TATA CONSULTANCY SERVICES

Building on belief

Low-Code No-Code

A call-to-action for enterprises

Abstract

In today's digital world, business leaders expect IT teams to deliver results at an unprecedented pace. The urge to lead the race in launching new product features has boosted the adoption rate of low-code no-code (LCNC) platforms. These platforms minimize the need for highly skilled software professionals, as business users, also known as citizen developers, create the required applications to accelerate market launches.

However, the adoption of LCNC platforms is a strategic decision that enterprises should make after considering several factors, including organizational culture and evolving software paradigms. These platforms must be seamlessly integrated into the growth and transformation initiatives of the enterprise. Moreover, the key to successful LCNC adoption is in the organization's ability to strike the right balance between productivity and flexibility. This paper presents an enterprise-wide, industry-agnostic perspective—going beyond the advantages and business benefits of LCNC—to provide key pointers that organizations must consider when adopting the LCNC strategy. Particularly, it highlights actions that enterprises can take to gain strategic advantage.

Foundation of Low-Code No-Code Platforms

While enterprises are pushing for newer and faster market-facing product features, so are individual departments for line-of-business applications. LCNC platforms are hence, in high demand. These platforms successively abstract and simplify the complexity of the software development process by automating and optimizing the various steps involved. The robustness and agility of low-code no-code platforms translate into easily adaptable processes and faster deployable solutions, essentially addressing the skill and time constraints associated with the complexity at the different layers of the computing stack. When assessed at a large scale across enterprise software needs, this can deliver direct savings, setting the stage for wider adoption of LCNC.

> Application development is 4.6x faster, 4.6x affordable and 4.8x easier when using low-code no-code platforms
>
> -The No-Code Census 2020 report.

These platforms have already proven effective for a wide variety of business applications, ranging from website and web application development to data analytics and business process automation. According to Gartner[1], nearly 80% of technology products and services will be built by non-technology professionals using LCNC platforms by 2024.

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[1] Gartner press release; published June 14, 2021; https://www.gartner.com/en/newsroom/press-releases/2021-06-10-gartner-says-the-majority-of-technology-products-and-services-will-be-built-by-professionals-outside-of-it-by-2024; accessed October 25, 2021

Scope of LCNC Platforms

The advantages of LCNC platforms include drag-and-drop visual interfaces; progressive deployment of web applications across various form factors and experiences; API-based integration with external as well as enterprise applications and data; and business process modeler and automation workflow designer using AI-based approaches. Another important benefit favoring LCNC platforms is their ability to fail fast. These platforms help convert business ideas to minimal viable products, without spending significant effort on coding. These platforms also aid in testing the potential of business ideas thus, reducing massive costs and risks associated with software product development.

Present-day LCNC platforms offer wide coverage: across enterprise applications, such as Salesforce, Oracle, and ServiceNow; business process management systems including Pega and Camunda; robotic process automation tools such as UIPath and Automation Anywhere; pure-play low-code no-code platforms, such as Appian and Mendix; and niche players such as AirTable and QuickBase. Several other platforms focus on value chain coverage, namely, intelligent document processing providers such as Kofax and Abbyy; and eCommerce platforms such as Shopify and Bigcommerce. We see similar traits in engineering tools such as Matlab and TeamCenter. Overall, there is a convergence of tools and platforms across the various functions. All these modern tools are incorporating LCNC capabilities with BizDevOps support.

The Productivity-Flexibility Trade-Off

As LCNC platforms evolve with more sophistication to address the needs of enterprise-class applications, it is essential for organizations to understand the effect of LCNC adoption and take appropriate and timely action. Typically, a business application can be viewed from four dimensions:

- Functionality that the application will address
- Business processes that cover the steps and tasks to be automated
- Design decisions, including strategies to ensure the desired level of performance, usability, and scale
- Architecture decisions (such as client-server, web, or cloud-native) and the technology stack, covering choice of programming language, database, graphical user interface, middleware, operating system, server, and others

While functionality remains common, choices along the other three dimensions are rarely identical across different enterprises unless the needs are commoditized (in which case, off-the-shelf products will meet the demands). Thus, enterprises tend to prefer bespoke business applications that meet the requirements along all four dimensions, similar to the traditional and manual software-development process.

For the business developer, however, low-code no-code attempts to hide the technical and technological aspects to the extent possible. Apart from the inherent benefits of saved time, cost and effort, LCNC can help improve productivity by providing:

- A library of ready-to-use design patterns
- Intuitive business-facing interfaces to populate application specification
- Generative mechanisms to automatically transform the specification into code
- A high-level integrated development environment to offer a seamless user experience

This is possibly the right approach for LCNC in an enterprise's overall development effort. There have been similar attempts earlier with varying degrees of success but the key to faster adoption is in the ability to strike the right balance between productivity and flexibility. When the LCNC platform supports the first three patterns cited above, it may lead to higher productivity, but the generated application may fall short of expectations on several other counts. Severe limitations to align the developed business application to the needs of the enterprise will deter and slow down adoption. Overcoming such pitfalls becomes a necessity. Organizations should incorporate learnings from model-driven software development to bolster LCNC platforms.

The Call to Action

As an important strategic decision, LCNC adoption should be aligned with the overall culture and business objectives of the organization. The key areas for enterprise action in this direction are shown in Figure 1.

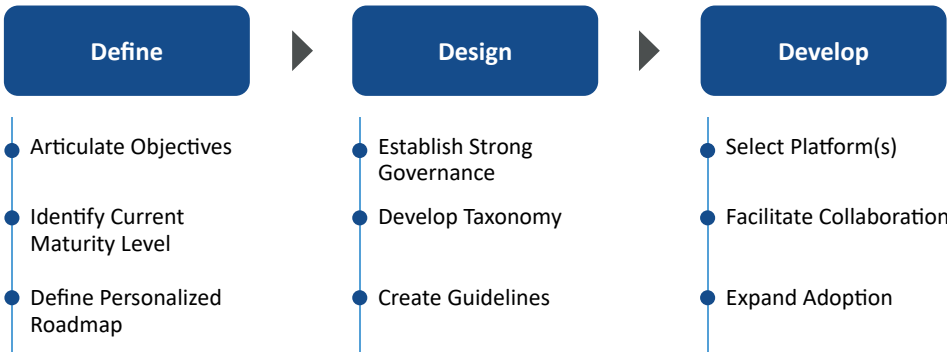

Figure 1: Key Areas for Enterprise Action

Define: Enterprise leaders must clearly articulate their low-code no-code vision and objectives. This would help the organization assess their progress through the LCNC journey and make necessary amends along the way. Secondly, they must create an assessment framework to categorize applications and identify current LCNC maturity levels. It will help score applications and portfolios and set the base for business transformation. Lastly, defining a roadmap will help align the low-code no-code platforms with the organization's growth and transformation journey to achieve the target LCNC state.

Design: Organizations must create a governance structure comprising business and IT leaders to oversee the enterprise's LCNC journey. The team must enable talent development using LCNC platforms. It must identify opportunities for its adoption and monitor progress. It should promote collaboration between IT and business developers and control undue overlap of efforts among the various teams. Taxonomy will play a crucial role in ensuring the consistency of language among enterprise stakeholders. Leaders must ensure standardized implementations of security, customer journeys and business processes. Lastly, guidelines for low-code no-code development will help standardize the usage of the platforms across the enterprise. Organizations must identify the types of applications and components suitable for low-code no-code or professional development, based on criteria, such as complexity and criticality. Additionally, they should devise a mechanism for moving applications from low-code no-code to traditional development and vice versa when the need arises.

Develop: Selecting the right platform is the key to success of the enterprise LCNC journey. Organizations must generally adopt more than one platform to realize the full potential of low-code no-code. They must consider fitment with respect to business strategy, current adoption rate, ease of use, platform roadmap, extensibility through plug-ins and accelerators, and the target marketplace while choosing the platforms. Potential risks of using commercial platforms include vendor lock-in,

and scalability, and security limitations. Organizations need a balanced and pragmatic approach to address these risks. Lastly, enterprises must facilitate business developers looking to adopt LCNC platforms for their individual lines of business. In addition to the guidelines mentioned above, professional and business developers must collaborate on projects to establish a suitable work culture, which complements the other. While the initial focus of LCNC adoption would be on pilots to demonstrate success, organizations could consider setting up an enterprise business transformation sandbox to continuously assess and improve performance across the value chain.

The Path Ahead

Low-code no-code platforms enable the automation of tasks, workflows and rule-driven business processes. Increased automation of such 'robotic tasks' via LCNC will pave the way for newer robotic assistants that can learn from automation and become companion 'cobots' for developers.

Recent developments in artificial intelligence (AI) have begun to drive the transition from the current rule-driven paradigm of enterprise business processes towards data-driven environments. Moreover, as organizations shift focus from process maturity to data maturity, there will be more opportunities for LCNC. Rapid adoption of AI and its evolution to neural-network paradigm will allow LCNC approaches to take a giant leap and may, in turn, accelerate the journey towards Software 2.0. The market expectation is that LCNC platforms will adopt abstractions offered by such evolving paradigms that go beyond what developers can conceive.

Enterprise developers are continuously seeking efficiencies in the software development lifecycle to improve productivity. As AI-native becomes the new norm, digital code assistants and an LCNC approach to building machine learning models will allow developers to focus on refining the existing models to their needs via emerging concepts, such as differentiable programming. Developing the ability to apply machine learning to identify new patterns from the large amounts of application development data and to utilize them in complex software projects will enable efficiencies and improve their productivity. We see several advancements in pre-trained models, such as the transformer architecture and the development of transformer models, GPT-3 (Generative Pre-trained Transformer) and BERT (Bidirectional Encoder Representations from Transformers) for pre-trained natural language processing.

Strategically, the LCNC phenomenon embodies a few characteristics of disruptive innovation (Clayton Christensen's theory)[2]. Firstly, it significantly lowers the entry barrier. LCNC platforms are providing the tools for developing innovative applications in the hands of the digital knowledge worker. This is an additional level of abstraction compared to disruptive innovations in the past

[2] C. Christensen, "The Innovator's Dilemma on How to Build a Disruptive Business," Startup Grind, 1 March 2016. [Online] https://www.youtube.com/watch?app=desktop&v=Zn6-KksdOgE

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