INDUSTRY DEVELOPMENTS AND MODELS

Leading in 3D: Managing Technical Debt in Digital Transformation

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IDC OPINION

Digital transformation (DX) is accelerating the pace of innovation and experimentation in every industry. Organizations are striving to provide new, more encompassing engagement models throughout their ecosystem with the application of 3rd Platform technologies and accelerators. But, at the same time, they are challenged with providing operational excellence at lower costs from their existing IT infrastructure. One problematic approach to managing this is to separate IT activities into "fast IT" that focuses on providing innovation and experimentation and "slow IT" that maintains a slow but steady path of efficiency, reliability, and stability. Unfortunately, this bifurcation of IT functions can lead to redundancy and inconsistency in DX innovations that threaten omni-experience opportunities and a buildup of fragile one-off connections that slows or stalls the entire transformation effort. These undesirable side effects of the fast/slow approach can be quantified in terms of "technical debt." Technical debt provides a powerful metaphor for IT and business leaders to understand the pitfalls of a fast IT/slow IT approach and the role that continuous integration plays in turning digital transformation initiatives into sustainable competitive advantage. In this context, technical debt refers to the work left unfinished when implementing fast IT innovation programs that are disconnected from the rest of IT. To implement digital transformation in a scalable and sustainable fashion, these innovations need to be continuously integrated into the enterprise-class IT infrastructure in the form of business services. Not doing so results in fragility and inconsistencies and builds up a backlog of work that is necessary to address them. Like financial debt, this backlog, or technical debt, must be paid down, with interest. The longer an organization waits to address it, the more it will eventually cost to resolve. Failure to address the debt at all will ultimately end in a bankrupt digital transformation. IDC’s Leading in 3D (L3D) approach attacks technical debt head on by continuously integrating innovations and incorporating them into the fabric of enterprise IT. L3D guides IT leaders to incorporate three specific and interrelated approaches into their IT management:

- **Innovate** — partnering with the business to create or enable digital innovation
- **Integrate** — establishing digital capabilities in the enterprise platforms by transitioning new technologies into stable business services and eliminating technical debt in the process
- **Incorporate** — evolving existing, at-scale, technology platforms by infusing new techniques and technologies into the existing infrastructure, organization, and processes
IN THIS STUDY

This IDC study explores the concept of technical debt as it applies to digital transformation initiatives. It provides a powerful metaphor for IT and business leaders to understand the pitfalls of a fast IT/slow IT approach and the role that continuous integration plays in turning digital transformation initiatives into sustainable competitive advantage.

In this context, technical debt refers to the work left unfinished when implementing fast IT innovation programs that are disconnected from the rest of IT. Scalable digital transformation requires innovations to be continuously integrated into the enterprise IT infrastructure in the form of business services. Not doing so results in a backlog of necessary work, or technical debt. Like financial debt, this technical debt must be paid down, with interest. Failure to address the debt will ultimately end in a bankrupt digital transformation.

IDC's Leading in 3D approach attacks technical debt head on by continuously integrating innovations and incorporating them into the fabric of enterprise IT.

SITUATION OVERVIEW

Digital transformation is accelerating the pace of innovation and experimentation in every industry. Organizations are striving to provide new, more encompassing engagement models throughout their ecosystem with the application of 3rd Platform technologies and accelerators. But, at the same time, they are challenged with providing operational excellence at lower costs from their existing IT infrastructure. One approach to managing this is to separate IT activities into fast IT that focuses on providing innovation and experimentation and slow IT that maintains a slow but steady path of efficiency, reliability, and stability.

Unfortunately, this bifurcation of IT functions can lead to redundancy and inconsistency in DX innovations that threaten omni-experience opportunities and a buildup of fragile one-off connections that slows or stalls the entire transformation effort. Compounded with this, a backlog of integration requirements accumulates, putting additional strain on the enterprise IT infrastructure and team. These undesirable side effects of the fast/slow approach can be quantified in terms of technical debt.

What Is Technical Debt?

Technical debt refers to the work left unfinished in a project, but which still needs to be completed to achieve agility, quality, and sustainability. While the term originated with the Agile development movement, the concept can be applied to any system, such as an enterprise IT portfolio or digital transformation initiative, not just to a single code base.

Figure 1 illustrates how technical debt will build up over time. In Figure 1, the bottom line shows the change of investment in slow IT, while the top line shows the accelerated investment in fast IT. The area between these lines illustrates the technical debt that accumulates as innovation is pursued independently of the IT infrastructure. The dotted line in the middle shows the impact of the technical debt on rising "keep the lights on" spending.
Steve McConnell defines technical debt as “A design or construction approach that is expedient in the short term, but that creates a technical context in which the same work will cost more to do later … worse, until that later date, the system continues to grow. When the time to integrate arrives, the cost is no longer just $C$, but it is $C + R$ where $R$ represents the impact of retrofitting the existing system” in light of the changes and complexity that have occurred in the meantime.

This lack of integration can be thought of as the principal of the debt — the cost (and effort) required to address the incorporation of innovation into the fabric of enterprise IT. A debt (both financial and technical) means that you have traded off acquiring something now in exchange for a longer-term financial burden. This burden is not just repaying what you got (the deferred work not performed), but there is also interest that must be paid (the cost of added complexity that accumulates in the meantime). If the debt is not paid down, the debt will keep increasing, and if ignored long enough, it will become unpayable until the endeavor goes bankrupt (DX will fail to scale).

Technical debt impacts a wide range of stakeholders, not just IT, such as:

- **Customers** are bothered by inconsistencies in information and the lack of integration, impairing the overall omni-experience.
- The pace of transformation slows exponentially with the backlog of integration, limiting business leader’s ability to seize new opportunities or respond to competitive challenges.
- Information is not interoperable across the DX initiative, reducing the value and insight delivered by analytics to marketing.
- Bugs lead to increased calls to the help desk and more frequent patches for the operations team.
- When integration is finally attempted, development teams are faced with more complex, expensive, and time-consuming projects.
Martin Fowler defined a technical debt taxonomy, which explains that technical debt can accumulate either deliberately or inadvertently and that an organization can address that debt either recklessly or prudently. Table 1 applies that taxonomy to digital transformation.

<table>
<thead>
<tr>
<th>Address/Accumulate</th>
<th>Reckless</th>
<th>Prudent</th>
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<tbody>
<tr>
<td>Deliberate</td>
<td>&quot;Integration is a waste of time. We're moving so fast that we don't need it&quot; … until quality, interoperability, and inconsistency catch up with you ….</td>
<td>Continuous integration is used to fully incorporate DX innovations into stable IT infrastructure.</td>
</tr>
<tr>
<td>Inadvertent</td>
<td>Ignorance is bliss, until DX initiatives collapse under their own weight.</td>
<td>Learn from the mistake. Hopefully, it's not too late to correct.</td>
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Source: IDC, 2016

Understanding technical debt should facilitate a "deliberately prudent" environment where the enterprise accepts the fact that innovation and speed will sometimes require deferring integration of new capabilities, while at the same time, business and transformation leaders understand that incurring this debt is only wise when there are also plans in place to incorporate the transformation into the stable enterprise foundation. Technical debt management is about navigating a path that considers time, value, and cost to focus on creating sustainable advantage through digital transformation.

Avoiding Technical Debt

IDC's Leading in 3D model addresses the accumulation of technical debt. L3D guides IT leaders to incorporate three specific and interrelated approaches into their IT management:

- **Innovate** – partnering with the business to create or enable digital innovation; and moving at the accelerating pace of digital transformation
- **Integrate** – establishing digital capabilities in the enterprise platforms by transitioning new technologies into stable business services; and managing the continuous exchange of lessons learned from existing operations and the scaling of business and technology with the innovation of technology incubators
- **Incorporate** – evolving existing, at-scale, technology platforms by infusing new techniques and technologies into the existing infrastructure, organization, and processes

Figure 2 illustrates how these three techniques work together. The top line, innovate, addresses the needs of fast IT by working with business partners to experiment and innovate. The bottom line, incorporate, represents the investment in operational excellence of existing infrastructure, plus the investment to incorporate new ideas, processes, and skills into that infrastructure and organization. To eliminate the technical debt that can accumulate between these, continuous integration (the middle line) systematically moves innovative ideas, techniques, and technologies into the enterprise infrastructure in the form of stable business services. It is the architecture and integration activities that reduce the technical debt while enhancing the overall enterprise capabilities. Also notice that continual integration and incorporation has the effect of reducing "keep the lights on" spending, more than compensating for the increased investment to incorporate the innovations.
FUTURE OUTLOOK

Digital transformation is much more than a popular buzzword. It is either an opportunity for an enterprise to thrive in its ecosystem or a threat to the enterprise’s existence. Some organizations will ignore these opportunities and threats at their peril. Most will enter cautiously, testing the waters and learning from others. A few will dive in head first. Whether they experiment with DX or fully embrace it, organizations will have to face the simultaneous challenges of innovation, scalability, and operational excellence.

Unfortunately, many organizations that are motivated to pursue digital transformation opportunities will not succeed. A simple fast/slow approach to IT will result in the accumulation of technical debt that can lead to DX failure. Many organizations will either take bad advice or simply not know better. And while ignorance is no excuse (in fact, a failure of leadership), with some luck they will learn the lessons in time to recover and move forward. Some organizations will simply ignore the problem, deeming warnings from IT and other leaders as "chicken little" alarmism. They will reap what they sow. The organizations that succeed will turn digital transformation into a sustainable competitive advantage by adopting a multidimensional approach of innovation, continuous integration, and incorporation.

ESSENTIAL GUIDANCE

- **Immediately (0-6 months):**
  - Learn about the concept of technical debt.
  - Evaluate the current and compounding technical debt in your DX initiatives.
  - Create a compelling story for your organization.
- **In the medium term (7-18 months):**
Use technical debt as a metaphor to influence DX business decision making.
- Initiate an L3D approach to IT leadership and transformation.
- Begin paying down technical debt with targeted integration efforts.
- **In the long term (18+ months):**
  - Formalize L3D leadership.
  - Systematize continuous integration to keep technical debt minimized.

**LEARN MORE**

**Related Research**

- *IDC MaturityScape: Leading in 3D* (IDC #US40933616, January 2016)
- *IT Strategy and Innovation: Leadership in 3D - Beyond Two-Dimensional IT Thinking* (IDC #256593, June 2015)

**Synopsis**

This IDC study explores the concept of technical debt as it applies to digital transformation initiatives. Technical debt allows IT and business leaders to understand the pitfalls of a fast IT/slow IT approach and the role that continuous integration plays in turning digital transformation initiatives into sustainable competitive advantage. Scalable digital transformation requires innovations to be continuously integrated into the enterprise IT infrastructure in the form of business services. Not doing so results in a backlog of necessary work or "technical debt." Like financial debt, this technical debt, must be paid down, with interest. Failure to address the debt will ultimately end in a bankrupt digital transformation.

This study focuses on three IT Executive Program practice areas: Leading in 3D, digital transformation, and IT strategy and governance.

"Technical debt provides a powerful metaphor for IT and business leaders," says Mike Rosen, research vice president with IDC's IT Executive Program. "IDC's Leading in 3D approach attacks technical debt head on by continuously integrating innovations and incorporating them into the fabric of enterprise IT."
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