

VODAFONE IDEA MERGER - UNPACKING IS INTEGRATION STRATEGIES

Himanshu Shekhar Mahanta and Ambuj Anand wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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In August 2018, Hitesh T.K., the chief information officer (CIO) of Vodafone Idea Limited (Vodafone Idea), resulting from the merger of Vodafone India Limited (Vodafone India) and Idea Cellular Limited (Idea Cellular), was tasked with integrating the information-system (IS) landscapes of the latter two firms. Both were formidable telecom service providers (TSPs) in India with their own vast, mature application landscapes.

Hitesh knew the decisions would be critical; they would not only have long-term implications for the IS operating model of the merged entity with its corporate office in Mumbai, India, but would also directly affect the cost synergies expected as part of the merger, along with the timeline targets set by Vodafone Idea's corporate board of directors (board) for completing the merger. It was important for the IS integration to be concluded swiftly as the business had a high degree of dependency on IS.

The areas that needed to be addressed included people, processes, and technology in the IS domain. The priority and sequence of the application integration also needed to be defined appropriately to ensure success.

The CIO had led major transformations in the past. However, this IS integration would be unique owing to the inherent nature of the merger, which aimed for the creation of India's largest TSP by subscriber base and the world's second-largest telecom operator after China Telecom Corporation Limited.¹ Moreover, the merger was a strategic response to the intense competition between TSPs in India, and its goal was to achieve significant cost and capital-expenditure synergies. The merged entity was expected to generate an annual run-rate savings of around US\$2.1 billion within four years,² ensuring strong market competitiveness.

Additionally, the merger aligned with the Indian government's Digital India initiative,³ which aimed to expand network coverage, enhance service quality, and drive technological advancements across the

¹ Romit Guha, "Idea Merges with Vodafone to Create India's Largest, World's Second Largest Telecom Company," *ETTelecom.com*, March 21, 2017, <https://telecom.economictimes.indiatimes.com/news/idea-cellulars-board-approves-vodafone-idea-merger/57726148>.

² Vodafone India and Idea Cellular, *Merger of Vodafone India and Idea: Creating the Largest Telecoms Operator in India*, 1-8, March 20, 2017, <https://www.vodafone.com/content/dam/vodcom/images/group-releases/merger-of-vodafone/Vodafone-India-Idea-Press-Release.pdf>.

³ Vodafone India and Idea Cellular, *Merger of Vodafone India and Idea: Creating the Largest Telecoms Operator in India*, 1-8

country. The merger involved major complexities of ISs, which were, by nature, characterized by technical intricacies, scale, and urgency.

The task for the CIO was not only to integrate the disparate information-technology (IT) systems of the two established TSPs but also to ensure seamless operational continuity for millions of customers while consolidating vast networks, customer data, and service operations. The integration would require meticulous planning and flawless execution and would necessitate activities ranging from data migration, system integration, and application modernization to network consolidation and regulatory and security compliance. The IS integration would be among the most ambitious in India's telecom sector and would serve as a benchmark for future mergers, not only within telecom but across other industries as well.

INDUSTRY AND MARKET CONTEXT

In September 2016, Reliance Jio Infocomm Limited (Reliance Jio) entered the Indian telecom market as the 12th TSP in the nation, taking the market by storm.⁴ As a greenfield TSP, Reliance Jio offered voice and data services at a substantially reduced price relative to its competitors and, in its first month of operations added 15 million subscribers (see Exhibits 1 and 2), capturing a 1.52 per cent market share.

Within six months of its entry, Reliance Jio acquired 108 million subscribers, which was 9.29 per cent of the overall market share,⁵ and a massive price war was triggered as other operators tried to match Reliance Jio's offerings. As Reliance Jio continued its dominance, smaller service providers struggled for survival, and the overall market moved toward consolidation.

In March 2017, Vodafone India and Idea Cellular, then two major TSPs in India, announced their intention to merge. The final approval from the Indian government's Department of Telecommunications came in July 2018,⁶ and the merged entity was launched as Vodafone Idea in August 2018, becoming the largest TSP in India, with a revenue share of 32.2 per cent. By October 2018, the merged entity had a market share of 36.6 per cent (see Exhibit 3). As part of the new organizational structure, the CIO, who had been the head of IT operations at Idea Cellular, was designated as the CIO of the merged entity.

Both Vodafone India and Idea Cellular had offered nationwide coverage in India (see Exhibit 4) and had mature IS landscapes to support their respective businesses. Given the criticality of ISs, discussions on integrating the IS landscapes of the two firms were initiated early on, with cost optimization being among the key drivers. Even so, the highly competitive market environment demanded that this integration be carried out swiftly. After all, the IS integration needed focused attention and, hence, a dedicated team. This team needed to be different from the business-as-usual program-management team, which also needed to work closely with the business teams to achieve the integration. Importantly, the customer- and partner-experience teams could not be affected in any way while the merger exercise was being executed.

Accordingly, a cross-functional team was formed to facilitate the merger. The team had 24 members from the IS teams of Vodafone India and Idea Cellular, with equal participation from these two firms. Day-zero planning was initiated at the outset to identify and enable applications needed on the first day of the merged enterprise.

⁴ "Highlights of Telecom Subscription Data as on 30th September 2016," Telecom Regulatory Authority of India, accessed January 10, 2024, https://trai.gov.in/sites/default/files/2024-09/PR_No_117_Eng_09_Dec_2016_0.pdf

⁵ Telecom Regulatory Authority of India, Highlights of Telecom Subscription Data as on 31st March 2017, 6, https://trai.gov.in/sites/default/files/2024-09/PR_No.37of2017_English_0.pdf

⁶ "Government gives final nod to Vodafone idea merger to be India's largest operator," Times of India, July 26, 2018, <https://timesofindia.indiatimes.com/business/india-business/government-gives-final-nod-to-vodafone-idea-merger-to-be-indias-largest-operator/articleshow/65148444.cms>.

Based on a detailed assessment done by the IS team, in April 2019, Vodafone Idea's board approved of a timeline of 36 months for completing the IS integration. A complex merger like this one needed to address challenges across multiple dimensions, including picking a new operating model, making considerations around cultural alignments and change management, and factoring in the need for the integration of the application stacks, which further required dealing with aspects including data-migration complexities, legacy system interoperability, and infrastructure optimization. The sections below provide a view of some of the key decision-making areas with which the CIO was dealing.

CREATING THE NEW APPLICATION BLUEPRINT

Vodafone India had 209 applications, while Idea Cellular had 166 applications. However, both TSPs were formidable players with an extremely mature IT application landscape. The wide array of these firms' IT systems included operational-support systems, business-support systems (e.g., customer-experience-management systems), enterprise resource-planning systems, data-management and analytics systems, telecom charging systems, security and firewall systems, and vendor- and partner-management systems. These applications catered to retail customers, enterprise customers, and partners. Apart from serving external users, the applications also included a set of systems leveraged by internal employees. These included collaboration tools, access management, and other human-resources (HR) applications. Each of the two merging entities had a complex yet efficient integration across its systems, which was crucial for providing reliable services and delivering high-quality customer experiences to subscribers, partners, and employees (see Exhibit 5).

Identifying the applications to be retained, integrated, or decommissioned from Vodafone India or Idea Cellular's IS landscape would be complex because each application had to be evaluated separately. This exercise would be especially critical as it would help identify the infrastructure requirements, data-centre requirements, and data-migration or integration efforts. This exercise would thus have a direct bearing on the cost and timeline for completing the current integration and facilitating future operations.

Senior IS leaders from Vodafone India and Idea Cellular, including enterprise architects, application architects, and application owners, were engaged in defining the landscape. Inputs from business leaders were also solicited as required.

IBM architects were tasked with providing their recommendation on the blueprint for the IS integration as they already had a view of the complete Idea Cellular application landscape, as well as specific areas of the Vodafone India landscape in which they had already been engaged. The IS leaders from Idea Cellular and Vodafone India complemented the effort as part of a cross-functional team to provide further inputs on aspects of the integration of which IBM was unaware.

The CIO had a few options for integrating the two IS landscapes. The options typically available in such mergers included the following (see Exhibit 6):⁷

- **Absorption.** All applications would be migrated to or replaced by an application of one of the merging entities.
- **Symbiosis.** An informed decision would be made based on various factors, typically through a "best-of-breed" approach, wherein the best applications from each merging entity's landscape would be selected for the integrated IS landscape).

⁷ Fons Wijnhoven et al., "Post-Merger IT Integration Strategies: An IT Alignment Perspective," *The Journal of Strategic Information Systems* 15, no. 1 (March 2006): 5–28, <https://doi.org/10.1016/j.jsis.2005.07.002>.

- **Preservation.** Both merging entities would co-exist and function independently.
- **Renewal.** A complete IS transformation would be initiated, aimed at introducing new IS systems.

The CIO and his team realized that migrating to a new landscape would not be a “one and done” activity because it would include over almost 100 applications across different functional areas (e.g., marketing, sales, networking, finance, and HR) that touched the whole organization, along with its customers and partners. This implied that the exercise would require temporary solutions for simultaneous scenarios, where two systems from either merging entity would need to work simultaneously until either of the applications was decommissioned. This effort, however, would be a sunk cost because all these temporary workaround solutions would be abandoned once the final solution was put in place. Thus, the aim was to reduce the need to build too many temporary interfaces, only to abandon them later.

It appeared that opting for a symbiosis and selecting the best applications from either landscape would be a logical approach, but taking this approach would still require careful evaluation of each application from either landscape. The core team discovered that this approach would require a review of not only the functional and non-functional aspects of the product but also of aspects like the product road map, licensing model, number of licences available, infrastructure requirements, existing customizations, annual maintenance cost, support model, existing application performance, ability to scale, expected migration or integration efforts, and effort required for developing new integrations. The whole exercise would also require ample time because the architects seemed to be deliberating endlessly on each of the over 300 applications that formed part of the list created across the two entities.

The Vodafone Idea CIO wondered which approach would be best suited for the merged entity and whether there was a way to expedite the development of a post-merger application blueprint. The blueprint needed to complement the need for reducing integration efforts, ensuring expedited delivery, and optimizing the sunk cost of developing multiple temporary solutions for parallel-running scenarios.

SELECTING THE IS SOURCING MODEL

One of the critical tasks for the new leadership team was to pick the sourcing model for the IS organization. The CIO observed that Vodafone India and Idea Cellular had followed two different approaches for managing their IS needs.

Idea Cellular had completely outsourced its ISs as part of a long-term strategic outsourcing contract to IBM. IBM, therefore, was the "prime partner" and was responsible for helping Idea Cellular with all its IT needs, including running application modernizations, application-management services, operations, and maintenance. Conversely, Vodafone India had a mixed-vendor approach following a long-tail outsourcing strategy, where it had multiple partners assisting with its IS needs. It had large partners in System integrators including IBM, Tata Consultancy Services Limited, Tech Mahindra Limited (Tech Mahindra), and Amdocs Limited. It also had other smaller partners, as well as original equipment manufacturers including Aepona Limited, IMImobile PLC, Aurionpro Solutions Limited, Mobicule Technologies Private Ltd., PennyWise Solutions Private Limited, and Talisma Corporation Private Limited for niche areas, which helped support and maintain Vodafone India's IS landscape.

Interestingly, the main competitor of Vodafone Idea, Reliance Jio, was moving toward an “insourced” approach to managing its IT—that is, relying on in-house employees for IT operations.

Each model had its own pros and cons (see Exhibit 7), and the merger provided an opportunity for the CIO to reimagine the IT outsourcing strategy to align with the turbulent business environment. Even within the realms of outsourcing, the CIO had to keep in perspective the supplier's ability to leverage emerging technologies and capabilities. Many global companies were expanding their portfolios of IT suppliers to include smaller but highly innovative companies that were truly agile with their service delivery.⁸

The decision on which approach to follow would be critical for the CIO as the chosen model would define the post-merger organizational structure of the IS function and the operational mode of the new entity.

EXECUTING APPLICATION INTEGRATION AND MODERNIZATION IN PARALLEL

While the application blueprint was being developed, the CIO, who had transitioned from Idea Cellular, realized that there was a major customer-relationship-management (CRM) application-modernization program in progress on the Vodafone India side, and that a decision needed to be made around the continuity and coverage of this program. Tech Mahindra was implementing the new Oracle Siebel CRM platform for Vodafone India.

Modernization programs were typically large transformation exercises aimed at addressing multiple pain points. The key drivers were a combination of Business and IT needs and were aimed at taking legacy applications and modernizing their platform infrastructure, internal architecture, and functionalities, bringing greater efficiency and agility to the affected business areas. The existing research underscores that although the path to modernizing legacy applications has obstacles, they can be navigated successfully through astute planning, strategic decision-making, and adept execution.⁹

The difference in how an application integration and a modernization program were approached (see Exhibit 8) necessitated a different delivery approach for the success of either of the two types of programs.

As CRM modernization was aimed at introducing the latest Siebel CRM platform, which was also integrated with some of the critical applications being retained in the post-merger blueprint, it was decided that the program would be continued, and that the new Siebel CRM would become the final CRM solution for the merged entity.

The Siebel CRM implementation was managed by Vodafone Idea's vice-president of IT, who reported directly to the CIO. The vice-president of IT had a dedicated team responsible for taking the Siebel CRM modernization program forward, and the program's scope was enhanced to include Vodafone Idea's subscriber base.

The Siebel CRM modernization program was concluded in mid-2020 and required significant roll-out effort. However, Siebel CRM was not the only modernization program undertaken during the application-integration phase.

The merger provided an opportunity to revamp the complete analytics solution of Vodafone Idea. The existing analytics applications were built predominantly to address the needs of voice and SMS traffic. The massive growth in data required an overhaul of the solution. Additionally, both merging entities were facing specific limitations in their existing analytics architecture. Vodafone India had an IBM

⁸ Ning Su, Natalia Levina, and Jeanne W. Ross, "The Long-Tail Strategy for IT Outsourcing," *MIT Sloan Management Review*, Winter 2016, 81-89. Available from Ivey Publishing, product no. SMR57206.

⁹ Ponnusamy, Sivakumar, and Dinesh Eswararaj. "Navigating the Modernization of Legacy Applications and Data: Effective Strategies and Best Practices." *Asian Journal of Research in Computer Science* 16, no. 4 (2023): 239-256.

Netezza data-warehouse platform nearing the end of life. Likewise, Idea Cellular had an IBM Integrated Analytics System, which had its own challenges.

The CIO thus realized that analytics was a critical area for the merged entity and that the existing solutions on either side were unsustainable. The need existed for an advanced and efficient system that would help provide deeper insights across customer experience, finance, partner performance, and networks, along with the ability to build models and enable predictive analytics to empower the enterprise to achieve more efficient operations and develop new offerings. Additionally, while investing in the right technology was essential, data indicated that companies needed to be far more committed and innovative in addressing the human aspect of data if they truly aimed to achieve meaningful business outcomes¹⁰ and avoid certain mistakes which have led to failures of applying the Data Analytics expertise built within the organisation (see Exhibit 9 for mistakes that occur at the interfaces between the data science function and the business at large).¹¹

As with the CRM area, the CIO assigned a senior leader, the associate vice-president at Idea Cellular, who was deeply experienced in the analytics domain, to lead the analytics transformation. The associate vice-president and his team of data architects embarked on building a Hadoop-based data-lake solution to handle the growing data volume. The analytics transformation was run as an independent track, so external consultants who had worked exclusively on the analytics track were engaged to execute the project. The analytics-modernization program was successfully concluded in two years.

While these modernization programs were executed in parallel to the application-integration exercise, the CIO had to approach application modernization and application integration differently, and he deployed different strategies in dealing with the two types of programs.

CHANGE MANAGEMENT, CULTURE, AND COLLABORATION IN THE IS INTEGRATION

Culturally, Vodafone India was a global brand; therefore, the employees had been exposed to a global work culture and practices. Contrastingly, Idea Cellular's culture was more orthodox. The two firms also had different IS operating models and working methods. The merger brought team members with different mindsets together, and for some time, loyalties toward the merging entities and old networks and groups were visible within the merged entity. Creating a new cultural identity was not an automatic process, and the CIO and his leadership team appreciated this factor and had to put in the required efforts to support change.

Organizational structure worked alongside organizational culture. Organizational culture is the set of values, beliefs, attitudes, systems, and rules that outlined and influenced employee behaviour within an organization, which was not always documented. It defines how employees, customers, vendors, and stakeholders experienced the organization and perceive its brand¹². Thus, culture was an important aspect that had broad implications for mergers and acquisitions.

One of the critical aspects of any merger was the consolidation of teams. There was a sense of uncertainty within teams as roles were redefined and positions were optimized in the new organizational structure. This

¹⁰ Randy Bean and Thomas H. Davenport, "Companies Are Failing in Their Efforts to Become Data-Driven," *Harvard Business Review*, February 5, 2019, <https://hbr.org/2019/02/companies-are-failing-in-their-efforts-to-become-data-driven>.

¹¹ Mayur P. Joshi et al., "Why So Many Data Science Projects Fail to Deliver," *MIT Sloan Management Review*, Spring 2021, 85-89. Available from Ivey Publishing, product no. SMR62317.

¹² "Organizational culture: Definition, importance, and development," Achievers, accessed February 3, 2025, <https://www.achievers.com/blog/organizational-culture-definition/>

triggered attrition and the fear of crucial personnel leaving and taking away the deep knowledge of ISs and associated business processes that they might have developed over time.

The announcements for IS leadership positions at Vodafone Idea were made at the outset. After that, the CIO worked with the HR teams to create the new IT organization. The organizational structure developed was more attuned to the requirements of the new entity. New roles were created with renewed targets and objectives, and the CIO and senior IT leaders invested significant time building the new organization.

Typically, new or vacant positions in an organization were filled by individuals through external hiring. There was a detailed evaluation mechanism involving interviews and tests to select the right candidate. However, this approach was not an option for the CIO and his extended leadership team, as existing IT team members from either merging entity had to be assigned to the new IT organization based on an understanding of their previous roles and responsibilities.

The challenge in this approach was that some individuals might feel that their role had been curtailed while perceiving that some of their colleagues had an enhanced role with more responsibilities.

At Vodafone Idea, new roles were created with new designations, and new bands were made for the IS function (as well as for the whole organization). Subsequently, the HR teams facilitated the transition of the IT team members to their new roles, with support from the CIO and his extended leadership team. HR had planned to complete the alignment of all teams to the new roles within six months of the merger. Hence, the CIO and his leadership teams worked toward this target and aligned the IT team. They tried to address individual concerns and keep the team motivated and synchronized. Concluding the realignment exercise early was important as it helped put to rest any misgivings about new roles and responsibilities. However, it took a few of months for the IT team to embrace the new organizational structure and adjust to the new working mode.

DEFINING NEXT STEPS

Hitesh had a truly complex integration task at hand. His team members from the erstwhile Vodafone India and Idea Cellular had been exposed to different IS operating models and organizational cultures. Thus, the task demanded getting to work quickly and executing the integration exercise with agility. The application integration would entail a vast landscape of different types of applications, demanding focused effort on application rationalization, data migration, and data-centre and infrastructure considerations. The CIO additionally had to deal with two major modernization programs in two business-critical areas, which added further complexity to the integration. Additionally, the integration timeline was fixed at the outset. The board had already given the CIO 36 months to conclude the IS integration, leaving no room for slippages. Externally, Vodafone Idea also faced a formidable competitor in Reliance Jio, which was highly active in the market and growing fast, making the integration even more challenging.

Thus, the CIO had to execute the integration in an extremely high-pressure environment with stiff deadlines. To start with there was a need to conduct a thorough assessment of the existing systems on either side and identifying key integration objectives including the future sourcing model and define a comprehensive integrated project plan, outlining the necessary resources, timelines, and risk management strategies. This also required engaging with stakeholders across business functions to ensure that the integration addressed their specific needs and targets. Finally, the CIO also had to focus on effective change management to facilitate seamless transition to the new integrated environment.

EXHIBIT 1: INDIAN TELECOM-SERVICE-PROVIDER MARKET SHARE, SEPTEMBER 2016

Telecom service provider	Market share (%)
Bharti Airtel Limited	24.76
Vodafone India Limited	19.12
Idea Cellular Limited	17.03
Bharat Sanchar Nigam Limited	8.93
Aircel Limited	8.59
Reliance communications Limited	8.3
Tata Teleservices Limited	5.44
Telenor (India) Communications Pvt Ltd	5.04
Reliance Jio Infocomm Limited	1.52
Sistema Shyam Teleservices Limited	0.64
Mahanagar Telephone Nigam Limited	0.35
Quadrant Televentures Limited	0.28
Total	100

Note: The market-share figures were current as of September 30, 2016.

Source: Created by the case author based on information gathered from "Telecom Subscription Report," Telecom Regulatory Authority of India, accessed January 10, 2024, https://trai.gov.in/sites/default/files/2024-09/PR_No_117_Eng_09_Dec_2016_0.pdf

EXHIBIT 2: NET ADDITIONS OF WIRELESS SUBSCRIBERS FOR INDIAN TELECOM SERVICE PROVIDERS, SEPTEMBER 2016

Telecom service provider	Net Additions
Reliance Jio Infocomm Limited	15979745
Bharti Airtel Limited	2432282
Idea Cellular Limited	1913319
Bharat Sanchar Nigam Limited	1401578
Vodafone India Limited	525281
Aircel Limited	426862
Reliance Communications Limited	97942
Quadrant Televentures Limited	6273
Mahanagar Telephone Nigam Limited	5641
Sistema Shyam Teleservices Limited	-340743
Telenor (India) Communications Pvt Ltd	-367162
Tata Teleservices Limited	-1223178

Note: The net additions of wireless subscribers were current as of September 30, 2016.

Source: Created by the case author based on information gathered from "Telecom Subscription Report," Telecom Regulatory Authority of India, accessed January 10, 2024, https://trai.gov.in/sites/default/files/2024-09/PR_No_117_Eng_09_Dec_2016_0.pdf

EXHIBIT 3: INDIAN TELECOM-SERVICE-PROVIDER MARKET SHARE OF WIRELESS SUBSCRIBERS, OCTOBER 2018

Telecom service provider	Subscribers	Market share (%)
Vodafone Idea Limited	427603241	36.547
Bharti Airtel Limited	341659280	29.201
Reliance Jio Infocomm Limited	262752230	22.457
Bharat Sanchar Nigam Limited	113434946	9.695
Tata Teleservices Limited	21055671	1.800
Mahanagar Telephone Nigam Limited	3486358	0.298
Reliance Communications Limited	24182	0.002
Total		100

Note: The market-share figures were current as of October 31, 2018.

Source: Created by the case author based on information gathered from "Telecom Subscription Report," Telecom Regulatory Authority of India, accessed January 10, 2024, https://trai.gov.in/sites/default/files/2024-09/PRNo01Eng02012019_0.pdf

EXHIBIT 4: SUBSCRIBER COVERAGE ACROSS COVERAGE AREAS IN INDIA, SEPTEMBER 2018

Telecom coverage area	Number of subscribers of Vodafone India Limited	Number of subscribers of Idea Cellular Limited
Andhra Pradesh	5,917,224	18,060,586
Assam	4,406,691	1,369,539
Bihar	10,375,094	14,661,777
Delhi	12,494,486	7,234,188
Gujarat	20,010,367	14,553,820
Haryana	6,399,044	5,330,093
Himachal Pradesh	501,889	993,491
Jammu and Kashmir	809,122	674,860
Karnataka	7,529,192	9,376,999
Kerala	7,745,232	12,757,000
Kolkata	7,064,615	2,959,917
Madhya Pradesh	5,598,615	28,188,196
Maharashtra	20,112,179	30,158,495
Mumbai	11,154,461	4,826,219
Northeast	1,834,157	519,815
Odisha	4,448,021	2,135,684
Punjab	4,481,132	7,609,769
Rajasthan	12,005,472	8,036,988
Tamil Nadu (including Chennai)	20,124,422	6,339,257
Uttar Pradesh (east)	24,739,638	13,100,928
Uttar Pradesh (west)	12,550,108	17,771,069
West Bengal	21,556,488	6,448,067
Total	221,857,649	213,106,757

Source: Created by the case author based on information gathered from "Telecom Subscription Report," Telecom Regulatory Authority of India, accessed January 10, 2024, https://trai.gov.in/sites/default/files/2024-09/PRNo114Eng28112018_0.pdf

EXHIBIT 5: TYPICAL APPLICATION TYPES USED BY TELECOM SERVICE PROVIDERS

Application type	Description
Customer-relationship-management systems (CRM)	Telecom operators used CRM systems to manage customer interactions, improve service, and increase retention rates. These systems also included mobile applications used by subscribers to manage their accounts, view usage statistics, and pay bills, and applications used by partners and employees.
Business-support systems (BSS)	Telecom operators needed billing and charging systems to manage subscription plans, usage-based billing, and revenue collection. These systems could also handle multiple currencies and complex pricing models. BSS also included order-management systems.
Operational-support systems (OSS)	OSS applications helped telecom operators monitor, control, analyze, and manage a computer network. OSS software was specifically dedicated to communications-service providers and mainly used for supporting network planning, network provisioning, service fulfilment, and service assurance from a common core of service and resource management.
Call-centre applications	These applications enabled operators to manage call centres and included messaging services, trouble-ticketing systems, knowledge-management systems, automatic call distribution, computer telephony integration, and interactive voice response.
Data analytics and business intelligence	Telecom operators used analytics platforms to process and analyze data for better decision-making, customer segmentation, and service optimization.
Security applications and solutions	To protect customer data, employee data, and network infrastructure, telecom operators deployed various cybersecurity applications. These included firewall, access-management applications and intrusion-detection systems, distributed denial-of-service protection, and end-point security.
Service-delivery platforms	Telecom operators often provided service-delivery solutions, ensuring faster streaming and data delivery and including products like messaging applications and streaming applications.
Internal applications	These applications were used for managing internal functions and users and included mail systems, collaboration systems, human-resources applications, legal and regulatory compliance applications and employee portals.

Source: Created by the case author based on information gathered from "What are the software tools used in telecommunications?," ITmindslab, accessed February 5, 2025, <https://itmindslab.com/what-are-the-software-tools-used-in-telecommunications/>

EXHIBIT 6: ANALYSIS OF APPLICATION-INTEGRATION OPTIONS

	Absorption	Symbiosis	Preservation	Renewal
Description	In the merger between entity A and entity B, all entity B's applications would be migrated to or replaced by entity A's applications.	A systematic exercise would be carried out to review each application of entity A, review the corresponding entity B application, and then decide which one would be retained, typically following the best-of-breed approach.	The two entities, A and B, would retain their individual application landscapes and work independently.	Implementing completely new information systems for the merged entity would lead to the decommissioning of entity A's and entity B's applications.
Complexity	Complexity would be low. However, there would be change-management activity for entity B as the teams and subscribers would have to be entirely aligned to the processes and functionalities available through entity A's application stack.	Complexity would be high. The best-of-breed approach would require significant effort to be spent reviewing the multiple dimensions of the application, including functional and non-functional factors, roadmap, stability of the original equipment manufacturer, and other related factors.	There would be no complexity.	Complexity would be extremely high. This option would entail completing a product-selection exercise, implementing new systems, performing data migration from the applications of both merging entities, and building completely new integrations.
Time commitment	This option would be completed the fastest as migration and change-management efforts would be time-limited.	Significant time would be spent building the road map, followed by performing migration and change-management.	Not applicable.	A significant time commitment would be needed as completely new systems would need to be deployed.

Source: Created by the case author based on information gathered from Philippe C. Hespelagh and David B. Jemison, *Managing Acquisitions: Creating Value Through Corporate Renewal* (New York: Free Press, 1991), 370-74; Stefan Henningsson, "Managing Information Systems Integration in Corporate Mergers and Acquisitions," (doctoral thesis, Lund University, 2008), 1-398 [https://lucris.lub.lu/se/ws/portalfiles/portal/5639735/1145560.pdf](https://lucris.lub.lu.se/ws/portalfiles/portal/5639735/1145560.pdf).

EXHIBIT 7: SOURCING MODELS

Sourcing model	Insource: in house	Outsource: prime vendor	Outsource: multivendor / long tail
Model description	The enterprise would manage information-system services using internal resources.	This option would involve completely outsourcing IS services to a single vendor. The "prime partner" would be responsible for all other vendors and original equipment manufacturers (OEMs).	Multiple partners and OEMs would be employed, each managing a specialized area. The enterprise would need to manage different vendor contracts.
Resource requirements for the enterprise	Requirements would be high. The need would exist for a large and robust internal Information-technology (IT) team, including architects, analysts, and developers. Teams would need to be trained regularly on evolving technologies and be motivated.	Requirements would be minimal. The prime partner would deploy its resources; hence, the enterprise's IT resource requirement would be limited to governance, including enterprise-architecture oversight and service-level agreement (SLA) adherence.	Small teams would be needed, predominantly for oversight and enterprise architecture. The need would exist to integrate the solution across partners.
Expertise	Expertise would be limited to the skills of the internal teams.	General expertise would be needed, with some specialization.	Deeper specialization across domains would be available.
IT service quality	The quality might become poor in the long run unless there is an investment on constantly upgrading the skills of the hired people. Accountability would need to be enforced.	The quality would be high. SLAs and key performance metrics (KPIs) would need to be adhered to as per the agreed contract.	High SLAs and KPIs would need to be adhered to per the agreed contract. There would also be a need to manage inter-partner dependencies effectively.
IT cost	This would necessitate a high upfront investment and ongoing costs for operations and skill development.	This option would offer initial volume discounts but involve overhead.	Competitive pricing would be available.
Speed of delivery	This option would be slow for new initiatives but would be accelerated over time.	Delivery would be optimized. However, this option might be less efficient for niche areas or emerging technologies.	The speed would be high for specialized and niche areas.
Main benefit	There would be cost savings and complete control of systems and processes.	Only one partner would be needed. Access to high-quality consultants who were experts in their areas and adept in the latest technologies would be available. This option would be suitable for enterprises prioritizing ease of governance, comprehensive service coverage, and moderate innovation.	This option would be highly adaptable to changing needs. It would afford access to high-quality consultants who would be experts in their areas and be adept in the latest technologies. It would be best for enterprises needing high specialization, flexibility, and increased vendor flexibility.
Limitation	This option would be inflexible. There would be an excessive dependency on internal resources. Also, solutions might be limited to the knowledge levels of internal teams. Ad hoc requests to OEMs might become expensive.	This option would be less flexible. Overtime would build a massive dependency on a single partner, making it difficult to change the model in the future. The partner might increase the price in the future, limiting the enterprise's options.	There would be multiple contracts to manage. The management of interdependencies would become the responsibility of the enterprise.

Source: Adapted by the author based on Tapio Reponen, "Outsourcing or Insourcing?", *ICIS 1993 Proceedings* 38 (1993): 103-105 <https://aisel.aisnet.org/icis1993/38>; Ning Su, Natalia Levina, and Jeanne W. Ross, "The Long-Tail Strategy for IT Outsourcing," *MIT Sloan Management Review*, Winter 2016, 81-89. Available from Ivey Publishing, product no. SMR57206.

EXHIBIT 8: COMPARISON OF APPLICATION INTEGRATION AND APPLICATION MODERNIZATION

Area	Application integration	Application modernization
Outcome	Integration would spur a decrease in the number of applications.	New applications would be added with new functionalities.
Application status	The applications would already exist.	A new application would be introduced.
Delivery approach	A top-down approach would be taken.	This would be a bottom-up approach.
Process impact	There would be minimal impact to existing processes.	This option would likely create new ways of working, introducing agility through automation.
Business involvement needed	This would be more IT focused and hence more technical.	This option would be business and IT focused. It would require significant business participation for a customer-facing application.
Integrations developed	A limited need would exist for any new integrations.	New integrations would need to be developed as required by the modernized application.
Testing requirements	Basic sanity testing and regression testing would be required.	Complete system-integration testing and user-acceptance testing would be required.
Training needs	No training requirements existed.	Training on the new application would be required.
Roll-out approach	Typically, this would involve a "one and done" approach.	Typically, this option would require an initial pilot program, followed by a phased delivery plan.
Efforts	Effort would be minimal and would entail migration to the application being retained and decommissioning of the migrated system.	Effort would be considerable, requiring the establishment of a deployment life cycle for a new product and software-development life cycle for customizations.
Time required	This option would be quick.	This would be a lengthy process.

Source: Created by the case author based on information gathered from Ponnusamy, "Navigating the Modernization of Legacy Applications and Data," 239-256 and Huang et al. "Corporate applications integration: challenges, opportunities, and implementation strategies." *Journal of Business and Management* 9, no. 2 (2003): 137-150, <https://www.inderscienceonline.com/doi/pdf/10.1504/JBM.2003.141105>

EXHIBIT 9: FIVE COMMON MISTAKES TO AVOID FOR A SUCCESSFUL APPLICATION INTEGRATION

Application Integration Mistakes
Applying an advanced analytical technique to the wrong use case
Not removing unrecognized sources of bias
Not implementing the right solution owing to a lack of business priorities
Finding the right solution but leveraging it through the wrong user group
Maintaining a weak collaboration with the business team and working in silos on the implementation

Source: Created by the case author based on information gathered from Mayur P. Joshi et al., "Why So Many Data Science Projects Fail to Deliver," *MIT Sloan Management Review*, Spring 2021, 85-89. Available from Ivey Publishing, product no. SMR62317.