers are mentioned as one of the PMI IS integration deficiencies in [16].

We can conclude that involved stakeholders and management should support the selected PMI IS integration strategy. Moreover, responsible stakeholders involved in PMI IS integration implementation should be willing and able to contribute without overwork and burnout. PMI IS integration strategies lead to different consequences for stakeholders and trigger different reactions [8]. Co-existence makes the organisation more complex and not transparent. Absorption requires acceptance from the absorbed organisation. Best-of-breed can lead to competitive thinking. New build leads to significant changes in both organisations and requires high acceptance for personal changes. When choosing between different PMI IS integration strategies, we should analyse how it will impact internal stakeholders, how well each of them is supported by management, how motivated the executors are and how much they can contribute to implementation.

3.3. User satisfaction

Additionally, to internal stakeholder support, PMI IS integration should also be supported by users and lead to user satisfaction. User satisfaction includes several perspectives, such as not disrupting employees' work, not inconveniencing customers and providing accurate, useful, timely and accessible information [10]. Additionally to business non-disruption, business efficiency is essential - PMI IS integration should not impact business performance and innovation [16]. But perfect user experience does not guarantee user support [15]. Often user resistance is related to insufficient user readiness for upcoming changes [5]. This could be linked to a personal attitude or lack of knowledge and experience. Summarising all mentioned above, user support is essential for PMI IS integration strategy, including not only motivations but also user readiness for changes and stability of user experience.

Each PMI IS integration strategy has a different impact on user experience and can trigger different user reactions [8]. The new build has the highest risks of affecting user experience, as too many changes are introduced in parallel. The complicated process of different IS combinations in best-of-breed can evoke problems in business performance. Co-existence can complicate future operations and reflect on business performance. Absorption causes resistance in users from the absorbed company. Thereby, one more criterion for PMI IS integration strategy selection should be applied user support for this strategy, which should incorporate subjective personal attitude, objective user readiness for changes and undisturbed user experience.

3.4. Integration process complexity

Existing business and IS architecture can impact PMI IS integration outcomes and make PMI IS integration projects more complex and expensive. The main factors affecting any IS integration strategy's effect are IS complexity characteristics, such as size, standardisation, geographical distribution, centralisation, and hierarchy [11], [17]. An additional factor important for any IS integration decision is the use of external resources [5], [11]. IS evolvability is a vital prerequisite for IS expansion, extension or enhancement. The following characteristics support IS evolvability [19] – analyzability, architectural integrity, changeability, portability, extensibility, testability, and domain-specific attributes. Some research mentions IT and business flexibility as essential for any strategies demanding changes in the current IS [11], [17]. Business flexibility depends on merging companies' size, industry and business process. IT flexibility is dependent on the level of standardisation and shared knowledge. IT compatibility is also essential when several IS systems should be integrated [15]. Compatibility can be supported by the familiarity of technology, commonality in systems, decrease in orthogonality, and functional and physical modularity[18]. Interdependencies on business and IT levels are also mentioned across IS integration factors [12], [14].

Specific IT characteristics can be not just impacting factors but determinants for excluding specific IS integration strategies [20]. Minimal architectural compatibility makes it very complicated to implement any integration related to the combination or extension of current systems to fit the needs of the future organisation. Modest architectural compatibility minimises the efficiency of the current IS combination. Retireability is another characteristic that can impact IS integration decisions. If some IS are not retireable, creating entirely new IS from scratch is impossible. With none of IS retireable, choosing one IS for the future organisation is also problematic.

In [8], for each IS integration strategy are defined requirements for the current IS architecture so that IS integration strategy can be implemented effectively. Co-existence is a good fit in cases when current IS architectures should be different or when it is impossible to make changes or retire current IS. Absorption works well when IS architectures are comparable and absorbing IS architecture is evolvable. A new build requires the current IS to be retireable and the existing business to be flexible. The highest requirements are for a best-of-breed strategy when current IS complexity, different quality and incompatibility can become blockers for IS combination. With this, we can conclude that some integration process complexity characteristics can impact implementation and require additional effort, including other costs and time. While selecting the best possible strategy, we should verify that the required effort will not become unacceptably high due to the integration process complexity.

3.5. Integration process maturity

Implementing IS integration decisions can also be impacted by available resources and established practices. With insufficient resources or lack of experience, PMI IS integration can delay and require rework. Such factors as lack of resources, such as money, time or experienced staff members, can worsen IS integration risks [15], [23]. Even sufficient resources, time and market pressure, can negatively impact the PMI IS integration decisions [5], [22].

IT leadership and IS planning quality are listed as additional factors impacting IS integration outcomes [5]. Efficient and effective IS integration management is also mentioned in [10]. This perspective highlights that resources should be not only available but also should be properly planned and effectively used. Management policies should be established for project management, change management, outsourcing, and others. Integration experience is highlighted as significant factors in [17], [21], [22]. A lack of established processes and experience can cause inefficient integration or re-doing of integration steps [16], leading to additional costs and required time. The company's insufficient focus, limited participation extent, non-structured decision-making and lack of overall consistency can be other blockers for PMI IS integration strategies that require more structured and organised processes [24]. Strategies such as best-of-breed and new build, where default effort and budget are high, and a long time is required, any additional overspending and delays can be critical.

We can see that some integration process maturity-related characteristics will impact specific PMI IS integration strategy implementation, leading to additional costs and time required. One of the tasks

for integration strategy selection is to confirm that the selected PMI IS integration strategy with current resources and maturity level can be implemented and maintained during a reasonable time.

3.6. Integration process uncertainty

PMI IS integration strategy implementation is linked to specific risks more likely to be realised [23]. As risks related to IS integration are listed integration process delays, cost increases and poor outcomes [15]. Similarly, in [16], delay and overspending are two main risks. Overspending is related to the need to re-do steps in integration or with inefficient integration processes. Overspending, value destruction and benefit delay are risks for integration in [22].

Each IS integration strategy is related to a different level of risk in [8] – low risk for co-existence and absorption, high risk for best-of-breed and new build. Additionally, migration and development issues can impact absorption and best-of-breed strategies.

Decision on PMI IS integration strategy should incorporate risk impact and likelihood evaluation in case the corresponding strategy is applied. The selected strategy should have an acceptable risk level.

4. PMI IS Integration Evaluation

In [8]. We can look at this through the so-called “project management triangle”, which states that the quality of the project is constrained by the project’s budget, deadline and scope [25]. We can apply this approach when selecting the most suitable PMI IS integration strategy (see Figure 1). Project quality can be evaluated through achieved M&A goals, satisfied IT staff and internal stakeholders, and user satisfaction. Project time is the required timeline to implement these changes in the context of current companies' architectures, current process maturity and available resources. Project cost contributes to change implementation cost, comprising project budget and project-related risks. Instead of a project scope perspective, we apply project-related risks.

When we choose PMI IS integration strategy, we start with evaluating achievable quality. The previous section identifies three main factors related to PMI IS integration quality: achieved M&A goals, satisfied internal stakeholders and users. So when we compare PMI IS integration strategies from a quality perspective, we compare how well each supports M&A goals, internal stakeholders and users. Then, for each of the PMI IS integration strategies, we evaluate costs, time and risks related to implementing the PMI IS integration strategy in the current project constraints. Existing research assigns different costs and time required for each specific PMI IS integration strategy implementation and maintenance [8]. In addition, we should consider extra costs and time required due to integration complexity and lack of integration process maturity. Integration complexity and process maturity characteristics impacting IS integration were explored in the previous sections. The last component in strategy evaluation is related to risk level, which also was mentioned in the previous section.

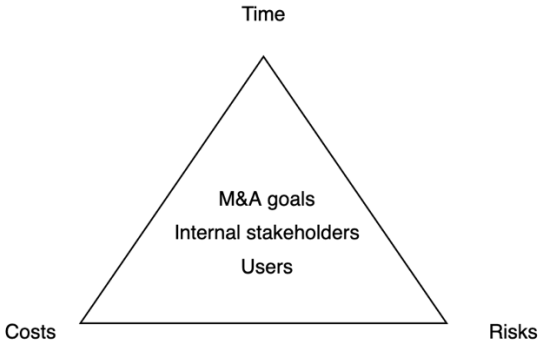

Figure 1: PMI IS Integration management triangle

As a result, we can evaluate the proportion between achievable quality and required costs, timeline and risks for each strategy. The best proportion allows us to determine the recommended PMI IS

integration strategy. We consider this proportion a value of the corresponding PMI IS integration strategy.

To define this proportion, we divide total quality represented by contribution into M&A goals, internal stakeholder support and user satisfaction by total cost, timeline and risks:

$$V = (G + S + U)/(C + T + R),$$

where:
V – the value of PMI IS integration
G – contribution to M&A goals
S – internal stakeholder support
U – user satisfaction
C – integration process cost
T – integration process timeline
R – integration risks

To balance possible outcomes for this formula, we propose to use as a value relative percentage of the maximum value between all strategies. Additionally, each value and cost element can have higher and lower priority for the selected initiative. In this case, we can use coefficients to represent relative priorities. In the following subsections, we review each of the perspectives and try to define how each of the perspectives can be evaluated.

4.1. Contribution to M&A goals

PMI IS integration quality component "Contribution into M&A goals" is based on the findings of the "Alignment with M&A goals" factor impacting PMI IS integration (Section 3.1). To evaluate the contribution to M&A goals, we need to define goals for the specific project, prioritise goals, and assess their contribution to particular goals for the selected PMI IS integration strategy.

The evaluation formula could look like this:

$$G = \sum_{i=1}^{n} I_i * C_i,$$

where:
G – contribution to M&A goals for the selected PMI IS integration strategy
n – number of goals set for the evaluation
I_i – importance of the specific goal
C_i – strategy contribution to a particular goal

A goal list can be defined for each specific PMI initiative. However, we define an essential list of M&A goals frequently mentioned in the research. We grouped M&A goals found in the study (Section 3.1) and proposed the following general M&A goal groups. The first group is related to optimisation. This can be cost savings or resource optimisation. The next group is connected to growth. The company can sustain growth through new markets or new capabilities. Another group is related to competition. This could be gaining a competitive advantage or achieving a monopoly. The last group is connected to diversification to minimise risks.

4.2. Internal stakeholder support

PMI IS integration quality component "Internal stakeholder support" is based on the findings of the "IT staff and internal stakeholder reactions" factor impacting PMI IS integration (Section 3.2). Internal stakeholder support can be evaluated through subjective stakeholder attitude, and contribution to the specific PMI IS integration strategy. We should include stakeholders from both groups – responsible executors and management. Responsible stakeholder support should be evaluated from two perspectives. The first of them is participant support, similarly to management stakeholders. Another one is the willingness and ability to contribute. Stakeholder support should be adjusted based on the stakeholder impact level.

$$S = \sum_{i=1}^{n} RI_i * (RS_i + RC_i) + \sum_{j=1}^{k} MI_j * MS_j,$$

where:

S – internal stakeholder support for the selected PMI IS integration strategy

n – number of responsible stakeholders selected for the evaluation

k – number of management stakeholders chosen for the evaluation

RI_i – the impact of the specific responsible stakeholder

RS_i - support of the particular responsible stakeholder for the PMI IS integration strategy

RC_i – practical contribution that the specific responsible stakeholder can add to the PMI IS integration strategy implementation

MI_j – the impact of the specific management stakeholder

MS_j - support of the particular management stakeholder for the PMI IS integration strategy

4.3. User satisfaction

PMI IS integration quality component "User satisfaction" is based on the findings of the "User satisfaction" factor impacting PMI IS integration (Section 3.3). User satisfaction is evaluated through subjective user attitude and support, objective values for user readiness level for changes (related to required training and support) and quality of user experience during and after modifications. User satisfaction should be evaluated for all impacted user groups. User satisfaction for the specific user group should be adjusted based on the user group impact level.

$$U = \sum_{i=1}^{n} UI_i * (US_i + UR_i + UE_i),$$

where:

U – user satisfaction for the selected PMI IS integration strategy

n – number of user groups chosen for the evaluation

UI_i – the impact of the specific user group

US_i – support of the particular user group for the PMI IS integration strategy

UR_i – readiness of the specific user group for the changes related to the PMI IS integration strategy

UE_i – specific user group user experience quality during and after the implementation of the PMI IS integration strategy

4.4. Integration process cost

PMI IS integration cost component "Integration process cost" is based on the default PMI IS integration implementation and maintenance cost for a specific strategy, as well as findings about additional costs related to "Integration process complexity" characteristics (Section 3.4) and "Integration process complexity" characteristics (Section 3.5). Integration process cost is evaluated through the standard cost level associated with the corresponding PMI IS integration strategy implementation and maintenance. Integration process complexity-related additional costs should be added. Specific cost-impacting business and IS architecture characteristics should be defined, and corresponding additional expenses specified. The following features are proposed as a baseline from the existing research – part of outsourced IS, the complexity of current IS architecture, fit of IS architectures in merging companies, retireability of existing IS, evolvability of existing IS, interdependencies on business and IT levels, business and IT flexibility (summary from Section 3.5). These characteristics can be adjusted for the specific project to include all factors that increase the required cost for some PMI IS integration strategies.

Similarly, should be added costs related to process maturity characteristics. The following factors are proposed based on the existing research – process inefficiency and lack of experience, lack of resources and resource competence, and lack of leadership (summary from Section 3.5). Similarly, as with integration process complexity, the list of cost-impacting characteristics can be adjusted for the specific project.

$$C = CI + CM + \sum_{i=1}^{n} CC_i + \sum_{j=1}^{k} CE_J,$$

where:

C – cost required for the selected PMI IS integration strategy implementation and maintenance

CI – standard cost level for the implementation of the PMI IS integration strategy
CM – standard cost level for the maintenance of the PMI IS integration strategy
n – number of integration process complexity criteria selected for the evaluation
k – number of integration process experience and maturity chosen criteria for the evaluation
CC_i – additional cost level due to specific criteria of the integration process complexity
CE_j – additional cost level due to specific criteria of lack of experience and maturity in the integration process

4.5. Integration process timeline

PMI IS integration time component "Integration process time" is based on the default PMI IS integration implementation and maintenance timeline for a specific strategy, as well as findings about additional time related to "Integration process complexity" characteristics (Section 3.4) and "Integration process complexity" characteristics (Section 3.5). The integration process timeline is evaluated through the standard time level associated with the corresponding PMI IS integration strategy implementation and maintenance. It is essential to notice that we differentiate between the total required time and the required timeline. At the same time, the effort may be spread across different timelines. Additional time due to integration complexity and lack of integration maturity is evaluated similarly as additional costs (see Section 4.4).

$$T = TI + TM + \sum_{i=1}^{n} TC_i + \sum_{j=1}^{k} TE_J,$$

where:
T – timeline required for the selected PMI IS integration strategy implementation and maintenance
TI – standard timeline level for the implementation of the PMI IS integration strategy
TM – standard timeline level for the maintenance of the PMI IS integration strategy
n – number of integration process complexity criteria selected for the evaluation
k – number of integration process experience and maturity chosen criteria for the evaluation
TC_i – additional timeline level due to specific criteria of the integration process complexity
TE_j – additional timeline level due to specific criteria of lack of experience and maturity in the integration process

4.6. Integration risks

PMI IS integration risk component "Integration risks" is based on the findings of the "Integration process uncertainty" factor impacting PMI IS integration (Section 3.6). Integration strategy risk level is evaluated as the likelihood and impact of risks in case the corresponding strategy will be applied. It is essential to assess all PMI IS integration strategies using the same risk list identified for the project. Similar to M&A goals, project risks can be very specific. However, we can find three main risks mentioned in PMI IS integration-related research – poor outcome, delay and overspending (summary from Section 3.6).

$$R = \sum_{i=1}^{n} (RL_i + RI_i),$$

where:
R – risk level for the selected PMI IS integration strategy
n – number of risks chosen for the evaluation
RL_i - likelihood for the specific risk for the PMI IS integration strategy
RI_i – the impact of the particular risk on the PMI IS integration strategy

5. PMI IS Integration Evaluation Process

To define the application process of evaluation criteria discussed in Section 4 and to demonstrate the practical applicability of our proposal in this section, we apply it to the case study. In this example, one company acquires another company. Both companies have their HR information systems (IS). It is required to decide on the best possible HR IS integration. In this case, the HR department of the acquirer

absorbs the acquired company's HR department. But the acquirer company is open to aligning and adjusting for a better fit. The main goals for HR function integration are to reduce costs and optimise processes and resources. Supplier and vendor optimisation is also a significant target. IT cost reduction is not the main priority, but it is still valid for overall cost reduction. Two prominent IT representatives are CTO and the HR administrator. CTO opinion is valued more. Both stakeholders are against enhancements and reinvention, making this project more complicated and requiring more effort than planned. Both stakeholders support no changes or acquirer system extension to add missing functions. Three leading user roles are HR managers in the acquired company, HR managers in the acquired company and employees equally important. Employees have no significant preference between strategies; they are satisfied with a current experience. Reinvention is not preferred as it can negatively impact everyday experience. All available functionality must be present for HR managers in the acquired company. They are not in favour of replacing their existing system. HR managers in the acquiring company are satisfied with their current system and do not want to change it. Current HR systems are built using different technologies. But HR system in the acquirer company has a modular design and comprehensive set of APIs. Data structures are also similar and can be mapped together. HR IS can be retired on the acquired company side, but this system is integrated with many other IS. This is the first acquisition project, so the project team has no previous experience.

The project team is small and mainly focused on other integration activities, no HR IS. However, the acquirer company has formal project management practices and processes to follow. For HR integration, decision-making is left to lower-level employees; high-level management is focused on other initiatives. The lower priority participation rate is relatively small, and stakeholder availability will be minimal. The approach for process management in the acquired company is somewhat different and is not very well organised. The project is arranged to control scope, budget and timelines.

We use PMI IS integration strategies defined in the previous research – No changes in IS, IS integration, IS expansion, IS extension, IS enhancement, or New IS [26]. In this paper we intentionally exclude integration decisions on the business level impact on IS integration. However, in future research, business-level integration and additional contextual factors should be combined in one PMI IS integration decision support framework.

5.1. Introduction

During the evaluation process for each PMI IS integration, value components are calculated for each comparable PMI IS integration strategy. To make results comparable, absolute values are transformed into relative values. After all value components are defined for all strategies, the final value for each strategy is calculated using the previously proposed formula: $V = (G + S + U)/(C + T + R)$. Component individual evaluations and the final value for each PMI IS integration strategy can be used to compare strategies and choose the one with the better ratio between delivered quality and the sum of costs, time, and risks.

5.2. Contribution to M&A goals

Step 1. Define a list of M&A goals.

Step 2. For each M&A goal, define the importance of this goal in the specific M&A initiative as a number from 1 to 3, where 3 is the highest priority.

Step 3. Then evaluate a contribution for each of the M&A goals for each IS integration strategy as a negative or positive number from minus -2 to 2, where a negative number is a conflict, 0 is no contribution, and a positive number is a contribution. Contribution is calculated using the previously defined goal importance coefficient.

Step 4. An outcome for each IS integration strategy is overall alignment for M&A goals, which is defined based on the accumulated contribution to all M&A goals.

Step 5. Assign contribution level to each integration strategy based on the relative outcomes.

We provide calculation results for illustration in Table 1. However, table usage in the process is not mandatory.

Table 1
PMI IS integration strategy alignment with M&A goals

M&A goal	Importance	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
Cost reduction in support functions	3	0	0	3 * 2	3 * 2	3 * 2	3 * 1
Supply chain synergies	2	0	2 * 1	2 * 2	2 * 1	2 * 2	2 * 1
IT cost reduction	1	0	1	2	1	1	1
Purchasing cost	3	0	3 * 1	3 * 2	3 * 2	3 * 1	3 * 1
Absolute contribution		**0**	**6**	**18**	**15**	**14**	**9**
Relative contribution		**0**	**0.3**	**1.0**	**0.8**	**0.8**	**0.5**

5.3. Internal stakeholder support

Step 1. Define a responsible stakeholder list.

Step 2. For each stakeholder, define the importance coefficient as a number from 1 to 3, where 3 is the highest importance.

Step 3. For each stakeholder for each IS integration approach evaluate contribution and support as numbers from 0 to 5, where 0 means highly negative and 5 is highly positive.

Step 4. Define the management stakeholder list.

Step 5. For each stakeholder, define the importance coefficient as a number from 1 to 3, where 3 is the highest importance.

Step 6. For each stakeholder for each IS integration approach evaluate support as a number from 0 to 5, where 0 means highly negative and 5 is highly positive.

Step 7. An outcome for each IS integration strategy is the sum of internal stakeholder support and contribution and external stakeholder support.

Step 8. Assign internal stakeholder support levels to each integration strategy based on the relative outcomes.

We provide calculation results for illustration in Table 2. However, table usage in the process is not mandatory.

Table 2
Internal stakeholder support for PMI IS integration strategy

Stakeholder	Importance	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
CTO	2	2 * 3	2 * 3	2 * 5	2 * 4	2 * 2	2 * 1
HR Admin	1	3	2	4	4	3	1
Absolute support		**9**	**8**	**14**	**12**	**7**	**3**
Relative support		**0.6**	**0.6**	**1.0**	**0.9**	**0.5**	**0.2**

5.4. User satisfaction

Step 1. Define external and internal user group lists.

Step 2. For each user group, define the importance coefficient as a number from 1 to 3, where 3 is the highest importance.

Step 3. For each user group for each IS integration approach evaluate motivation, readiness and stable user experience as numbers from 0 to 5, where 0 means highly negative and 5 is highly positive.

Step 4. An outcome for each IS integration strategy is the sum of user group support, readiness, and stable user experience.

Step 5. Assign user satisfaction levels to each integration strategy based on the relative outcomes.

We provide calculation results for illustration in Table 3. However, table usage in the process is not mandatory.

Table 3
User satisfaction with PMI IS integration strategy

User group	Importance	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
HR manager – acquirer	1	1 + 4 + 5 = 10	2 + 4 + 4 = 10	5 + 4 + 4 = 13	5 + 4 + 3 = 12	5 + 3 + 2 = 10	1 + 1 + 1 = 3
HR manager - target	1	4 + 4 + 5 = 13	4 + 4 + 4 = 12	4 + 2 + 1 = 7	4 + 2 + 2 = 8	4 + 3 + 3 = 10	2 + 1 + 1 = 4
Employee	2	2 * (4 + 4 + 5) = 26	2 * (4 + 4 + 5) = 26	2 * (4 + 4 + 4) = 24	2 * (4 + 4 + 4) = 24	2 * (4 + 4 + 5) = 26	2 * (2 + 1 + 1) = 8
Absolute satisfaction		**49**	**48**	**44**	**44**	**46**	**15**
Relative satisfaction		**1.0**	**1.0**	**0.9**	**0.9**	**0.9**	**0.3**

5.5. Integration process cost

Step 1. For each IS integration strategy define standard integration implementation and maintenance costs as numbers from 0 to 5 indicating relative costs between different strategies [8]. These numbers can vary for specific PMI IS integration projects.

Step 2. Evaluate integration complexity and define additional required costs as a number representing relative cost from the standard implementation and maintenance cost. The numbers in this example are based on the findings in the existing research. In practice, these numbers will be adjusted per specific of the PMI IS project, as well as previous experience of the merging organisations.

Step 3. Evaluate the lack of integration maturity and define additional required costs as a number representing relative cost from the standard implementation and maintenance cost. Similarly to integration complexity evaluation, numbers in this example can be adjusted for the specific PMI IS integration.

Step 4. An outcome for each IS integration strategy is the sum of standard implementation cost, standard maintenance cost and all additional cost values.

Step 5. Assign cost level to each integration strategy based on the relative outcomes.

We provide calculation results for illustration in Table 4. However, table usage in the process is not mandatory.

Table 4
Integration cost required for PMI IS integration strategy

Cost	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
Standard implementation cost	0	1	2	3	4	5
Standard maintenance cost	5	4	1	2	3	1
Outsourcing part	0	+0.5	+0.5	+0.5	+0.5	0
Existing IS complexity	0	+1	+1	+1	+1	+1
Existing IS fit	0	+0.1	+0.1	+0.1	+0.1	0
Existing IS retireability	0	0	0	0	0	0
Existing IS evolvability	0	0	+0.1	+0.1	+0.1	0
Process efficiency	0	+0.1	+0.1	+0.1	+0.1	+1
IS integration experience	0	+0.1	+0.1	+0.2	+0.1	+0.2
Sufficient resources	0	0	0	0	0	+0.3
Resource competence	0	0	0	0	0	0
Absolute cost	**5**	**5.8**	**4.9**	**7**	**8.9**	**8.5**

Relative cost	**0.6**	**0.7**	**0.6**	**0.8**	**1.0**	**1.0**

5.6. Integration process time

Step 1. For each IS integration strategy define standard integration implementation and maintenance time as numbers from 0 to 5, indicating relative time between different strategies [8]. These numbers can vary for specific PMI IS integration projects.

Step 2. Evaluate integration complexity and define additional required time as a number representing relative time from the standard implementation and maintenance time. Integration complexity is evaluated similarly to integration cost evaluation (see the previous section).

Step 3. Evaluate the lack of integration maturity and define additional required time as a number representing relative time from the standard implementation and maintenance time. Integration maturity is evaluated similarly to integration cost evaluation (see the previous section).

Step 4. An outcome for each IS integration strategy is the sum of standard implementation time, standard maintenance time and all additional time values.

Step 5. Assign time level to each integration strategy based on the relative outcomes.

We provide calculation results for illustration in Table 5. However, table usage in the process is not mandatory.

Table 5
Integration time required for PMI IS integration strategy

Time	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
Standard implementation time	0	3	2	3	4	3
Standard maintenance time	5	4	1	2	3	3
Outsourcing part	0	+1	+1	+1	+1	0
Existing IS complexity	0	+1	+1	+1	+1	+1
Existing IS fit	0	+0.1	+0.1	+0.1	+0.1	0
Existing IS retireability	0	0	0	0	0	0
Existing IS evolvability	0	0	+0.1	+0.1	+0.1	0
Process efficiency	0	+0.1	+0.1	+0.1	+0.1	+1
IS integration experience	0	+0.2	+0.2	+0.3	+0.2	+0.3
Sufficient resources	0	0	0	0	0	+0.3
Resource competence	0	0	0	0	0	0
Absolute time	**5**	**9.4**	**5.5**	**7.6**	**9.5**	**8.6**
Relative time	**0.5**	**1.0**	**0.6**	**0.8**	**1.0**	**0.9**

5.7. Integration risks

Step 1. Define the risk list for the specific project. In this example, we take three generic risks found in the research. The risk list can be adjusted for specific PMI IS integration initiatives.

Step 2. Each PMI IS integration strategy for each risk defines likelihood and impact as numbers from 1 to 5, where 5 corresponds to the highest likelihood or impact.

Step 3. Each PMI IS integration strategy for each risk defines risk as a sum of likelihood and impact.

Step 4. An outcome for each IS integration strategy is the sum of risk values.

Step 5. Assign risk level to each integration strategy based on the relative outcomes.

We provide calculation results for illustration in Table 6. However, table usage in the process is not mandatory.

Table 6
Integration risks for PMI IS integration strategy

User group	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
Overspending	2 + 3 = 5	3 + 3 = 6	5 + 3 = 8	5 + 3 = 8	5 + 3 = 8	5 + 4 = 9
Delay	1 + 3 = 4	3 + 3 = 6	5 + 3 = 8	5 + 3 = 8	5 + 3 = 8	5 + 4 = 9
Insufficient outcome	5 + 3 = 8	5 + 3 = 8	5 + 3 = 8	5 + 3 = 8	5 + 3 = 8	5 + 4 = 9
Absolute satisfaction	**17**	**20**	**24**	**24**	**24**	**27**
Relative satisfaction	**0.6**	**0.7**	**0.9**	**0.9**	**0.9**	**1.0**

5.8. Final evaluation and recommended PMI IS integration strategy

Step 1. Define the weight coefficient for each value and cost component.

Step 2. Calculate final value using formula $V = (G + S + U)/(C + T + R)$ and applying weight coefficient defined in the previous step.

Step 4. Compare IS integration strategies evaluation for specific cost and value components, as well as total calculated value and make a decision.

We provide calculation results for illustration in Table 7. However, table usage in the process is not mandatory.

Table 7
PMI IS integration strategy evaluation comparison

Evaluation Criteria	Weight Coefficient	No changes in IS	IS integration	IS expansion	IS extension	IS enhancement	New IS
Contribution into M&A goals	2	0	2 * 0.3	2 * 1.0	2 * 0.8	2 * 0.8	2 * 0.5
Internal stakeholder support	1	0.6	0.6	1.0	0.9	0.5	0.2
User satisfaction	1	1.0	1.0	0.9	0.9	0.9	0.3
Quality		**1.6**	**2.2**	**3.9**	**3.4**	**3.0**	**1.5**
Integration process cost	1	0.6	0.7	0.6	0.8	1.0	1.0
Integration process time	1	0.5	1.0	0.6	0.8	1.0	0.9
Integration risks	1	0.6	0.7	0.9	0.9	0.9	1.0
Cost, time and risks		**1.7**	**2.4**	**2.1**	**2.5**	**2.9**	**2.9**
Final Value		**0.94**	**0.91**	**1.85**	**1.36**	**1.03**	**0.51**

With a focus on cost synergies, IS expansion takes the lead in value. Stakeholders and users also support this strategy. IS expansion provides relatively small cost and time effort. Which is not significantly impacted by current IS architecture and process maturity. Even with a relatively high-risk level, IS expansion is still recommended IS strategy in this case.

6. Conclusions

PMI IS integration strategy selection is a complex decision considering several factors. Each IS integration strategy can lead to different outcomes due to PMI specifics. The main questions for this research are what factors in the PMI context could impact the efficiency of different PMI IS integration strategies and if it is possible to compare different strategies and identify the one which fits the PMI context the most. As a result, the authors propose the PMI IS integration strategy pre-evaluation approach based on the value provided by different possible IS integration strategies. Value is calculated as a ratio between an achievable quality and related costs, time and risk. Quality is a perceived

contribution to M&A goals, stakeholder support, and user satisfaction. The approach is described as process steps required to calculate a value for strategies in review and make a comparative analysis. The process is also verified with a case study. Verification confirms that process allows comparing strategies using multi-facet criteria, representing value and required effort. Still, formulas used for calculations should be verified in the more significant count of practical examples. Open questions for the following research are how this evaluation can be combined with business decision impact on the IS integration decisions to create one standard process that can be applied in PMI to choose between possible IS integration strategies.

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