IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2024

DOI: 10.17148/IJARCCE.2024.13340

Ensuring Data Quality in ERP Implementations: Key Conversion Considerations

Tirumala Rao Chimpiri

Independent Researcher, NY, USA

Abstract: Enterprise Resource Planning (ERP) systems offer significant benefits, but data migration poses a major challenge during implementation. Converting legacy data accurately into the ERP environment is critical, as data quality issues can disrupt operations, financial reporting, and decision-making. This paper provides a comprehensive analysis of ERP data conversion strategies and best practices to help organizations plan and execute successful migration projects.

The research evaluates the pros and cons of prevalent conversion methodologies, including Big Bang, phased and parallel approaches. While Big Bang migration appears faster and cheaper, it is highly risky for most organizations. Phased conversion is widely seen as the optimal approach, especially for larger firms with complex legacy landscapes. Incrementally migrating data by module or location constrains the scope of potential issues. Selective parallel runs of old and new systems provide a valuable safety net for critical data.

Automated conversion tools are also essential to handle today's data volumes efficiently. However, algorithms must be combined with human oversight and robust testing to validate conversion logic. The most successful migration initiatives invest heavily upfront in data profiling, cleansing, mapping, and governance. Proactive planning avoids disruptive legacy data issues from cascading into the ERP system.

Ultimately, the right conversion approach aligns with the overall ERP strategy and balances transformation goals with risk mitigation. By prioritizing data quality, organizations are better positioned to realize the full potential of their ERP investments. The findings provide a valuable framework for managers to assess conversion trade-offs and make informed decisions in planning ERP data migration projects.

Keywords: ERP, data conversion, data migration, legacy systems, phased implementation, automation

I. INTRODUCTION

Enterprise Resource Planning (ERP) systems are integrated software suites that centralize the management of core business processes within a unified database. By replacing disparate legacy systems built for narrow departmental functions, ERP solutions enable previously unattainable levels of operational visibility, coordination, data sharing, and performance optimization across an enterprise (Davenport, 1998).

Leading ERP platforms from vendors like SAP, Oracle, Microsoft, and Infor now span a comprehensive range of functions including finance, accounting, manufacturing, supply chain, procurement, inventory, human capital, sales, marketing, and more. Successfully adopting an ERP system can drive significant improvements in productivity, cycle times, customer service, and cost control (Shang and Seddon, 2002).

However, ERP implementations also involve substantial risk. Projects can extend over multiple years with a total cost of ownership in the tens to hundreds of millions for large global deployments. Business disruption is likely if complex rollouts are not carefully orchestrated. Organizational change management is critical to overcome employee resistance and lack of training.

While ERP programs face myriad technology and business challenges, legacy data migration consistently ranks as one of the highest-risk activities (Nah et al., 2001; Shanks et al, 2000; Brooks, 2006). Converting years or decades worth of data from entrenched systems into the new ERP environment is fraught with pitfalls.

This research paper will analyze the importance of data conversion in ERP success, evaluate different migration strategies, and recommend best practices to optimize conversion outcomes.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2024

DOI: 10.17148/IJARCCE.2024.13340

II. IMPORTANCE OF ERP DATA CONVERSION

Data is the lifeblood of ERP systems. Migrating information from legacy transaction processing and reporting tools into the central ERP database is a prerequisite for deployment. This includes both master records, like customers, vendors, materials, and employees, as well as transactional data such as orders, invoices, payments, and inventory movements. For large enterprises, conversion can span billions of records across dozens of separate source applications built up over many years.

Failure to accurately convert legacy data can cripple ERP usability and performance, negating the business case. Faulty product, pricing or inventory records lead to incorrect orders being processed. Material planning runs on bad supply and demand data, causing shortages or excess. Financial postings are rejected due to customer and accounting setup errors. Inaccurate balances and histories produce unreliable management reports. Productivity plummets as staff struggle with data issues instead of focusing on their jobs.

The operational disruption and financial losses from botched data migrations can be devastating. Even if the requisite information exists in source systems, converting it properly into the ERP's data model is complex and error-prone. Fields must be transformed into new formats, business rules applied, relationships linked, redundancies eliminated, missing elements defaulted, and inconsistencies resolved. Doing this manually is impractical given the data volumes involved.

Surveys show most organizations still underestimate the challenges in ERP data conversion (Panorama Consulting Group, 2020). Migration is treated as an IT afterthought rather than a core project workstream. Requirements are vague, planning is piecemeal, and testing is shortchanged. This leads to budget and timeline overruns as unexpected issues crop up. Operational impacts mount as bad data accumulates within the ERP system.

However, studies indicate effective data migration, when coupled with other success factors, can significantly boost ERP performance and adoption (Brooks, 2006). A robust conversion strategy backed by strong executive sponsorship, business engagement, and rigorous execution is fundamental to ERP program success. With data constituting the building blocks of ERP processes and analytics, proper migration must be treated as a top implementation priority.

III. DATA CONVERSION METHODOLOGIES

Organizations can take different approaches to convert legacy data into ERP environments. The optimal migration path depends on project scope, business needs, data volumes, system complexity, in-house skills, and risk tolerance. Below are the leading methods for structuring data conversion initiatives.

Direct Cutover Conversion:
The "Big Bang" approach involves migrating all legacy data in a single cutover event. This one-shot deployment moves the full data set required to run the business into production simultaneously. Subsequent transactions are performed only in the new ERP with old systems decommissioned immediately thereafter.

The main advantage is speed and simplicity. Users automatically begin working with new ERP processes from day one. It compresses project scope, resources, and costs. The hard stop also prevents backsliding to legacy systems and workarounds.

However, big bang conversions come with major downside risks. Converting huge data volumes from multiple systems in one batch makes thorough validation unfeasible. Even small defects can spark widespread business disruption. Fallbacks to prior applications are difficult as source data gets archived and IT teams shift focus to ERP support.

The failure rate for big bang ERP projects is markedly higher than phased approaches (Panorama Consulting Group, 2020). This option may be feasible for smaller sites with limited data footprints and few source applications. But attempting to migrate millions of records across dozens of operating units and geographies in a single shot is exceedingly dangerous. Undetected data issues can quickly metastasize into significant financial and operational impacts that erode faith in the entire ERP deployment.

Phased Data Conversion:
A phased, incremental approach converts legacy information in waves over an extended period. Data migration is sequenced to align with the staged ERP rollout by module, business unit, legal entity, or geographic region.

International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2024
DOI: 10.17148/IJARCCE.2024.13340

For example, the project may begin with finance data, and then progress to supply chain, manufacturing, sales, and service. Or deployment proceeds site by site, with each facility systematically converted before moving to the next. Hybrid models are possible based on process and location scope.

Phasing provides manifold advantages by breaking complex data migrations into more manageable components:

1. Smaller batch sizes are easier to extract, transform, test, and load.
2. Specific data objects can be tackled one at a time to ensure quality.
3. Disparate source applications are retired gradually vs. all at once.
4. Users have ample time to adapt to new data structures and processes.
5. Business maintains the ability to fall back to legacy systems if needed.
6. Project teams can apply lessons from each phase to improve later ones.

On the downside, stretched out timelines increase project cost and resource needs. Staggered rollouts require maintaining old and new systems in parallel. Temporary interfaces may be required to share data across functions. Coordinating phases around evolving business events is challenging.

Despite the added duration and complexity, research shows phasing is the preferred model for most ERP data conversions (Gargeya and Brady, 2005). De-risking deployment through incremental migration is prudent for large enterprises with entrenched legacy landscapes and intricate data relationships. Situations favoring a phased approach include:

1. Complex multi-site business models (e.g. numerous plants, countries).
2. Deeply fragmented application and data architectures.
3. Transformative ERP initiatives requiring process redesign.
4. Limited internal bandwidth to support simultaneous rollout.
5. Regulatory and financial reporting requirements restricting cutover timing.

Parallel Data Conversion

Another way to reduce risk is running new and old systems side-by-side for a defined period. The legacy applications remain the system of record during this parallel testing window. But converted data is also fed into ERP and outputs are compared to find discrepancies.

The safety net of keeping source systems fully operational is the major benefit. Potential data or processing gaps in the ERP environment can be rectified with minimal business exposure. Maintaining dual data entry also allows transaction matching to pinpoint conversion or configuration variances.

However, parallel testing is a temporary measure, not a permanent crutch. Costs accrue from duplicating IT support and data entry. Staffing is strained if the overlap window extends too long. Motivation to address ERP issues may dwindle if people rely on legacy tools as a backstop.

Hence, the cutoff date for decommissioning old systems must be defined at the outset and adhered to. Prolonging parallel operations risks end runs around core ERP processes. Parallel conversion should be used judiciously for mission-critical datasets, not comprehensively. Employ it selectively to supplement rather than replace phased migration.

Automated Conversion Tools

Data conversion involves repetitive steps to extract, transform, cleanse, and load data. ERP packages increasingly provide inbuilt utilities to automate conversion activities. Enterprise integration platforms and stand-alone ETL (extract, transform, load) tools also offer powerful capabilities to streamline data migration.

Automated options can accelerate many conversion tasks:

1. Retrieve data from legacy databases, files, and external sources.
2. Filter and merge records to isolate relevant subsets for loading.
3. Validate field lengths, data types, keys, and referential integrity.
4. Standardize master data values and hierarchies across sources.
5. Convert legacy codes and identifiers to ERP-compatible formats.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2024

DOI: 10.17148/IJARCCE.2024.13340

Conversion tools encapsulate data mapping logic and business rules in reusable workflows. This shifts the conversion off end users to IT and functional experts who understand the data context. Automated checks can quickly process huge record volumes and pinpoint anomalies for fixing. The systematized approach also ensures consistency and repeatability. However, tool-driven conversion is not a panacea. Packaged utilities may need significant enhancement to support bespoke data models and nuanced business policies. Implementing new software adds training and maintenance overheads. Over-reliance on tools can breed a "black box" mindset that skips proactive data cleansing.

Conversion automation should be balanced with manual analysis and auditing. Algorithms can suggest data mappings but humans must approve the logic. Exception reports remain vital to track conversion health. Tools optimize tedious data manipulation but informed oversight is essential to validate outputs.

IV. RECOMMENDATIONS AND CONCLUSIONS

Converting data is an integral part of every ERP transformation but entails major risks if mishandled. With no one-size-fits-all approach, each organization must assess its unique migration drivers and constraints to pick an apt conversion strategy. However, some universal principles optimize the probability of data migration success.

First, a phased, incremental conversion is superior for most ERP deployments, especially at larger enterprises. Attempting to switch from legacy systems to ERP overnight in a single big bang is exceedingly dangerous. Odds of business disruption due to inaccurate data, processing errors, and training gaps are too high.

Systematically migrating data by module, process, and/or geographic area surfaces problems more manageably. Teething issues can be corrected without derailing the entire initiative. Lessons from each phase help debug subsequent ones.

Second, selective parallel testing complements the phased model for critical data subsets and business flows. The peace of mind from having dual systems is invaluable during the initial ERP rollout. It allows kinks to be ironed out with less pressure on project teams and operations staff.

But parallel processing has downsides if overused. It should confirm data consistency and ERP processing accuracy, not become a crutch to avoid fully adopting ERP capabilities. Continuing dual data entry and IT support adds unnecessary cost and complexity if extended past a brief overlap period.

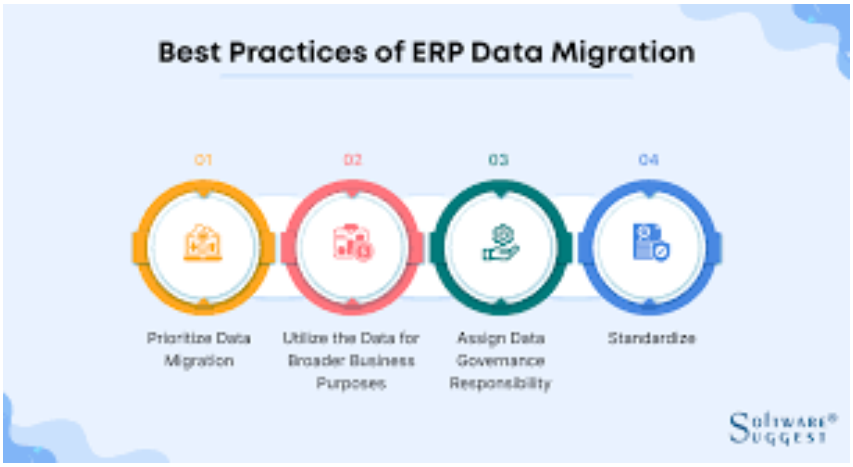

Figure 1. Best Practices in Data Migration

As shown above figure some best practices can be referred for the parallel approach of data conversion, automated conversion utilities are essential to handle today's massive data volumes. ERP and third-party tools can vastly improve productivity for data extraction, mapping, cleansing, transformation, loading, and auditing activities. However, tools do not absolve organizations from thoroughly analyzing data issues and assumptions.

The mechanics of data manipulation are expedited but conversion logic still requires human judgement. Business context is key to validating that automated conversions yield the intended results. Algorithms must be consistently tested, refined, and governed to ensure data quality.

International Journal of Advanced Research in Computer and Communication Engineering
Impact Factor 8.102 ⁜ Peer-reviewed & Refereed journal ⁜ Vol. 13, Issue 3, March 2024
DOI: 10.17148/IJARCCE.2024.13340

Finally, data migration headaches compound when basic conversion prerequisites are neglected. Establish a clear data governance structure to define standards and policies. Assess the legacy environment thoroughly to plan the decommissioning roadmap. Document current data flows, quality, and consumption patterns.
Specify target state requirements that support the future ERP vision. Invest in data profiling early to find problem areas proactively. Test mapping scenarios iteratively so errors are caught before load. Carefully orchestrate cutover to keep data and transactions in sync.

These foundational elements are vital regardless of the specific data migration path. Skimping on data due diligence and testing will dramatically elevate ERP risks even with a robust phasing strategy aided by proven conversion tools. Methodology alone is not a substitute for robust analysis, planning, governance, and execution discipline.

In summary, data migration is a core ERP workstream, not a side activity. Most organizations will optimize outcomes by combining phased deployment with selective parallel testing, tailored conversion tools, and robust data governance. Aligning data migration with the overall ERP implementation approach provides the best balance between transformation goals and risk mitigation.

REFERENCES

[1]. Ahmad, M.M. and Pinedo Cuenca, R. (2013). Critical success factors for ERP implementation in SMEs. Robotics and Computer-Integrated Manufacturing, 29(3), 104-111. https://doi.org/10.1016/j.rcim.2012.04.019.
[2]. Botta-Genoulaz, V., Millet, P.A. and Grabot, B. (2005). A survey on the recent research literature on ERP systems. Computers in Industry, 56(6), 510-522. https://doi.org/10.1016/j.compind.2005.02.004.
[3]. Brooks, L. (2006). Best practices for implementing ERP systems. The Journal of Corporate Accounting & Finance, 17(5), 73-77. https://doi.org/10.1002/jcaf.20229.
[4]. Davenport, T.H. (1998). Putting the enterprise into the enterprise system. Harvard Business Review, 76(4), 121-131.
[5]. Dezdar, S. and Ainin, S. (2011). Examining ERP implementation success from a project environment perspective. Business Process Management Journal, 17(6), 919-939. https://doi.org/10.1108/14637151111182683.
[6]. Gargeya, V.B. and Brady, C. (2005). Success and failure factors of adopting SAP in ERP system implementation. Business Process Management Journal, 11(5), 501-516. https://doi.org/10.1108/14637150510619858.
[7]. Panorama Consulting Group. (2020). 2020 ERP Report. Retrieved from https://www.panorama-consulting.com/resource-center/erp-industry-reports/panoramas-2020-erp-report/
[8]. Shang, S. and Seddon, P.B. (2002). Assessing and managing the benefits of enterprise systems: the business manager's perspective. Information Systems Journal, 12(4), 271-299. https://doi.org/10.1046/j.1365-2575.2002.00132.x
[9]. Shanks, G., Parr, A., Hu, B., Corbitt, B., Thanasankit, T. and Seddon, P. (2000). Differences in critical success factors in ERP systems implementation in Australia and China: a cultural analysis. ECIS 2000 Proceedings, 53.
[10]. Umble, E.J., Haft, R.R., Umble, M.M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. European Journal of Operational Research, 146(2), 241-257. https://doi.org/10.1016/S0377-2217(02)00547-7