

Post-merger IT Integration in Banking: Literature Review

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Received: June 30, 2023

Accepted: August 17, 2023

Online Published: September 29, 2023

doi:10.5539/ijbm.v18n6p77

URL: <https://doi.org/10.5539/ijbm.v18n6p77>

Abstract

IT is a critical feature of post-merger integration in modern banking but academic coverage is sparse and industry organizations keep most of the practically useful knowledge in-house. This review analyses key operational aspects of the IT integration process, identifies its core guiding principles, produces an extended process timeline, and highlights the special importance of IT risk management. It presents a holistic view of the academic theory and practice-based insights around the main stages of the IT integration process, identifies knowledge gaps, and highlights potential directions for future research.

Keywords: M&A, mergers and acquisitions, banking, post-merger integration, IT integration

1. Introduction

This research looks at information technology (IT) integration in mergers and acquisitions (M&A) (also referred to as post-merger IT integration or M&A IT integration) in banking. IT plays a positively pivotal role in today's business world by enabling business capabilities and facilitating the achievement of strategic goals but it also has the propensity to bring the entire business down when mismanaged. This situation is particularly pronounced in the banking industry since post-merger IT integration will underpin the quality of the new business entity's operation by enabling the realisation of projected synergies. Despite its importance, however, post-merger IT integration is often planned and executed poorly with its achievability not typically being fully factored into decisions made regarding banking M&As at the board level.

The authors' approach to this subject has been to proceed through a comprehensive review of the available sources. This overview will review common themes and principles behind the planning and practical implementation of post-merger IT integrations in banking within the broader context of post-merger integration of information systems (IS). It will provide a structured reference for senior-level decision-makers. The study also identifies areas in this domain that are less developed presently and require further study.

1.1 Problem Statement

M&A in banking ranks eighth in the 91 industry positions list produced by the Institute for Mergers, Acquisitions and Alliances (IMAA, 2021). Banking accounts for approximately 3.05% of all the M&As from 1985 to date with close to 28,000 transactions and over \$5 trillion in volume. At the same time, according to various sources (European Central Bank, 2000; Accenture, 2002; Mehta & Hirschheim, 2004; Lohrke, Frownfelter-Lohrke & Ketchen, 2016; Koi-Akrofi, 2016), somewhere between 60% and 80% of M&As of all types fail to deliver on their promise, and only 10% to 30% of these projects are considered a success.

Poor post-merger integration is identified as one of the chief reasons for the "all types" M&A failure by many academic and industry publications (Haspeslagh, 1991; Pablo, 1994; Stylianou, Jeffries & Robbins, 1996; Gadiesh & Ormiston, 2002; Lynch and Lind, 2002; Accenture, 2002; Epstein, 2004; McGrath, 2008; Henningson & Carlsson, 2011; Chang, Chang & Wang, 2014; Venema, 2015; McGee, 2015; Koi-Akrofi, 2016). For banking, the sources specifically stress post-merger integration aspects such as strategic planning (Maire & Collerette, 2011; Badcock, 2016), human resources (Tetenbaum, 1999; Darnell, 1999; Zollo & Singh, 2004), organisational culture (Weber & Pliskin, 1996; Davis, P., 2004; Farina, Carretta & Schwizer, 2007), process

(Pollard & Malcolm, 2005; Ruess & Voelpel, 2012) and IT (Johnston & Yetton, 1996; Ramsaran, 2004; Fest, 2005; Beck, 2011; Hossein Zadeh, 2018).

While not unique to banking, the importance of the post-merger IT integration aspect really sets the industry apart due to the severity and long-lasting nature of the impact on both the organisations partaking and their clients. Failure to integrate technology platforms for an acquirer bank may lead to crippled operations (e.g. online access to clients' funds becomes limited), affect millions of client accounts and cause considerable damage to the brand and financial standing of the organisation. Cases like Santander's takeover of Alliance and Leicester (Done, 2010), the integration of the RBS Group's IT infrastructure (Boyce, 2011; King, 2012) and Sabadell's integration of TSB's IT infrastructure (Morrison, 2018), where the problems with IT integration affected nearly two million mobile users in a matter of days and cost the organisation millions in damages and fines, all illustrate this point.

1.2 Working Hypotheses

Stylianou, Jeffries and Robbins (1996), Accenture (2002), Deloitte (2008) and Roehl-anderson (2013) point out that properly integrated IT should enable organisations to achieve the following direct benefits:

- continued delivery of operational services and capabilities,
- cost savings (e.g. shared overhead, economies of scale, cross-fertilisation,
- operational integration, and synthesis of capabilities, etc.) and improved revenues (innovation) through realised synergies,
- integration of business along the value chain, and reduced risk.

KPMG (2012) further emphasises that the rapidly evolving technology landscape and the changing regulatory environment push banks to seek cost-efficiency, compliance, and innovation. Benefits such as increased market share, expansion of technical and management capabilities, improved market position, diversification, and greater flexibility to cope with law and judicial regulations are achieved through the renewal/transformation of the merged entity's IT platform (Hossein Zadeh, 2018). Asshoff (2014) also highlights the value of new/transformed IT as an integral part of the merged business TOM. Cumulatively, then, an efficient post-merger IT integration should lead to a "contribution to the development of the merged business TOM and achievement of a wide range of strategic benefits". Hughes, Mirza and Ghosh (2013) indicate that the post-merger IT integration can serve as "an umbrella project for a broader IT transformation" leading to the improvement of overall technical and management capability and enhancing the company's competitive advantage.

The authors expand on this situation and propose the following six points – covering both risks and benefits – as regards why efficient post-merger IT integration is vital in banking:

- 1) **Added value.** IT has played a key role in the transformation of the industry in the past several decades and continues to be the key enabling and facilitating force behind its operations. Payne and Frow (2018) and Bohling et al. (2006) suggest that this added value is achieved on the basis that: "information, technology, and applications... are used to foster the integration of processes, people, operations, and capabilities". Because IT underpins core existing business capabilities in banks these organisations may see M&A as a method for sourcing new IT capabilities so that IT can be both the reason for the M&A and a vehicle for the fundamental organisational change that the M&A can enable (Finextra, 2008; Hossein Zadeh, 2018).
- 2) **Synergy.** The realisation of a significant part of all projected M&A synergies in a banking M&A is directly attributable to efficient IT integration. McKinsey & Co (2005) and Kendler (2005) note that "IT capabilities can enhance the value that banks derive from the process of merger integration". At the same time, Tafti (2013) argues that in IT-intensive businesses such as banks "the integration of IS can bring high economies of scale in many departments, functions, and processes and also reduce redundant and underproductive capacity". According to McKinsey's research as cited in (Davis, 2000) such synergies constitute between 30% and 50% of banking M&A value. Weber and Pliskin (1996) suggest that for IT-intensive firms (such as financial services (FS) institutions) "the integration of IS can bring high economies of scale in many departments, functions, and processes and also reduce redundant and underproductive capacity". For instance, Lloyds Banking Group claimed £2bn per year saving with "IT a major contributor" after it integrated the TSB systems in 2012 (Flinders, 2010). Tanriverdi and Uysal (2011) also indicate that acquirers with efficient IT integration capability generally receive "positive and significant cumulative abnormal returns to their M&A announcements" short-term and "significantly higher abnormal operating performance" long-term. On the other hand, however, Ernst & Young (2011) surveyed 220 senior corporate and private equity executives across

Europe to find that in more than a quarter of the cases IT issues are the reason why the projected synergies are not achieved.

- 3) **Complexity.** Integration of systems is the preferred method for producing an IT platform for the merged business entity; not creating a new system. The required timeframes for IT integration are often too narrow, especially in the case of forced deals, to make the creation of a brand-new comprehensive IT platform worthwhile (Beck, 2011). IT integration is also generally the largest cost item in a banking M&A (Roehl-anderson, 2013) and “there is an exponential increase in resource requirements associated with moving across the spectrum from the most economic integrated platform to the development of a new state-of-the-art system” (S. Davis, 2000). Challenges in efficient banking M&A IT integration are multi-faceted, and executive decisions are not straightforward. Modern banks’ IT infrastructures often consist of hundreds of systems with scores of different data formats, exchange interfaces, protocols and standards. Some of these systems are decades old, and the documentation is often incomplete or missing, while qualified specialists are in short supply. The problem may also be exacerbated further by the need to scale up some of those systems to meet the increased capacity demand from the consolidated business entity (Tanriverdi & Uysal, 2015). There can also be a difficulty in aligning business and IT strategic objectives, reconciling differences in IT policies and procedures, and handling shifting priorities during the integration process. Banking M&A IT integration projects often occur in highly stressful circumstances where narrow timeframes for making the decision to go through the deal result in heavy reliance on the professional judgment of a handful of key individuals (Beck, 2011). As a result, IT integration often tends to attract the most integration effort compared to other aspects of the M&A integration project (The Mergermarket Group, 2007; Ernst & Young, 2011).
- 4) **Regulation.** Additional complexity comes from the fact that regulators require the new business entity to have “all of its regulatory reporting and risk management put in place from Day 1”. The considerable integration and testing required to accomplish M&A objectives can be complicated even further by legal constraints. For instance, unless there has been a change of control in the acquired bank such things as a discussion of future strategies of the merged entity and the exchange of real client data cannot be accomplished. Legal repercussions must therefore be clearly understood and communicated early in the M&A (McGrath, 2008).
- 5) **Risk.** Getting it wrong may mean significant complications for a heavy IT-reliant business like a bank whilst getting it right promises major gains. The last decade has seen a number of high-profile banks’ IT failures that were directly attributable to problems with post-merger IT integration (Treanor & Wood, 2010; Boyce, 2012; Morrison, 2018). One prominent example is the merger of Bank One with First Chicago NFD in 2000 where failure to integrate IT systems for over two years led to a 6% decline in customer satisfaction scores and a net loss of 200,000 customers in 2001 (Lohrke et al., 2016). Regarding this risk Gartner (Beck, 2011) indicates that “across the industry, the success or failure of banking M&A activity can very easily depend on IT integration... a lot of banks will be stumped by the complexity of mergers”.
- 6) **Cost.** M&A IT integration in banking is expensive. Tanriverdi and Uysal (2015) give an account of many sources discussing the high complexity and cost of IT M&A integration which is relevant to an IT-heavy industry such as banking. Kovala and Skok (2012) and Roehl-anderson (2013) also indicate that despite the expense of post-merger IT integration often being considered immaterial in the overall scale of the deal the costs are still substantial. Learning to do the task properly would therefore potentially save organisations engaged in M&A funds which could be deployed more productively elsewhere.

2. Literature Review

Post-merger IT integration in banking exists in the broader context of post-merger IS integration and post-merger integration in general. This study explores these concepts together to ensure a comprehensive coverage. The pervasiveness of IT in the business model and operations of modern banks means that it would in any case be difficult to consider post-merger IT integration in isolation from other IT-related organisational aspects (e.g. governance, service delivery), and so the applicable frameworks and standards in that space should also be considered. Finally, it is important to include both academic and practitioner-oriented sources since they provide two distinctively different perspectives on the subject. We can thereby make sense of how academic theory correlates with the practices prevalent in the sector and advise on how they can be adjusted to take better advantage of the emerging theory.

Given the above considerations the authors constructed four search queries using various combinations of relevant keywords (e.g. bank, banking, merger, demerger, restructuring, reorganisation, process, capability, model, IT, IS, integration, specifics, practice, model, framework, etc.) and Boolean operators (AND, OR) to

cover the broadest possible set of options. Every query was run as a full-text search both on documents in a substantial number of popular scientific research databases and those indexed by the Internet's most popular search engine, Google. The validity of the results was ensured by iteratively refining the search keywords and incorporating new relevant sources as the analysis progressed. The reliability and comprehensiveness of the findings was ensured by the breadth and depth of those searches. The search specifically covered authoritative scientific research collections such as ABI/INFORM Complete, ProQuest Science Journals, EBSCOhost Business Source Premier, KB+ JISC Collections Springer Compact and IEEE Conference Publications and employed Google and Google Scholar. The authors first screened (title and abstract) at least the top 200 results for each query and then conducted a full-text analysis of the sources selected. Importantly, academic and practitioner-oriented industry sources were considered regardless of their year of publication whilst popular press publications, used mainly for anecdotal evidence, were restricted to the more recent. Table 1 summarises the parameters of the search.

Table 1. Literature search parameters

Scientific research databases:	ABI/INFORM Complete ProQuest Science Journals EBSCOhost Business Source Premier KB+ JISC Collections Springer Compact IEEE Conference Publications
Search keywords/queries:	Query 1: ("bank M&A" OR "banking M&A" OR "bank merger" OR "bank demerger" OR "banking demerger") AND (trend OR growth OR Brexit) Query 2: ("bank M&A" AND (demerger OR restructuring OR reorganisation OR reorganisation OR ring-fencing OR "living will" OR "resolution plan" OR "enforced takeover" OR "accelerated takeover") Query 3: (bank OR banking) AND (setup OR organisation OR process OR capability OR function OR model) AND (typical OR standard) Query 4: (bank OR banking) AND (M&A OR merger) AND ("IT integration" OR "IS integration") AND (practice OR framework OR model OR standard OR structure OR factor OR specifics)
Types of sources covered:	Peer-reviewed academic journal articles Conference proceedings Books Consultancy reports/industry publications Newspaper articles and other popular press items
Timeframe:	2014 – 2021 for popular press articles; no restriction for other types of sources.

Upon reaching the point of saturation, the combined search yielded over 300 potentially relevant publications of which 230 sources contributed to this work. The authors assessed the balance of sources covering M&A general theory and practice, post-merger integration, and post-merger IT/IS integration across banking and other industries and then broke it down by academic and practitioner-oriented groups (see Table 2).

The subsequent critical analysis of the sources selected was structured around the following emerging themes:

- Role and significance of the post-merger IT integration in banking.
- Integration/separation strategies, methods, and dimensions.
- Issues pertaining and the special importance of due diligence and risk.
- Key operational aspects (e.g. guiding principles, process timeline, etc.).
- Existing approaches, models, and frameworks (theoretical and empirical).
- Gaps in knowledge.

Applying the above method resulted in a comprehensive overview of the planning and execution process for post-merger IT integration (and disintegration) scenarios in the banking industry and pointed out areas where additional research may be needed.

2.1 Balance of the Topic Coverage in the Extant Literature

Whilst the banking industry enjoys broad M&A general theory and practice coverage, the more specific topics of post-merger integration and post-merger IT/IS integration are far less well represented than in other sectors. Comparison of the practitioner-oriented sources presents a similar picture. Although total numbers here are somewhat skewed in favour of the banking industry, perhaps because historically it has been among the most significant buyer of strategy, M&A advisory and IT consultancy services worldwide (Consultancy.uk, 2018; Source Global Research, 2017), the sources covering post-merger integration and post-merger IT/IS integration are also under a third of the total numbers in those categories.

Table 2. Breakdown of sources

Industry/Source group	Academic	Practitioner-oriented	Popular press	Group total
Banking	26	44	31	101
M&A general theory and practice	12	36	20	68
Post-merger integration	4	3		7
Post-merger IT/IS integration	10	5	11	26
Other Industries	60	36	11	107
M&A general theory and practice	1	5	4	10
Post-merger integration	15	10	2	27
Post-merger IT/IS integration	44	21	5	70
Grand Total	86	80	42	208

Overall, we find that there seems to be no shortage in academic or practitioner-oriented sources discussing general theory and practice of M&A in banking but the more specific studies seem to be comparatively lacking. This may be due to the viewpoint that banking is itself fully covered by common business practices and methods and therefore does not warrant a dedicated stream of inquiry. The authors, however, posit that the pivotal role of IT in enabling and facilitating the contemporary banking business model should call for the development of a more considered understanding of how common practices apply to the industry and whether there are points of specificity that would require special attention and a different approach.

3. Approaches, Models, and Frameworks

3.1 Academic Theory-Based

Academic theory-based publications on this subject are quite limited with very few connecting banking/FS M&A with IT (IS) integration directly in the same discussion. The broader base of post-merger IS integration does, however, provide the researcher with some relevant sources.

Three sub-themes were identified in this literature – (i) holistic view, (ii) business-IT alignment, and (iii) focus on specific aspects such as systems, process, knowledge, and risk.

(i) Holistic view

Johnston and Yetton (1996) analyse post-merger IT integration in banking in terms of organisational fit where differences between the organisations merging in respect to aspects such as IT strategy, technology platforms, project management structures and styles, and IT staffing practices determine the suitability of a certain scenario (e.g. absorption vs “best of breed”) and the dynamics of the IT integration process. Kovala and Skok (2015), suggests that considering the pervasiveness of the IT function in banking business operations it would make sense to consider the post-merger IT integration project in the context of IT governance. Kovala and Skok propose structuring the IT integration process based on the elements of Control Objectives for Information and Related Technologies (COBIT), a popular IT governance framework by ISACA (2018), and combine it with the reflections of selected leading industry practitioners based on their involvement in a diverse selection of high-profile banking M&A projects. Finally, the work by Henningsson and Carlsson (2011) introduces the

Dynamic System of IS Integration in M&A (DySIIM) framework based on six dimensions – synergistic potential, organisational integration, intentions and reaction, IS ecology, integration architecture and IS integration role. DySIIM is put forward to assess certain aspects of the process such as resource implications, outputs, and the achievement of the planned objectives.

(ii) Business IT alignment

Wijnhoven et al. (2006) suggest that the business goals and objectives of the merger determine the choices that need to be taken in respect to the IT integration strategy and IT processes and infrastructure. These business goals enable and constrain “certain merger objectives, and organisational designs”. They further establish a correspondence between specific M&A objectives (absorption, symbiosis and preservation), IT integration objectives (complete, partial and co-existence) and IT integration models (renewal, takeover, standardisation and synchronisation). Two other perspectives – symbolism and organisational power – can be found in Mehta and Hirschheim (2004), a study based on a small number of M&A in banking/FS. These researchers reflect on how the urgency of signalling integration success to the markets leads to potentially harmful prioritisation of operating efficiency over other aspects of the integration and how the balance of authority between the acquirer and acquired organisation influences choices about the IT integration strategy and methods. They offer a framework for business-IT alignment with various configurations of IT structure and sourcing in accordance with the chosen M&A strategy (vertical/horizontal integration or concentric/conglomerate diversification).

This last position is developed further through another framework (Mehta & Hirschheim, 2007) which incorporates a broader industry context (e.g. market trends and expectations, regulatory specifics, etc.) and organisational context for the companies merging (e.g. business structure, culture, financial state, and prior experience in M&A integration). These researchers theorise upon how these factors determine the way the IT integration strategy goals and priorities are defined and how the IT integration decisions (IS sourcing, IS structure, IS infrastructure, applications and processes) are made. Despite this study being based upon cases from the oil and gas industry its framework provides a good holistic view of the factors influencing the organisation-level decision making about IT integration in M&A transactions in general.

(iii) Focus on systems, process, knowledge, and risk

The extant literature indicates that the systems-based perspective is one of the earliest considered by the academic community as appropriate for post-merger IT integration. As early as 1997, Giacomazzi et al. (1997) identified IT integration strategies based on two dimensions, namely computer architecture and software (applications and data). Here the choice between scenarios of total, partial or no integration would be dictated by various degrees of standardisation of applications and databases and centralisation/distribution of computers. It should be noted that such a division would require adjustment given the broad adoption of Cloud services in the industry today.

Alaranta and Henningson (2008) study post-merger IT integration by focusing on the planning process through the prism of its six dimensions, i.e. flow, focus, comprehensiveness, formalisation, participation, and consistency. The researchers suggest that there is no one single “right” way to plan the integration, but rather a set of choices that establish a balance on several levels, e.g. cost control vs seeking and leveraging opportunities, exhaustive vs expedited analysis of options, flexibility vs documentation and transparency, narrow vs broad engagement of personnel, targeted vs canvassed consideration of potential issues, etc. Burke and Kovela (2017) develop this view further by structuring their analysis around another dimension, viz. speed of delivery. Using the case of a financial services firm, this study identified critical success factors such as organisational alignment for delivery at pace, motivating teams, and regulatory, technology and data considerations as instrumental for achieving success in a broad range of post-merger IT integration scenarios.

Working from the knowledge-based perspective of acquisitions, Henningson (2017) defines two aspects of organisational knowledge relevant to M&A IT (IS) integration – integration routines and expertise. The idea here is that the efficiency of post-merger IT integration is gradually developed by organisations through routine refinement (repetition), superstitious learning (trial and error), and expertise building (reflection and evaluation) with every new experience.

Last but not least, looking at the post-merger IT integration through the prism of risk management Alaranta and Mathiassen (2014) suggest that a structured approach to risks pertinent to the context, content and process as an integral part of the IT integration would help managers to proactively reduce the impact of adverse events and increase the likelihood of successful merger outcomes. Dynamically adjusting goals and modifying strategy as well as mobilising stakeholders and reorganising process to respond to evolving situation flexibly enables efficient allocation of resources and increases knowledge for future integration projects.

3.2 Practice-Based

3.2.1 Consultancies/Practitioners' Views

Sources of this type include open publications by consultancies, independent practitioners, and industry standards and frameworks. The authors note that although most of these sources claim the existence of various planning artefacts based upon the information presented, such artefacts are seldom (if at all) discussed at any level of detail. This may be due to intellectual property protection considerations but may also testify to the difficulties associated with the need to tailor such documents to each individual case.

Deloitte (2008) offers a generalist M&A IT integration guidance covering both integration and separation scenarios. For the integration specifically, a framework is presented that includes dimensions such as M&A business direction, IT funding and governance, IT architecture, IT organisation, and M&A IT execution. EMC (2012) provides a more detailed framework consisting of phases (due diligence, detailed integration planning, and execution), dimensions (infrastructure/security, process/application, and PMO), and elements (infrastructure/security, process/application, PMO). An even more comprehensive framework found in Roehl-anderson (2013) covers a broad set of elements (end-state vision, degree and speed of integration, value drivers and synergy targets, key milestones, guiding principles and risks) and defines the overall integration scope, approach, and plan for achieving both Day 1 and the end-state target operating model (TOM). This framework can be used to develop the TOM at an individual function level and translated into practical project plans, schedules, and budgets. Importantly, the framework maps certain high-level IT integration scenarios (consolidation, cost-saving, revenue capture, portfolio) to standard M&A strategies absorption, symbiosis, and portfolio that are covered in the academic literature.

For banking specifically, McGrath (2008) offers perhaps the most detailed process-focussed guidance for the post-merger IT integration. This work lists business lines affected (e.g. credit/loans, derivatives, equities, fixed income, audit, compliance, risk, etc.), discusses various aspects (e.g. dress rehearsals, operational readiness, change of control and cutover), and suggests possible milestones for the integration project. Another source focussing on the post-merger IT integration process in banks, Gaikwad and Bhaduri (2014), suggests stages as follows:

- designing the IT infrastructure to support the new TOM,
- mapping data and products to the new platform,
- training users operating the new IT environment,
- identifying the time window when the migration takes place to ensure business continuity,
- testing the migrated data before go-live and arriving at a go/no-go decision,
- ensuring that all delivery channels are functional post-migration, and
- updating business continuity and disaster recovery plans for the merged entity.

3.3 Industry Standards and Frameworks

The academic sources view the post-merger IT integration chiefly in the context of business-IT alignment, IT governance, and specific aspects such as systems, process, knowledge, and risk. Reflecting on this situation and based on an earlier work by one of the authors (Kovela & Skok, 2015), several applicable popular industry frameworks were identified (see Table 3).

Table 3. Applicable frameworks and standards

Context	Framework/standard	Publisher (author) / year
Business IT alignment	The Open Group Architecture Framework (TOGAF)	The Open Group (2018)
	Calder-Moir IT governance framework	Calder (2007)
IT governance	BS ISO/IEC 38500	The British Standards Institution (2015)
	Control Objectives for Information and Related Technologies (COBIT)	Information Systems Audit and Control Association (ISACA) (2018)
Systems, process, knowledge	Information Technology Infrastructure Library (ITIL)	IT Service Management Forum (itSME) (2007)
Risk	Information Technology Assessment Due Diligence (ITADD)	(ITADD, Sundberg et al. (2006));
	Framework for Information System Due Diligence (FISDD)	(Delak & Bajec, 2014)

4. Post-merger IT Integration and Separation Strategies, Methods and Dimensions

4.1 Strategies and Methods for Mergers

When considering IT integration objectives, numerous academic and industry sources (e.g. Johnston and Yetton (1996), Giacomazzi et al. (1997), Wijnhoven et al. (2006), Böhm et al. (2011), EMC (2012), Roehl-anderson (2013) & Lohrke et al. (2016), etc.) broadly converge on the following three options:

- 1) Complete integration – the IT assets of both the acquirer and acquired are fully consolidated.
- 2) Partial integration – the IT assets considered most important on both sides are integrated, with the rest left to a later stage.
- 3) Co-existence – the IT assets on both sides remain unchanged, with only basic network and data connectivity established between them.

The context for M&A strategy in general is defined by Wijnhoven et al. (2006a) as absorption, symbiosis, or preservation as generic post-merger strategic objectives. For IT integration specifically, these objectives translate as:

- 1) Absorption – conversion of all the acquired IT systems and related processes to those of the acquirer.
- 2) Symbiosis – choosing the best IT systems and processes from either side to form an optimised TOM of the merged entity.
- 3) Preservation – retaining the unique IT capabilities of the acquired business. Apart from minimal process standardisation and basic connectivity between the acquirer and acquired, little integration occurs, so that the acquired capabilities co-exist beside the rest of the IT estate of the acquirer as a separate entity.

Zhao (2006) identifies a further distinct M&A strategic possibility – transformation, i.e. the creation of a new technology platform to replace the existing ones for both the acquirer and acquired business. This is particularly difficult in banking where replacing the IT estates of two heavily IT-reliant organisations could be enormously complex, costly and risky, and therefore the decision to undertake a full transformation has strategic implications for the organisation beyond the mere operational scale-up.

As regards the IT integration method Johnston and Yetton (1996), Harrell and Higgins (2002) and Zhao (2006) suggest the following possibilities:

- 1) Take-over (or Consolidation) – the IT estate of one of the sides of the deal (acquirer or acquired) is chosen to be used across the two organisations merging; the other one is switched off.
- 2) Standardisation (or Best of Breed) – selected parts of the IT estates from both sides are combined.
- 3) Synchronisation (or Co-existence or Disconnection) – the IT estates of both sides are kept “as is” with limited synchronisation of redundant systems.
- 4) Renewal – both the IT estates are retired to allow the development/adoption of an entirely new and strategically more advanced IT platform for the merged organisation.

- 5) Several sources (Wijnhoven et al., 2006b; Zhao, 2006; Hossein Zadeh, 2018) offer mapping for the above-mentioned M&A strategies, IT integration objectives and methods. In Table 4 below, the authors present an adapted and extended version of that mapping.

Table 4. The mapping between M&A strategic objectives, IT integration objectives and IT integration methods

M&A strategic objective	Benefits sought	IT integration objective	IT integration method
Absorption	Increased market share Complementary businesses Economies of scale Cost reduction	Complete integration	Take-over Standardisation
Symbiosis	Enhanced market position More efficient or effective systems	Partial integration	Standardisation
Preservation	Acquisition of new capabilities Economies of scope	Co-existence	Synchronisation
Transformation	Enhanced market position/business model innovation	Partial integration (data only)	Renewal

4.2 Strategies and Methods for Demergers

As regards demergers the IT separation, also known as IT carve-out, involves detachment of “the IT assets of the business unit that is being separated from the parent company” (Böhm et al., 2010). The above-mentioned source identifies three types of IT carve-out – stand-alone (also called spin-off and producing a fully independent IT estate), merger carve-out (resulting in an IT unit that is ready to be integrated with the acquirer’s IT estate), and joint venture carve-out (organisations combine their business units to “create a new company in an attempt to create a more efficient and effective IT architecture”). In terms of method, according to Roehl-anderson (2013), we find a range of degrees of control over the original IT asset given by the former owner:

- 1) Extract and go – only data from the production system is released.
- 2) Copy, configure, and load – a configuration-only copy of the production system is created, then relevant master and transactional data are loaded onto the new instance.
- 3) Clone, vitiate and go – a copy of the production system is created, but sensitive data (legal and competitive) is cleaned out from it before it is released.
- 4) Clone and go – a full copy of the production system is created and released.
- 5) Give and go – the production system itself is released.

The authors would add to this list a method called “run as outsource” to account for the emerging range of scenarios caused by the growth of outsourcing and the emergence of Cloud architecture. For instance, the merged entity could choose not to own and manage the software or technology infrastructure supporting its operations (Morrison, 2018). One could imagine in this case a scenario where the demerged entity retains a significant portion of its operations on the infrastructure of the parent entity or the operations and IT infrastructure of the demerged business are moved to a separate service provider entity.

Hossein Zadeh (2018) points out that there is a dependency between the IT carve-out objective of the seller and the IT integration objective of the acquirer since outputs of certain types of IT carve-out organically lend themselves to particular modes of integration (e.g. a stand-alone carve-out is better suited for co-existence with the acquirer’s IT estate). It also means a transitive dependency between IT carve-out objectives of the seller, M&A strategic objectives of the acquirer and the IT carve-out method. The authors extend the mapping between M&A strategic objectives and IT integration objectives of the acquirer (Hossein Zadeh, 2018) to include IT carve-out objectives and methods of the seller identified above in Table 5.

Table 5. The mapping between M&A strategic objectives and IT integration strategy of the acquirer and IT carve-out strategy and method of the buyer

M&A strategic objective of the acquirer/new entity	IT integration objective of the acquirer/new entity	IT carve-out objective of the seller	IT carve-out method of the seller
Absorption / Symbiosis	Complete integration / Partial integration	Merger carve-out	Extract and go Copy, configure, and load Clone, vitiate and go Clone and go Give and go Clone and go
Preservation	Co-existence	Stand-alone	Give and go Run as outsource Extract and go
Symbiosis	Partial integration	Merger carve-out	Copy, configure, and load Clone and go Give and go
Transformation	Partial integration (data only)	Joint venture carve-out	Extract and go

4.3 Dimensions of the IT Integration and Separation

The choice of a particular IT integration objective and IT integration/separation method will be determined by the M&A strategic objectives and will therefore depend on several factors including but not limited to strategic intent (benefits sought), legal and regulatory constraints, time pressure, financial exposure, as well as business continuity and risk. Tanriverdi and Uysal (2011) give a breakdown of the dimensions of IT integration/separation which includes the following:

- 1) IT infrastructures – integration and standardisation of technology and interfaces.
- 2) IT applications and data – software, data and processes.
- 3) IT HRM processes – evaluation of current and required staff capabilities, managing capacity, culture and change.
- 4) IT strategy-making processes – planning of TOM, communication, coordination and leadership.
- 5) IT vendor management processes – evaluation and management of relationships with suppliers and consultants.

It would be appropriate to add “business processes served by IT” to supplement this source which takes a very IT-centric view and possibly does not consider the impact of the IT integration decisions on core business processes.

In banking specifically it may be difficult to stick to one particular choice in a complex IT environment since the given IT portfolio could consist of thousands of separate applications and systems. Choices, therefore, are often made on an individual application or stack basis (e.g. IT stack for Fixed Income, Equities, etc.), and the resulting overall integration/separation model ends up being a mix of the above options (Kovela & Skok, 2015). The mix of dimensions involved in an IT integration project will then be determined on a case-by-case basis.

In general, the authors submit that the sources available do not generally appear to be exhaustive, particularly considering changes in technology (omitting things like Cloud, outsourcing, etc.). There appears to be a need for further research to reassess these lists in the light of evolving technology trends.

4.4 Issues in Post-merger IT Integration

In a practitioner-oriented publication, Capgemini (2014) presents a reasonably comprehensive combined list of issues for banking structured around the stages of the integration process, as below:

- 1) Due diligence and planning:
 - CIOs not involved during the initial phase, and IT strategy not planned out,
 - poor assessment of IT landscapes of both the acquirer and target banks,

- poor post-merger IT capacity planning.
- 2) M&A execution:
- poor retention of key IT personnel,
 - implementation of risky and temporary IT solutions,
 - M&A transaction not accounting for potential costs for IT synergy.
- 3) Post-M&A synergy:
- interruption of day-to-day operation,
 - inconsistency in customer experience leading to customer dissatisfaction,
 - extended lead time required to implement the consolidated IT solution.

The above list resonates with many academic sources discussing both the banking industry specifics and post-merger IS integration practice and theory in general. For instance, the importance of doing the due diligence properly and engaging key IT personnel early in the process is discussed by Gaikwad and Bhaduri (2014) and Alaranta and Mathiassen (2014). Lohrke et al. (2016) cite Buck-Lew, Wardle and Pliskin (1992) and talk about the need to consider IT issues as part of the initial motivation for an M&A since failing to do so means that the acquirer will likely miss opportunities to exploit potential advantages and run into difficulties integrating the acquired IT estate.

Beck (2011) places a special emphasis upon the importance of due diligence in critical situations based upon the case of the acquisition of Lehman Brothers Europe, Middle East and Africa investment banking and equities business by Nomura in 2008. This case illustrates how challenging timeframes imposed by the objectives of the acquirer business or by the market (e.g. Nomura's CIO only had two days to assemble the team and only a few hours to do the due diligence that would be key in informing the final decision to go through with the acquisition) can lead to potentially very risky strategic choices in the deal. Wirz and Lusti (2004) indicate that the early involvement of IT teams in the planning of post-merger IT integration is a critical factor affecting the success of the project. The lack thereof results in several serious issues such as unrealistic expectations of the IT integration in terms of cost, timeline and deliverables, lack of clarity on responsibilities, uncertainty and stress.

The importance of a proper assessment of the IT landscapes of both the acquirer and target banks is considered by Wirz and Lusti (2004) and Alaranta and Mathiassen (2014) who point out the challenges consequent to the degree of (in)-compatibility of IT platforms being merged – a significant degree of incompatibility may significantly escalate the time and cost of integration. Connected to this situation is the issue of legacy systems as pointed out by Beck (2011) and Kovala and Skok (2012). As IT asset portfolios in banks often have a significant proportion of systems that have been in place for decades and where documentation and qualified specialists are now scarce, integrating such assets may prove a challenge and a significant increase in time and costs, yet simply turning them off may be too risky. The scale of the problem here is the combination of the problems internal to both entities.

The issue of future capacity planning is discussed by Fest (2005) and Tanriverdi and Uysal (2015). Zhao (2006) argues that proper planning and clear understanding of the TOM are important since integration without planning and understanding in place leads to costly mistakes and rework. Fest (2005) cites Gartner research according to which often due to cost considerations less than 25% of all related mergers in FS pay serious attention to modelling and testing for capacity management or performance of their consolidated IT platforms. Tanriverdi and Uysal (2015) also make a point of the importance of the scalability of IT capabilities both in respect to the acquirer and the acquired from the perspective of capital markets and shareholder value. According to these authors the perceived poor scalability of IT capabilities may lead to a negative reaction from capital markets and hence destroy shareholder value. The authors theorise that this problem can be mitigated by factors such as the similarity of operating models, regulatory context and market dynamics, as is often the case when both the acquirer and acquired business are in the same industry, e.g. a bank acquiring another bank.

In respect to the execution phase, issues such as cultural fit, speed of integration and exposure to security breaches are discussed in the extant literature. Ramsaran (2004), Zuckerman (2011), and Gaikwad and Bhaduri (2014) stress the need for a cultural fit between the merging IT teams since poor management of potential gaps (e.g. focus on innovation and differentiation through technology vs operational effectiveness and efficiency) often results in conflict and loss of key IT personnel who often take critical tacit knowledge on the existing systems with them and increase the time, risk and cost of integration. The associated problem of user resistance is covered in Alaranta and Mathiassen (2014) and Beck (2011). Gaikwad and Bhaduri (2014) also point out the

importance of appropriate pace throughout the IT integration – delays often cause disruption to the business as usual, affect customer journey, cause the loss of key staff and destruction of shareholder value in general. In some cases, however, a slower pace is indeed advisable (Homburg & Bucerius, 2006; Garcia-Canal, Rialp-Criado & Rialp-Criado, 2013). Either way, implementing temporary solutions may cause significant risk and further escalate costs in the longer term. Finally, Lohrke et al. (2016) make an important point about IT integration being the cause of increased security vulnerabilities – citing a number of sources (Noto, 2011; Yadron, 2014; Goldstein, Perlroth & Corkery, 2014; Crosman, 2014) the authors draw on the evidence of security breaches in major organisations attributed to “vulnerabilities created by using disparate IT systems from recent mergers”. The problem here is ultimately that acquired systems which are not properly understood and managed can be exploited.

Shah, Lino and Padmanabhan (2014) point out that there is a fundamental conflict between short and longer-term objectives for companies integrating their IT estates post-merger. The immediate concern of preparing for Day 1 operation and supporting the short-term revenue goals often requires solutions that are temporary in nature but deliver the functionality required immediately, even if at the cost of later rework. These short-term fixes often do not serve the longer-term IT strategy and the acquisition of sustainable cost and revenue synergies. The issue at stake here is how to strike the right balance between the two priorities and ensuring efficiency in the IT integration, both short and long-term.

In relation to potentially unaccounted costs in respect to IT synergy, Gaikwad and Bhaduri (2014) point to the cost of software licenses, infrastructure, and the training required for users as well as the availability and quality of data to be migrated to the merged IT environment. Roehl-anderson (2013) discusses the importance of data-related issues at length and draws attention to such aspects as the data integration planning required to reconcile conflicts in existing data architecture and structures and to develop a future-state enterprise data architecture. Data consolidation (i.e. transformation, migration, and integration across comparable products, services, and systems), co-existence (data for similar business functions across disparate systems), quality (consistency, accuracy, and relevance) and rationalisation (achieving a single version of “the truth” across customers, products, markets, and offerings) also need to be considered. The lack of a clear and consistent view of data across the organisation may cause issues with regulatory compliance.

Finally, the issues listed above are not independent of each other but are intertwined. For example, loss of key staff would likely have an impact on shareholder value, just as key staff are less likely to stay in situations of a falling share price. It means that all these issues need to be managed simultaneously, with careful consideration of possible ripple effects arising from these interdependencies.

5. Post-merger IT Integration – Key Operational Aspects

5.1 Guiding Principles

There appears to be, perhaps unsurprisingly, a striking similarity between the basic principles of post-merger integration at large and the principles guiding its IT integration element. From the academic perspective, Wijnhoven et al. (2006) propose a list including the existence of a pre-approved formal plan, priority integration of mission-critical and strategic IT systems, speedy execution, retention of key IT staff, and management of the integration as a project. The list is extended by Lohrke et al. (2016), who note the importance of involving the CIO early in the integration planning, enhancing competitive advantage through the acquired/merged IT capabilities, and maintaining the IT security during and after the merger.

From the practitioner perspective, Zhao (2006) presents a compilation of views of leading management consultancies such as BCG, Accenture, Deloitte, etc. The researcher notes two principles as critically important – aligning IT strategy with business strategy and selecting applications for the merged platform so as to reduce the IT integration complexity. The other principles deserving mention include early involvement of the IT function thorough due diligence including the IT component, effective communication with internal and external stakeholders, and an appropriate speed of integration.

The significance of the speed of IT integration is highlighted by another source, BCG (2004), which argues that the pace of change must be appropriate and the method of selecting applications streamlined based on a set of criteria (viz. functionality, quality, durability, and flexibility, potential savings and operating costs, the feasibility of the migration project, speed of implementation, etc.). This source postulates that takeover, standardisation, or synchronisation, rather than renewal, should be the preferred IT integration method in order to reduce the complexity of the process. Ernst & Young (2011) and EMC (2012) acknowledge the importance of involving the IT function early, embedding the IT in the due diligence and strategic decision making about the deal, establishing clear communications between stakeholders and retaining key IT staff. Ernst & Young (2011) also

makes a point of managing IT integration as a project with set milestones (Day 1, Day 100, etc.) and deliverables. Another industry source, Capgemini (2014), postulates the same principles but adds creating a flexible architecture as a means of enabling smooth post-merger integration and future transformation of the IT capability for competitive advantage.

Accenture (2002) advocates for the early engagement of the IT function in the integration planning, subordinating the vision of future IT capability to business strategy and doing IT due diligence. It also points out the importance of:

- appointing a dedicated IT integration team and manager to oversee the IT integration,
- using experienced staff to manage the IT integration and external staff to help execute the IT integration activities,
- engaging in IT cultural change and human performance-related programs.

Another source discussing M&A IT integration in banking, Bruno-Britz (2008), places special emphasis upon the cultural dimension of the IT integration which is similar to the emphasis made by Accenture (2002). It is supported by yet another source, Roehl-anderson (2013), which suggests the following points:

- building and executing a meaningful strategic communication plan to alleviate employees' concerns over their future in the new organisation,
- defining the IT organisation and TOM for the merged business,
- identifying and retaining IT staff and skills for the realisation of M&A objectives and synergy targets, and
- establishing and embedding common culture in the merged organisation.

For banking specifically, Gaikwad and Bhaduri (2014) suggest the same principles for the IS systems at large as identified above generally. They do, however, emphasise one additional principle – effective risk management that includes business continuity and disaster recovery plans.

5.2 M&A and IT Integration Process Timeline for Banking

Several sources, mostly practitioner-oriented ones, discuss the M&A IT integration timeline broadly in line with M&A integration objectives identified earlier in this study. EMC (2012), for instance, recognises three stages – IT diligence, detailed integration planning, and execution of the integration – lasting up to three weeks, six months, and eighteen months respectively. Whilst not providing timeframes, Roehl-anderson (2013) suggests similar stages and specific activities for the planning stage which include IT integration/separation planning and governance, IT Day 1 and end-state blueprinting, IT synergy analysis planning and IT Transaction Services Agreement (TSA) strategy and planning. Capgemini (2014) by specific reference to M&A IT integration in banking gives the stages of due diligence/planning and M&A execution and adds post-M&A synergy as a separate final stage.

An earlier academic paper by one of the authors of the current study, Kovela and Skok (2012), proposed a summative layout of the M&A IT integration for banking institutions, updated and represented below in Figure 1.

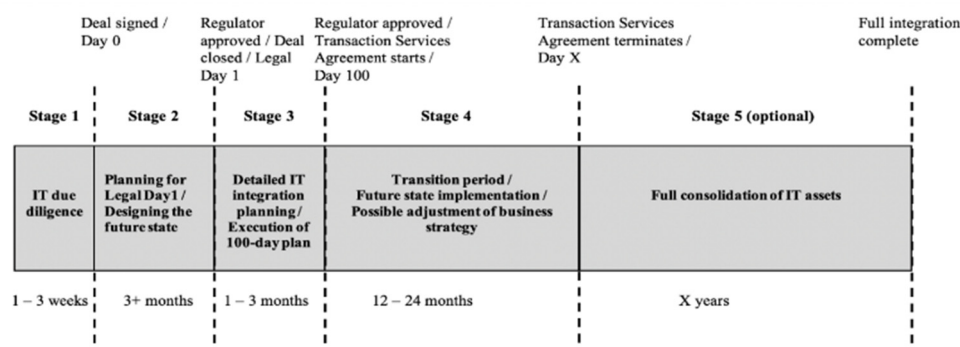


Figure 1. M&A IT integration in banking – the timeline (indicative timescales)

It is important to note that specific timings of the above stages depend on a variety of factors and may vary significantly between deals. For instance, in some extreme cases the final stage may never fully complete at all.

5.3 Special Importance of IT Risk Management

Risk management is the aspect of the post-merger IT integration most deserving of special attention since it permeates the entire project planning and delivery and can have a disproportionately high impact on its success. The role of IT risk management is to ensure that the project stays on track and delivers the planned outcomes, e.g. continued operation, achievement of synergies, transformation, etc. Khazanchi and Arora (2016) quote a number of high-profile bank M&As where risk management issues prevented the progress of the post-merger integration or caused a serious problem along the way and goes on to say that managing risk should be among the top priorities within M&A planning and execution. It makes sense on this basis to understand this aspect in better detail.

The US National Institute of Standards and Technology (NIST) defines three layers of IT-related inter-organisational risk – organisation (governance), mission/business process (information and information flows), and information system (environment of operation) (NIST, 2011). The same work by Khazanchi and Arora referred to above has extended and applied these layers to the post-merger IT integration scenario to form the following categories:

- (1) Business-level risk – which ensures the appropriateness of extant systems and technologies for an organisation's culture and structure, assesses direct/indirect benefits of IT integration, adheres to legal requirements (electronic orders, signatures, trading partner agreements, information privacy laws, etc.), facilitates proper planning and systems for ensuring the monitoring of data and the transmission of security/auditability, gauges the appropriateness of workflow procedures for achieving efficiency gains, and assesses internal control systems for their viability in assuring continuous monitoring of controls over privacy of data and the reliability of systems and security of electronic transmissions.
- (2) Technical-level risk – combines or consolidates information systems across the merging organisations, ensures that appropriate internal applications are selected for integration, ensures that business transaction processes work and include all electronic transaction sets, and implement appropriate systems, policies, and processes to engender confidentiality, integrity, and availability of data, technology, and systems.
- (3) Application user-level risk – clearly communicates and understands potential benefits and the additional costs of IT integration across the organisations, intentionally plans for integration after M&A, assesses organisational readiness for adopting or changing current systems, establishes a degree of reliance on paper-based transactions for internal processes that might need to be automated, and assesses coordination and control procedures for maintaining the reliability of transaction processes.

Alaranta and Mathiassen (2014) also approach the situation on the basis of risk and Deloitte (2008) suggests a framework for value protection in M&A through IT risk management through the following dimensions:

- (a) Business assessment – technology strategy, business process control, governance and compliance.
- (b) Technology assessment – core technology development, licensing and integration.
- (c) Integrated requirements – IT risk management practices.
- (d) Information assessment – sensitive data handling.
- (e) Risk quantification – translation of identified risks into financial impact.

It appears, then, that this topic has been covered in some detail by academics and industry experts and has even made it into the standards space. There still remains, however, a question, in respect to how applicable this standard and these categories are in practice across the industry.

5.4 Gaps in the Knowledge of Post-merger IT Integration in Banking

The academic and practitioner-oriented sources reviewed above demonstrate close alignment between the theory and practice of post-merger IT integration in the banking industry and the broader research base of post-merger IT/IS integration at large. This situation shows that a significant amount of that theoretical knowledge and practices can be applied to the banking industry without much adjustment. However, certain peculiarities of the industry, chiefly its critical reliance on IT, technical and organisational complexity of planning and implementation of integration projects, exacerbated by the fast-changing technology and regulatory landscape still present, in the authors' view, a matter unaddressed by the extant literature to date.

Better coverage is required in respect to effective risk management and compliance, the special structure and pace of the IT integration process, the impact of strategic IT integration decisions on core business processes, the impact of large-scale outsourcing and use of contemporary technologies, and the reconciling of the immediate

business priorities of the IT integration with its long-term benefits. The authors conclude that whilst the academic sources reviewed do provide some useful theoretical basis for this knowledge domain, much of the practitioner-oriented sources lack the implementation-level detail and therefore fall short of helping to generate a better overall understanding of how post-merger IT integrations must be managed in practice. The authors would submit that, given the high level of M&A activity, poor success rates and potential impact of failed M&A, the industry would benefit from a coherent body of knowledge combining the existing academic theory and industry best practice to facilitate efficient integrations. The literature reviewed, however, indicates that no such guidance exists in the public domain to date.

6. Conclusions

Inefficient post-merger integration is one of the chief reasons why M&As don't succeed and IT is one of the most impactful aspects of post-merger integration, especially in heavily IT-reliant industries such as banking. Academic and practitioner-oriented literature covering post-merger IT integration in banking aligns closely with the literature looking at the broader subject of post-merger IT/IS integration at large. The literature dealing with post-merger IT integration in banking should comprise both generic principles of IS/IT integration and principles addressing the banking industry specifically. Such principles must include the early engagement of relevant IT staff in the planning process, due diligence which explicitly covers the target IT estate, alignment of the IT and business strategy, running the integration as a project, appropriate pace, retention of key IT staff and skills, common expectations regarding working practices, and alleviated concerns before and during the integration. It is through these actions that risk will be managed, business continuity ensured, and competitive advantage enhanced through new IT capabilities. The critical reliance on IT and the technical and organisational complexity of planning and implementation of integration projects which are exacerbated by the fast-changing technology and regulatory landscape are among the aspects with little coverage in the extant literature. A coherent and widely available body of knowledge combining the existing academic theory and clearly articulated industry best practice would be instrumental in improving the M&A success rate across the industry.

Acknowledgements

The study is based on the design and work of the authoring team members.

Authors contributions

Dr. Serhiy Kovala was responsible for the study design and original manuscript draft. Dr. Serhiy Kovala and Amanda Annandale were jointly responsible for the data collection. Amanda Annandale, Brett Annandale, and Peter Jackson revised the manuscript. All authors read and approved the final manuscript.

Funding

This work did not use grants or other external financial support and was entirely supported by the authoring team members.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal and publisher adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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