A 'Yardstick' To Simplify ERP Implementation

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While rapid globalization and inorganic growth have been the cornerstones for defining business strategies for most of the CEOs and business leaders today, these have also created a nightmare for CIOs with the ever evolving IT landscape and struggle in maintaining a common layer across diverse business units. In the past, CIOs have swiftly embraced enterprise resource planning (ERP) as a strategic tool to enable integration, as well as to provide a strong IT backbone to support enterprise growth. However, ERP deployments are large business transformation programs, and far more complex by its nature compared to any other IT initiative. The significant challenge for CIOs is maintaining the simplicity of the solution being implemented in its entirety.

Over the years, ERP system has grown to be a massive software application that can automate the flow of information among enterprise functions across geographically strewn business units as well as with the external stakeholders. The current estimates put ERP market to over $50 billion in total revenue with a multitude of tightly integrated functional modules covering end to end and standardized business processes for any industry vertical.

Needless to say, implementing an ERP solution can be challenging for enterprises of any size. The extent of complexity, however, is difficult to define. At present, there is no established industry specific measurement baseline or metrics available for complexity analysis. The complexity measurement has to involve a quantification of various inter-dependent program elements such as process scope, technology architecture, organization readiness, and so on. This measurement becomes further complicated by the fact that often these deployments are done over a period of time in the form of roll-outs or in a phased manner, resulting in the need to further refine the definition of the baseline pilot implementation metrics versus those of the roll-out phases and the localization impacts of different geographies. Finally, this measurement also has to be industry and product agnostic, and establish a common baseline applicable across various industries as well as multiple ERP products e.g., SAP, and Oracle, leading to a comparable assessment.

In order to drive IT simplification for an ERP implementation, there is an acute need to establish a yardstick or metrics for determining its complexity, and common strategies to identify the means to influence this yardstick. The common strategies in turn drive the simplification which leads towards overall reduction of TCO for the ERP Package.

A Large Manufacturing Enterprises' Battle on ERP Deployment Complexity

*ABC Inc.*is a multi-billion dollar manufacturing enterprise of large industrial equipment, but grew from a small parts company by expanding and acquiring businesses. The CIO now has a great challenge at hand, because the spree of

mergers and acquisitions resulted in heterogeneous, localized and disintegrated IT landscape resembling spaghetti. His job was to simplify and nurture an integrated IT landscape to support the enterprise growth pace.

Furthermore, business expectation was to enhance business process capabilities to provide flexibility and scalability to adapt to future market needs, global customer demands, and organizational changes. The overall business objective was to consolidate order taking points to single window, source seamlessly from low cost regions, real time collaboration with global partners, leverage contract manufacturing, and single planning engine across multiple plants, along with keeping single database for products, customers, supplier and engineering data.

Hence, the CIO embarked on the journey to implement ERP to standardize and streamline business processes and localized IT systems into a single global instance. There were numerous challenges in front of the CIO even before ERP deployment began. He had to take a call on the ERP product amongst the long list of options available. He also had to put a core team in place to support the implementation program, comprising of key IT as well as business stakeholders. Despite the challenges, because of the great support from business and his previous experience with multiple products, he was able to finalize the preferable ERP *Product XYZ* to implement. However, with the intent of simplifying the process, he decided to conduct an XYZ package assessment exercise to understand the ERP's complexity and come up with deployment plan and the best estimated cost.

The case considered here is fictitious. It is used in the context of elaborating various dimensions of ERP implementation complexity, and any resemblance to any enterprise is purely coincidental. However, the situation would have similarities of various degrees to real-world organizational scenarios. The scenario has been taken for a generic ERP deployment for industrial manufacturing industry; however this approach can easily be extended to any mature ERP product in most of the industry verticals.

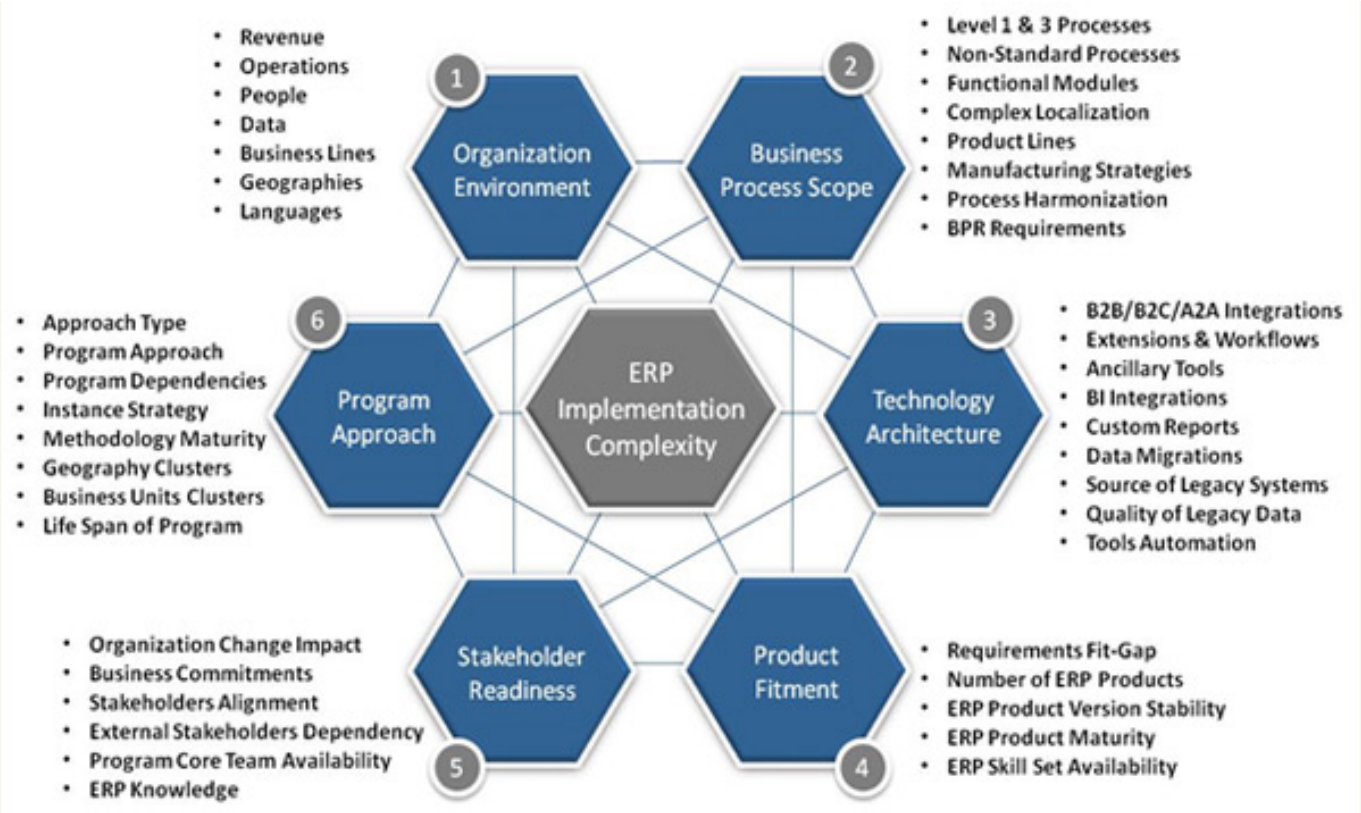
Why Enterprises Fail To Understand ERP Implementation Complexity

In the early 1990's, ERP evolved out of the manufacturing industry as a transition from existing MRP-II system to integrate manufacturing activities with enterprise financial resources. ERP, as simple as it may sound, is a complex piece of the puzzle that makes an impact on the entire user community and inevitably touches the enterprise's core business functions. It is a long and expensive affair that can take anywhere between 1 to 5 years to deploy, along with colossal budgets, in the range of few millions to hundreds of millions of dollars.

Any ERP program's success in the context of users is predominantly explained by five key criteria: meeting business requirements by delivering value metrics; acceptable response time from new system; access of relevant data accurately and timely; knowledge of performing tasks in the new system; and meeting regulatory compliance and controls. Also, in the context of a CIO, the program must be within given timelines and budgets. However as per analysts, nearly 60-70 percent of ERP programs fail to meet user expectations, frequently grapple with milestones,

repeatedly are over-budget, and often don't deliver the stated business benefit metrics. The causes of failure vary from one situation to another and cannot be attributed to any single reason, yet ERP complexity is a common thread.

In general, any ERP deployment is driven and funded by business executives, along with well-defined benefits metrics to eventually achieve universal objectives to increase efficiency, reduce cost, enhance revenue, improve customer engagement, and finally enable management executives to take informed decisions with real time data. So, the focus of CIOs remains on complexity of business solution during the entire program, which is only one of the success criteria in the context of end users. CIOs many times fail to understand the complexity of other critical elements of the program, which in turn results into further strain on the overall budget, timelines and even business goals. These critical elements can be broadly categorized into six dimensions: organization, process, technology, stakeholder, product and implementation approach.



The various dimensions of ERP complexity are not so independent, and extensively influence each other in almost all the stages of the deployment. Their complexities can also vary significantly based on culture and environment of the enterprise. To identify strategies to drive the ERP simplification, it is necessary to strike a balance among all of these dimensions. It is , however, easier said than done as it's not only a matter of striking balance across all these dimensions, but also for the CIOs to know exactly where the complexity can be reduced and where it needs more focus and effort.

Many CIOs just take any path without knowing the destination. Many of ERP initiatives fail or falter due to confusion over exactly what is expected to be delivered from the ERP at the end. To achieve the goals of ERP deployment, CIOs

need to first define the destination, then zoom in on it on a complexity map, and figure out an optimum and simplified path to move forward.

A Holistic Approach To Understand Complexity Dimensions

There are several parameters that can determine the size of any ERP deployment. The larger the size of the deployment, greater would be the number of scenarios and complex business processes. CIOs need to focus on each dimension and their various parameters carefully, and measure it on the various scales. Later, they can associate appropriate weights to these parameters to determine overall complexity of any ERP deployment.

Dimension 1 -- Organization Environment

Firstly, there is a need to understand the size of the organization in scope for ERP deployment. The size can be determined by a scale across multiple parameters: revenue, operations, people, lines of businesses, divisions, geographies, languages, master and transactional data, and so on. For instance, ABC Inc. has following data:

Scales	**Value**	**Complexity**	**Details**
Revenue	$5B	high	$5 B Yearly Sales Dollars; $2B Yearly Shipment D plant only
Operations	Large	high	800,000 sq ft of US mfg plant; 350,000 sq ft of US space; 1000-1300 units shipped every day from U
People	2500	high	10,000 users; 7,000 in the various plant, ~ 3000 t ERP business users
Data	Medium	medium	500,000 iItems, 800 suppliers, 2000 distributors, routing lines, 450,000 bills etc.
Business lines	5	high	Industrial equipment mfg plant for 5 different bus
Geographies	8	high	8 mfg plants across the globe; US plant for base c
Languages	4	high	English language only for base implementation

In this example, the complexity of organization environment is elevated due to high revenue base, shipments and users in the largest single plant. Furthermore, the implementation is to be done for 8 geographies, with multiple language support and including 5 business lines.

The other consideration is to evaluate if any major organizational change, such as a merger or acquisition, is happening in parallel. These can impact ERP deployment. If one of these changes is ongoing, one must answer how drastic is the change will be from the original organizational structure. The ERP deployment itself bring some change in structure and culture of organization, and if there are too many parallel

organization changes with creating dependencies for ERP deployment, it can increase the risk as well as complexity multi-fold.

Dimension 2 -- Business Process Scope

ERP systems model any enterprise in context of these functional modules and respective process flows which can be further exploded to different levels representing Level 0 for functional areas, Level 1 for processes, Level 2 for sub-processes, Level 3 as functions and finally Level 4 for tasks and activities.

ERP systems are different from traditional software systems, and provide a pre-packaged application where process flows are standardized by ERP vendors based on industry best practices. Hence, it becomes apparent that the program managers need to equally proportionate the complexity of ERP program to the number of functional modules, as well as process flows they intend to configure. However, it is not a true measurement of complexity. Depending on the maturity of the given ERP, this configuration effort can vary drastically, and even make it more complex if there are non-standard processes, localizations, and functional gaps. For instance, ABC Inc has following data:

Scales	**Value**	**Complexity**	**Details**
Level 1 Processes	7	medium	Forecast to plan, plan to build, build to deliver, c order to cash, source to pay and record to report
Level 3 processes	300	medium	Order creation, pick-release, invoice creation, cre inventory, receiving inspection and so on
Non-Standard Processes	45	high	Label printing, engineering change order approv line side replenishments, quality testing flow and
Functional Areas	15	medium	Mfg, orders, WMS, costing, work-in-process, rece
Localization	20	low	Needed for regulatory requirements for various g
Product Lines	25	high	25 manufacturing lines based on product and sp variants such as commercial, govt., gas etc.
Mfg Strategies	4	very high	All 4 – MTS, MTO, ATO and ETO
Process Maturity	Low	high	Low business process harmonization
BPR Complexity	High	very high	50 L3 processes needs BPR (Business Process Re

In this example, the complexity of product lines and non-standard processes is resulting into multiple manufacturing strategies and scenarios, and also requires high effort due to the low level of process harmonization and business process re-engineering. On the other side, some of the functional areas such as lead to quote (CRM), implement to support (Service), hire to retire (HRMS) and core financials are

not part of scope and there is limited localization requirement. This is due to the fact that ABC Inc. has shared server satellite system for HRMS, financial, CRM and service functional areas, and does not intend to implement those within the ERP system. This reduces the overall process scope complexity and effort for configurations due to reduction in scope. However, this will introduce the need for various integrations requirements, and increase the technology scope and complexity.

Dimension 3 -- Technology Architecture

Over the last two decades, technology innovations have changed the face of ERP architecture. Evolving from mainframes to client-server to web platforms required enterprises to re-architect their existing systems and solutions. Today, most of the ERP technology landscape offers SOA-based architecture and lighter applications compared to its primitive models.

Any ERP today implies multi-tier architecture in which UI presentation, applications, and databases are logically separated layers. This architecture runs on a given operating system that sits on the top of the hardware. Thus, this architecture represents five levels of hierarchy. This also needs to integrate with satellite applications within the enterprise, as well as with external stakeholders through various options such as point-to-point interfaces, web services, e-commerce, portals and so on. This architecture also needs to integrate with data warehouses and data marts for reporting requirements. There are other technology trends to consider such as decision between on-premises versus on-demand (hosted), sustainable architecture for green-IT, handheld-enablement etc.

Once decided on architecture, the enterprise also needs to finalize the number custom components to be developed, including extensions, interfaces, workflows, reports, and data migrations objects. Admittedly, it is sometimes reasonable and unavoidable to include custom components on top of the ERP to address the specific functional gaps; however it comes with its own cost and complexity. For instance, ABC Inc. has the following data:

Scales	**Values**	**Complexity**	**Details**
B2B and B2C Integrations	25	medium	ASN, SO or PO Acknowledgement, Shipments to Supplier Portal and so on
A2A Integrations	35	high	Suppliers, Invoices, Warranty, Orders and so on
Ancillary Tools	15	low	Tax Calculation, Job Scheduling, Export Complia
Extensions	80	high	Notifications, Personalization, Label and Name F Printings, Bolt-on Applications and do on
BI Integrations	2	low	Data warehouse for analytical reports and Data hoc reporting requirements
Custom Reports	60	medium	Custom MIS and Analytical Reports out of ERP s

Data Migrations	30	medium	Items, Bills, Routings, Cost, Suppliers, Orders ar
Source Systems	3	low	ERP will replace 3 different legacy systems
Source Systems Data Quality	Low	high	Significant effort needed for data cleansing and
Tool Automation	High	low	Using Regression and Performance Testing tools Purging Tools, Version Control tools and so on
Tools Stability	High	very low	XYZ proprietary technology is relatively stable
Technology Skill Set Availability	Medium	medium	XYZ proprietary tools and technologies has fewe in the market

In this example, the complexity of custom components is on the higher side primarily due to higher number of non-standard processes, more satellite applications and three legacy systems from where the data needs to be migrated from. On the other side, leveraging automated tools and availability of skill set help in reducing some amount of effort and complexity.

Dimension 4 -- Product Fitment

ERP system is a standardized application that supposedly offers industry best practices based business processes as a result of product vendors' extensive research and experience. However, one size does not fit all, and in many cases there are one-off processes and functional gaps which a given ERP product does not fulfill off-the-shelf. A very low product fitment, such as less than 40-50 percent, implies inapt selection of ERP product, and significant deviations to company core processes and operations. The other key consideration is the number of ERP products selected for deployment in parallel. Many enterprises intend to implement best of the breed products, and choose multiple packages for various functional areas, e.g., one for financials and other one for HRMS. This makes the deployment complex, more so in cases where the level of compatibility for such products is low. For instance, ABC Inc. has the following data:

Scales	**Value**	**Complexity**	**Details**
Requirements Fit-Gap	80%	high	Fitment to ERP product
ERP Products	1	very low	Only one ERP product in scope
ERP Version Stability	Low	high	Using latest and recently released version of XY take some time to stabilize
ERP Product Maturity	High	high	XYZ is one of largest ERP vendor and many refe deployments available

ERP Skill Set Availability	Medium	medium	XYZ proprietary tools and technologies has fewe in the market

In this example, the complexity of product fitment is on lower side due to higher percentage of fitment and usage of single and matured ERP product. However, the latest version is not stable, so it will require additional effort for testing.

Dimension 5 -- Stakeholder Readiness

The quantum of process change in any ERP program can overwhelm business users. The new integrated and automated processes bring more accountability and higher expectations from them. This change can impact not only business processes, but also affect organization's existing policies and procedures, roles and responsibilities, structure and cultural environment. If the key stakeholders are not ready or magnitude of change is high, it increases the complexity of the deployment significantly.

All the key stakeholders of program must be comfortable, effective, and committed to use the new system. This is achieved with the help of an effective organization change management (OCM) effort. OCM is not about creating forced buy-in, or just advocating the new business paradigm, but also helping all the stakeholders understand benefits stated as a rationale for the change, and accurate use of new processes and tools.

ERP program must be owned and driven by senior business leadership. It must be demonstrably committed to the change and the stated benefits. This responsibility also needs to be cascaded down through formal and informal leaders in the program such as users' immediate supervisor. Both business and IT teams must be aligned to the objectives and execution plan of the program. There must be active involvement of key business users from all the relevant functional areas and program core team at all stages of the implementation, and just not limited to initial requirements gathering and in the last user acceptance testing phase.

If there are many external stakeholders involved in the program such as suppliers, customers, banks, and distributors, and their involvement is required during deployment stages such as solution design or testing, their availability has to be planned upfront. For instance, ABC Inc. has the following data:

Scales	**Value**	**Complexity**	**Details**
Organization Change Impact	High	high	Significant changes in business processes, po procedures. Relatively lower impact in org str
Business Sponsorship	High	low	CXO driven program with high visibility
Stakeholders Alignment	High	low	Both Business and IT teams are aligned with p objectives and goals
External Stakeholders	High	high	Suppliers and distributors dependencies for p

Dependency			requirements and testing etc.
Program Core Team Availability	High	low	Dedicate program core team and all stakehol available within similar time zones
Program Core Team ERP Knowledge	Low	high	First ERP implementation for organization

In this example, the complexity of change impact is on the higher side due to significant variations in business processes. However, the program is driven by business leadership with high commitment, and users are involved actively.

Dimension 6 -- Program Implementation Approach

Once all the data gathered for above stated five dimensions, the CIO has to determine the right ERP implementation approach. There are various options available and enterprise need to evaluate and select the most viable option based on its overall revenue, business lines, concurrent users and their demographics, geographies and languages, allocated budgets, desired timelines and, most importantly, risk appetite.

In case of global deployments, organizations also need to decide on the set of geographies or business units that can be grouped together for deployment. In case there are multiple clusters with number of localization requirements, it adds multi-fold to the ERP complexity. Similarly, another key decision is about overall instance strategy. There are three models: single global instance, multiple individual instances, or hub-and-spoke instances. In case of single global instance, during the base implementation, the additional effort must be included to understand other geographies or business units' specific localizations needs, and later for thorough regression testing. For instance, ABC Inc. has the following data:

Scales	**Value**	**Complexity**	**Details**
Program Type	New	high	New Implementation vs. Re-Implementation v
Program Approach	Phased	low	US Plant as base implementations, and other be rolled out in later phases
Program Dependencies	High	high	Parallel technology upgrade for legacy system Lifecycle management (PLM) and data wareh programs
Instance Strategy	High	high	Single Global Instance
ERP Methodology Maturity	Low	low	Leveraging SI proven implementation method
Geography Clusters	None	high	8 geographies in 4 clusters US, EMEA, APAC a

Business Units Clusters	None	high	5 business lines clustered in base implementa
Life Span of Program	3 years	medium	Including 1 year for base implementation and for phased rollouts

In this example, ABC Inc has taken the phased approach with single global instance, which reduces the overall complexity, however US is the largest plant and accounts for 40 percent of overall revenue, which adds significant risk to the program.

Closing Thoughts

The ERP landscape is a mountainous terrain due to the uncertainties involved in the business environment that every organization competes in and becomes a treacherous environment for the CIO. A holistic approach has to be identified to reduce the uncertainties involved in the ERP implementation space by identifying metrics which can help determine deployment complexity. Even though six critical dimensions have been identified to measure, it becomes very important to not sideline it as an IT initiative but to put in on the pedestal as an enabler for the organization's core business processes.

Highly cross-functional teams, effective change management, and homogeneous communication strategies are needed to provide effective ERP implementation process. Other vital success factor is the commitment and support of senior management. They should undertake the implementation of an ERP system as a "business transformation exercise" and should steer the entire process to assure its success.

About The Author

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Nikhil has significant experience for global large-scale and complex Oracle ERP-led business transformations across various industries including High-Tech Manufacturing, Automotive, Retail, Banking and Financial Services. He specializes in Program Management, ERP Product Evaluation, IT & Business Strategy Alignment, Program Start-up & Planning, Business Process Re-engineering and Solution Consulting. He is an avid blogger and has published multiple thought papers. He can be reached at Nikhil_Kumar@infosys.com *[1].*

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