Digital Transformation in the Manufacturing Industry
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Introduction

This paper sets out to explore the current challenges of the manufacturing industry, with particular emphasis on the effects of digitalization on its processes. The paper builds on the 2016 edition of CGI Global 1000, an outlook based on in-depth, in-person conversations with over 1,000 senior business and IT leaders, and provides insights and recommendations garnered from CGI’s extensive knowledge and experience helping our clients in the manufacturing industry increase productivity and agility to transform and grow.

About the CGI Global 1000

In 2016, as part of our annual Voice of Clients program, CGI met face-to-face with more than 1,000 business and IT leaders across 10 industries and 20 countries to hear their perspectives on the trends impacting their organizations and the implications these trends have on their business. From the manufacturing industry, we interviewed 87 clients across 13 countries and multiple industries including mining, metal, pulp & paper, chemicals, automotive, aerospace, high-tech, industrial and products.
Manufacturers are on the threshold of a new digital era

As manufacturers embark on their journey to Industry 4.0, they are accelerating digital to optimize, modernize and automate.

- Digital Transformation is accelerating across the value chain
- Reducing costs, improving agility and speed to market are the key business drivers
- IoT, mobile and cloud solutions are essential for the transformation
- IT/Legacy modernization is a key enabler

Source: CGI Voice of Our Clients (2016)

Almost 90% of our clients have on-going digital initiatives, although they are at different stages in their transformation journeys.

36% are exploring digital initiatives or running proof of concepts

62% are executing digital pilots and programs, however most are discrete digital projects
The question for our clients today isn’t whether or not to get on the “digital” bandwagon, but how to embrace this transformation in a smart way that brings together their short-term and discrete on-going initiatives with the prerequisites for a long-term vision, governance and architecture.

This paper will share insights and recommendations on the somewhat disparate, but important elements that manufacturers need to consider when planning a digital strategy and implementing comprehensive solutions to support their strategy.
A digitally-integrated and intelligent value chain is vital to drive innovation and become customer-centric

The CGI Global 1000 outlook reveals the specific drivers of digital transformation in the manufacturing industry:

- Currently, there is still a strong focus on product transformation—from product-centric to services and solutions—as well as on operations efficiency
- With the exception perhaps of the Automotive Industry, the focus on consumerization is slightly lower in the manufacturing industry compared to other more consumer-oriented sectors like banking and retail. Consumer and customer-centric initiatives in the manufacturing industry are very often product driven and leverage systems and methods such as advanced product configurators and mass customization.
- Technology modernization is of particular importance as the industry has to often contend with three kinds of legacies—R&D, operations and enterprise

Along with the three pillars of Industry 4.0—operations, product lifecycle and value chain—digital transformation in the manufacturing industry boils down to three areas that are tied together in an ubiquitous (cloud- and mobile-enabled), automated (software defined) and secure way.

Intelligent and connected assets: for top-to-bottom integration of operations

Intelligent and connected products: aimed at adding value to services and solutions

Intelligent and connected value chains: for collaboration and innovation within the eco-system of customers, suppliers and partners
Manufacturing companies need to consider these transformation areas and articulate (or re-articulate) what value they bring to their business in terms of client value and differentiation, new business models and growth potential, and prioritize accordingly.
The rise of industry platforms

The ability to leverage platforms that focus on reuse and commonality, such as modular design systems or, in IT, ERP platforms, is deeply rooted in the manufacturing industry. As manufacturers seek to embrace an enterprise-wide approach to digital transformation, the various discrete digital implementations currently in play—many of which are based on diverse technologies and “niche” solutions—will consolidate onto packaged digital platforms.

These platforms will likely be industry specific and will focus on industrial equipment and consumer products such as home appliances, connected cars, etc. They will take advantage of the global reach, cost benefits and opportunities for innovation that large cloud providers such as AWS, MS Azure and Google offer.

As the emphasis on innovation in products and services grows, these platforms will also need to handle and integrate product and asset-related information over the various stages of the life cycle, from design, production and sales to service and retirement.

Product Lifecycle Management (PLM), manufacturing information systems and IoT will come together, leveraging connectivity to cover parts of the product or asset life cycle that have so far been overlooked. This development will lie at the heart of the convergence of digital platforms in the manufacturing industry.

For affordability reasons, digital solutions for connected products and connected assets will converge within most manufacturers (across Development, Production and Maintenance / Services business scenarios).
The ability to seamlessly integrate Development, Production and Maintenance & Services business scenarios should be a key consideration in the selection of digital solutions and platforms for manufacturers. Among the 300+ digital and IoT “platforms” available in the market, the few that support this convergence will be the ones that stand out from the crowd.

In addition, manufacturers should consider the platforms’ capability to support open standards and industry frameworks emerging from various industry alliances such as Allseen, Thread, Open Interconnect Consortium (OIC), Industrial Internet Consortium (IIC) and oneM2M. This should be factored in by manufacturers when developing their digital strategy and choosing supporting technologies to guarantee future-proof capabilities and consolidate existing diverse initiatives.
Discrete digital implementations will require enterprise-grade service levels

Most digital solutions are either business critical (connected assets) and/or client-facing solutions implemented at manufacturers’ clients’ sites (connected products).

A large number of discrete digital implementations today are point solutions that have been implemented by individual business units in the company. Sometimes provided “as-a-Service”, these discrete projects do not take into account (at least not at the beginning) integrating the solution with the rest of the company’s portfolio of technologies and IT delivery services (Dev-Ops).

Critical and/or client-facing solutions require high availability and secure technology. Manufacturers need to keep in mind that the overall reliability of a solution often depends on its weakest component.

Right from the beginning, manufacturers need to take a holistic view on the future operability of their digital solutions.

Strong Software and Applications Lifecycle Management (S&ALM) capabilities will also be required to deploy, update and operate innovative solutions involving a large number of intelligent assets, equipment, devices, appliances, buildings or vehicles. Managing software in an industrialized way has so far not necessarily been a priority for manufacturers. This is changing. The ability to manage software is becoming a core element in their digital transformations, and organizations will need to either acquire these competences or rely on partners for them. Additionally, manufacturers should also look for strong S&ALM capabilities in the platforms that they ultimately choose as the backbone of their digital initiative.

We often hear from our clients the terms of “Mode 1 / Mode 2” and “traditional vs agile IT”. The emergence of a “2-speed IT” is a clear outcome of the CGI Global 1000 survey. This means that the IT organization often manages and runs enterprise and traditional IT environments and projects in parallel, and often separated from, digital and agile initiatives initiated in different business units in the organization, aiming to support their fast changing business needs.

“2-Speed IT” is a challenge as most manufacturers are often faced with three separate kinds of legacy technologies (R&D IT, Operations IT and Enterprise IT), as a consequence of traditionally siloed cultures.
As enterprise grade service levels are required, the capabilities available in manufacturers’ IT organizations will increasingly be required for the enablement of digital initiatives: it is in the flexible deployment and operation of scalable, operationally stable and secure solutions that the two-speed ITs will soon meet, leveraging best of both worlds. “2-Speed IT” is not a fatality but an opportunity to be embraced by IT organizations.
IT modernization will “fuel” digital transformation

Of the manufacturing clients interviewed as part of the CGI Global 1000 outlook, 57% cited addressing legacy technology as the second biggest barrier to digital transformation.

Increasing agility and speed of action, guaranteeing operational stability (“Silent IT”) and coping with continuously increasing regulatory constraints while reducing operating costs, is the new equation many manufacturing industry CIOs have to solve. In some companies, finding the answer to this equation is almost a precondition for CIOs to be able to “sit at the digital table” with their business counterparts.

In fact, reducing the costs of running the business, in order to invest in transformation and generate growth is a collective theme that emerged from conversations with the CIOs who participated in the CGI Global 1000 outlook.

- 68% of our clients plan to increase their total IT budgets or keep them flat in the coming years. This is primarily being driven by increased analytics capabilities and the need to develop new products and services.
- 72%, on the other hand, indicate they face significant pressures to contain operational expenditure (OpEx) budgets, and struggle to change their spend mix to fund transformation.

Accordingly, the key drivers for the year-over-year trends are:

67% plan to increase or maintain Total IT Budgets ...

... however organizations have not been able to change the mix to fund transformation

IT modernization/rationalization and transformational outsourcing will remain among the top two enablers to achieve “run” costs reductions and “fuel” digital transformation.
A significant part of the value related to digital transformation relies on manufacturers’ capability to consolidate, analyze and make decision based on real-time information acquired from intelligent and connected things. However, many organizations report that their employees spend a significant part of their time reconciling inconsistent information sources, with inconsistent master data related to products, customers, partners, assets, warehouses, etc., often being the root cause of these issues.

Major process interruptions or delays often occur due to master data inconsistencies. For example, discrepancies between a bill of materials across sales, production and after sales can result in delayed or wrong shipments, a delay in equipment installations and an increase in working capital; it can even cause low first-time resolution rates in the service space.

The impact of such inconsistencies is exponential in a global digital context with increased levels of automation and speed. This challenge is not new, but it is beginning to get harder. In fact, the axiom, GIGO or garbage in, garbage out, which suggests that the quality of input will determine the quality of output, is truer than ever today. Manufacturers’ capability to govern, maintain and distribute/publish master data will account for a large part of the agility and responsiveness of their end-to-end digitally-enabled business.

Master data governance, management and integration are a set of key capabilities that need to be considered at the outset of charting a digital transformation strategy and roadmap. Supporting solutions, including Product Information Management (PIM), Master Data Management (MDM) and Digital Assets Management (DAM) are key components of the backbone platforms that are required now and in the years to come.
The importance of change leadership

of our manufacturing clients interviewed revealed that managing change and overcoming internal resistance is the main barrier to digital transformation.

While embedding a digital-first culture is a challenge common to many industries, there are certain distinct cultural characteristics of the manufacturing industry that make addressing this challenge unique:

• Many manufacturing companies, in line with a traditionally product-oriented culture, often focus on the operational or technical side of things, overlooking the “softer” aspects of change
• Manufacturers are by nature slightly risk averse. Changes need to be tested and proven before they can be implemented and accepting failure is not always a part of the working culture.
• Change requires stepping out of one’s “comfort zone”, which in the case of manufacturers translates to the need for thinking beyond a well-established set of processes. The existence of NIH or the “Not Invented Here” syndrome, well-known in engineering-proud cultures can definitely impede rapid change

Managing change is often seen as a set of tactical tools, measures and practices that are needed to for organizational alignment across R&D, operations and enterprise business functions, under the crucial support and sponsorship from company executives. While these practices are valid as a reference framework, the nature of the change manufacturers are facing with digital transformation is different:

• Digital transformation has already started and it is accelerating
• Manufacturers are in part subjected to it by external factors (consumerization, etc.), which they do not have control over
Accelerating the journey: key takeaways

- Try to keep it simple and ask, re-ask and ask again the question “why?”
- “Think big, start small” is a common expression in transformation agendas, and for good reason. Many manufacturers have started small but now it’s time to take a holistic view and consolidate the various initiatives on an enterprise-wide basis.
- Think beyond the cool solution or the trendy app. Manufacturers need to keep the big picture in mind when choosing and deploying digital solutions. Reusability, scalability and enterprise-grade operational capabilities, supported by a platform-based approach is the way forward.
- Look at “2-Speed IT” not as a fatality but as an opportunity, to be addressed by the IT organization.
- End-to-end master data management is key to digital transformation and cannot be considered a by-product any longer
- Enabling change leadership will play a pivotal role in achieving a successful transformation to digital.

Change needs to be embedded in the company culture to enable “micro-level changes” at the individual level. In periods of instability, individuals look for empathic role models whom they can trust to navigate uncertainty and foster a sense of well-being and pride of accomplishment. Enabling these role models in the organization is what change leadership is about.
About CGI

Founded in 1976, CGI is one of the largest, end-to-end IT and business process services providers in the world. Operating in hundreds of communities across the globe, we help clients become customer-centric, digital organizations. Our high-end business and IT consulting, systems integration and transformational outsourcing services, complemented by more than 150 IP-based solutions, help clients accelerate their digital strategies. Our unique client proximity and best-fit global delivery model enables highly responsive service, on-time and within budget delivery, and competitive advantage for an increasingly digital world. We are one of the few providers with the talent, scale and end-to-end capabilities that clients need to connect legacy to digital for holistic success.

For more information about CGI, visit www.cgi.se and info.se@cgi.com.

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