Digital Transformation and Lean Management. Challenges in the Energy Industry of Utilities. A Review

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Abstract

In an era of increasing technological transformation, industries, competitors, and companies are combining platforms to create unique methods for engagement. Survival and growth in a rapidly changing marketplace require companies to embrace internal innovation that adds value for both channel members and customers. The fourth industrial revolution has already begun to take shape, on the road to an end-to-end value chain, by using Industrial Internet of Things (IIoT) and decentralized intelligence in manufacturing, production and logistics. The world is heading toward a digitized future. Already, an entire generation has grown up immersed in the digital world. This paper focus on the following fields: General Strategy and Procedural Aspects of Digital Transformation, Digital Transformation and Lean, Lean Digital Management, Applying Lean Digital Transformation and Transformation of Enterprise Resource Planning Systems to Smart Engaged Systems. Finally, this research study the challenges of Digital Transformation in Energy Industry of Utilities.

Key – Words: Digital Transformation, Lean, Lean Digital Management, Digital Transformation in Energy

Introduction

In recent years, an important phenomenon in companies research strategic called Digital Transformation (DT) has appeared [1,2,3,4]. DT encompasses the changes taking place in society and industries through the use of digital technologies [5,6]. Recent research has shown that technology is only part of a complex puzzle that must be solved for organizations to remain competitive in a digital world. Strategy, structure, culture and processes are required to yield the capability to generate new paths for value creation [7,8,9,10,11]. The present work provide a review that integrates the strategies, methods and processes on DT, how lean digital transformation can be applied in companies and finally the challenges of Digital Transformation in Energy Industry.

1 Digital Transformation, General Strategy and Procedural Aspects

Digital Transformation (DT) is defined as the integration of digital technology into all areas of a business resulting in fundamental changes to how businesses operate and how they deliver value to customers. The fourth industrial revolution has already begun to take shape, on the road to an end-to-end value chain, by using Industrial Internet of Things (IIoT) and decentralized intelligence in manufacturing, production and logistics. Beyond that, it's a cultural change that requires organizations to continually challenge the status quo, experiment often, and get comfortable with failure.

Over the past decade, this digital duality of threat and opportunity has created a new generation of corporate giants and killed off others. A Bain & Company analysis shows that digital natives have generated 80% of the growth in market capitalization of the top companies over the past 10 years. In their pursuit of innovation, most, if not all, incumbent companies have digital efforts under way [12].

DT involves a change in leadership, different thinking, the encouragement of innovation and new business models, incorporating digitalization of assets and an increased use of technology to improve the experience of organization's employees, customers, suppliers, partners and stakeholders [13].

Digitalization enables the collection of large, even vast, amount of data, the so called Big Data, generated either by humans connected to Internet, or by connected devises/machines, e.g. smart meters and sensors, using the Internet of things (IoT/IIoT). Specialized software tools and applications for predictive analytics, data mining, text mining, forecasting and data optimization are typically used. Most of these tools are based on machine learning, which is seen as a subset of artificial intelligence[1].

Companies are feeling the pressure to go digital, and know that they need to do so quickly before they are left behind by innovative and digitally-focused competitors and new entrants. It is crucial for them to understand how digitalization affects the customer and turn a profit by meeting customer demands [14,15,16].

Once the defined digital strategy is implemented across all products and business processes, the company can be classified as "transformed" (Fig. 1).

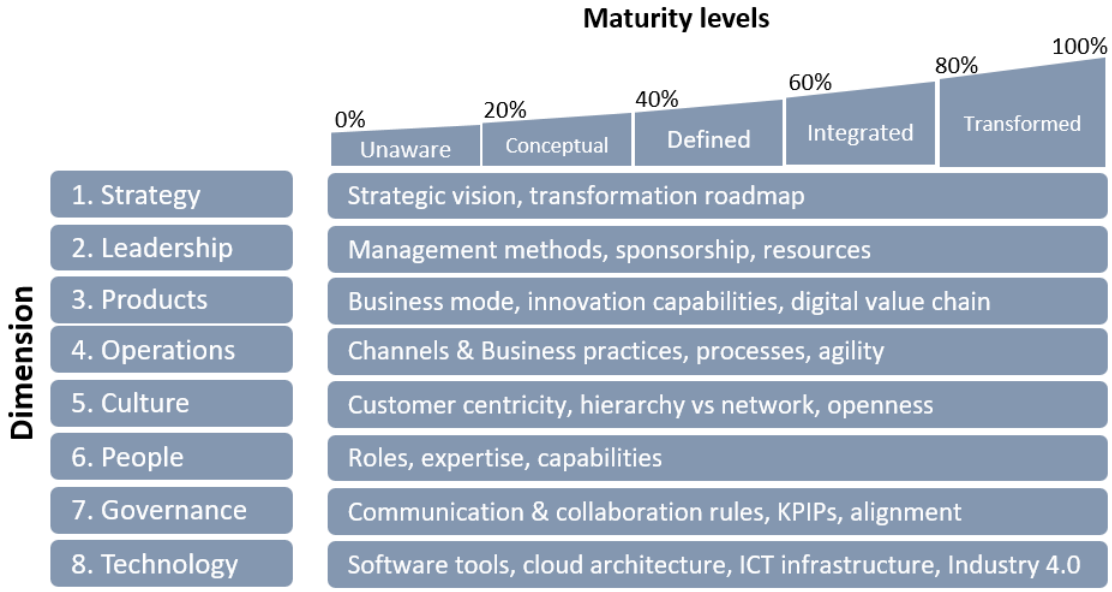


Figure 1: Methods and processes for digital transformation

The starting point for digitalization is the development of a digital strategy. This includes digital transformation of the core business and the development of new digital business segments. Digitalization drivers are often the IT departments, but specialist departments and management must also support the digital strategy since all areas of the company are affected by digitalization. The digital strategy forms the basis for developing digital business models. Modern methods are used to analyze challenges and problems, create ideas and fine approaches to resolving issues. It is important to convey methodological expertise to the entire organization (Fig. 2).

Design Thinking: is an approach to problem solving and finding ideas, based on user perception, as well as user needs and motivations. Design Thinking is based on the assumption that the collaboration of people of different disciplines in a creative environment can solve problems better.

Lean Startup: is a method for the rapid development of organizational units or products with the leanest possible processes and little capital expenditure. The focus is on a reduced conceptual phase, a short time-to-market and the fastest possible creation of a prototype on the market. The prototype is continuously developed in short, iterative product release cycles while, it is possible to react quickly to validated learning-by-doing experiences and customer feedback and wishes at no great cost.

Establishing Agile Methods: The appropriate methodological competence is of fundamental importance for the success of a digital organization. It is needed to meet challenges as well as to develop and efficiently implement digital business models. This applies to structures, methods and processes as well as the culture within the company. In order to implement digital business models efficiently and effectively, to bring prototypes to the market quickly and to react flexibly to customer feedback and market changes, an iterative approach with agile methods offers a considerable advantage. The establishment of agile methods applies to the methodology of software development and project management, including processes and structures, as well as corporate culture [17].

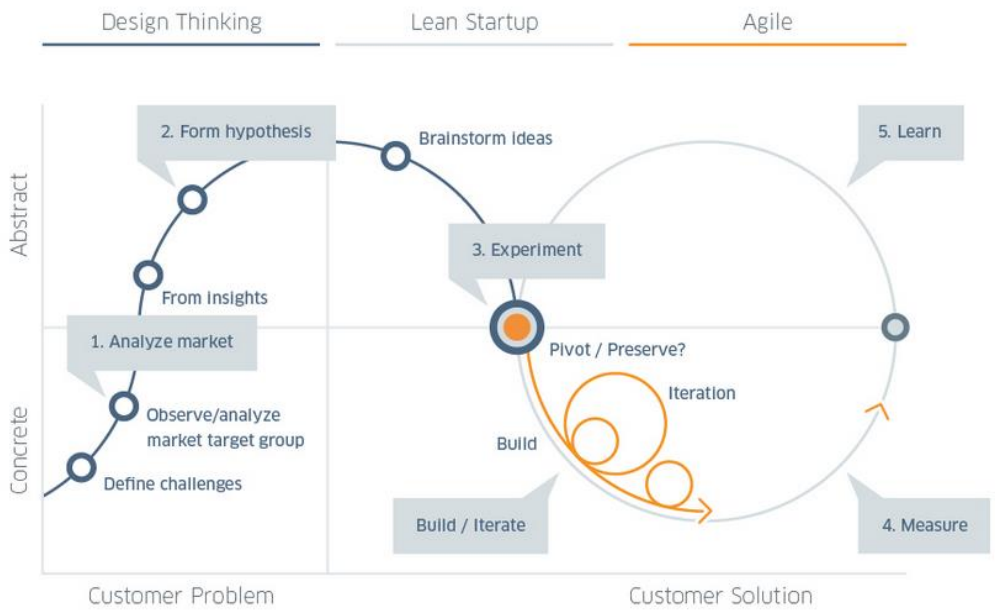


Figure 2: Digital business model

Digital transformation is a continuous complex undertaking, that can substantially shape a company and its operations. Clear adequate responsibilities for the definition and implementation of a digital transformation strategy must be ensured. The person who is operationally responsible for the digital transformation strategy, e.g. a Chief Information Officer (CIO) or a Chief Digital Officer (CDO) or even the Chief Executive Officer (CEO), must have sufficient experience in transformational projects and directly pursue the strategy's targets and progress. Ideally, this person must be supported by a group of people with expertise in new technologies and digitalization, as well as, experience with the firms' processes and value creation. Organizational leaders must work to ensure that a digital mindset is developed, while being capable of responding to the disruptions associated with the use of digital technologies.

Digital transformation strategies affect the entire company, and there may be inertia and resistance that can hinder the unfolding of an organization's digital transformation. Inertia is relevant where existing resources and capabilities can act as barriers to disruption from new technologies.

To deal with such barriers to DT, transformation leadership skills are essential and require the active involvement of the different stakeholders affected by the transformations. Digital Transformation undertaking, especially in power industry, can be characterized by high volatility, uncertainty, complexity, and ambiguity (VUCA). Under this context a shared understanding among top management must be built, a culture of dedication and discipline to address change must be created and a broader mindset must be adopt and sustained.

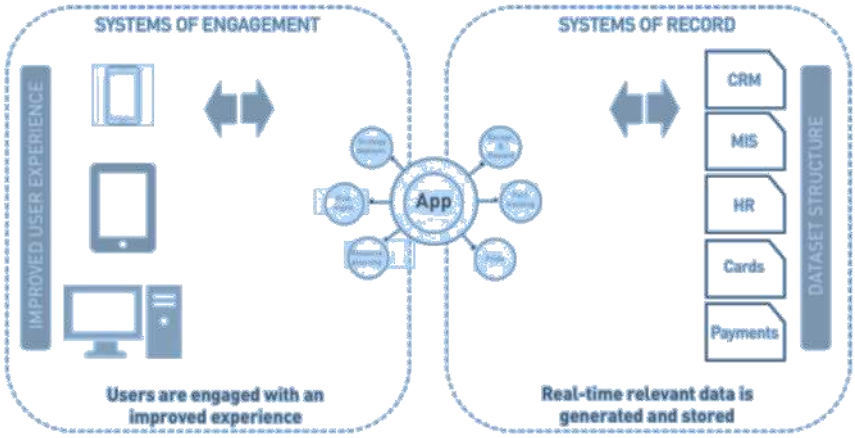
2 Lean Digital Transformation and Engagement Systems

2.1 Systems of engagement

Companies that embrace the digital transformation trends are disrupting their industries by becoming fast, flexible and low-cost players. Keeping them at the tip of the spear requires a lot of focused effort and change management experience.

One of the main components and drivers of a Lean digital transformation, are the systems of engagement. Through systems of engagement, the user interacts dynamically with digital tools/trends on a daily basis using apps or platforms whose value is measured in terms of number and quality of interactions. Some examples of engagement systems are social apps like LinkedIn and Facebook or business platforms like Uber and Airbnb[7].

The goal of creating a system of engagement is to increase the user engagement with high quality user experience paired with high user related value creation. A circle is formed where more value generation translates into more engagement, more involvement brings in more data generated, more data is generated that can be converted again in more value generation and so on.



During this circle, however, an exponential growth of available unstructured and structured data, e.g. texts, videos, audio messages, smart-meter data, etc., is accumulated.

2.2 Digital waste & Data Profit

Digital waste is defined as all the data that is not accounted for, or combined in redundant, wrong or misleading information, while data profit is defined as all data combined withrelevant information for the user, permittinghim to make the correct choices. Even structured data may be in some cases perceived as digital waste. Data analytics tools must be wisely used to harness the wealth of available data.

Beside the useful information that is lost, digital waste accumulation may even render a system unaffordable to maintain both technically and economically.So, in order for a digital transformation to succeed it is advisable to follow a Lean Digital strategy which focuses oneliminating digital waste while maximizing data profit. Furthermore, through Lean Digital, as the digital waste is removed, the user experience and engagement is improved, which can result a ‘virtuous’ circlepermitting to boost data generation and userexperience further continuously.If this is addressed together with traditional Lean management in all the aspects of an

enterprise to eliminate traditional waste while maximizing customer value can revolutionize a business taking it to a next level, where the limit may be only its people vision [18].

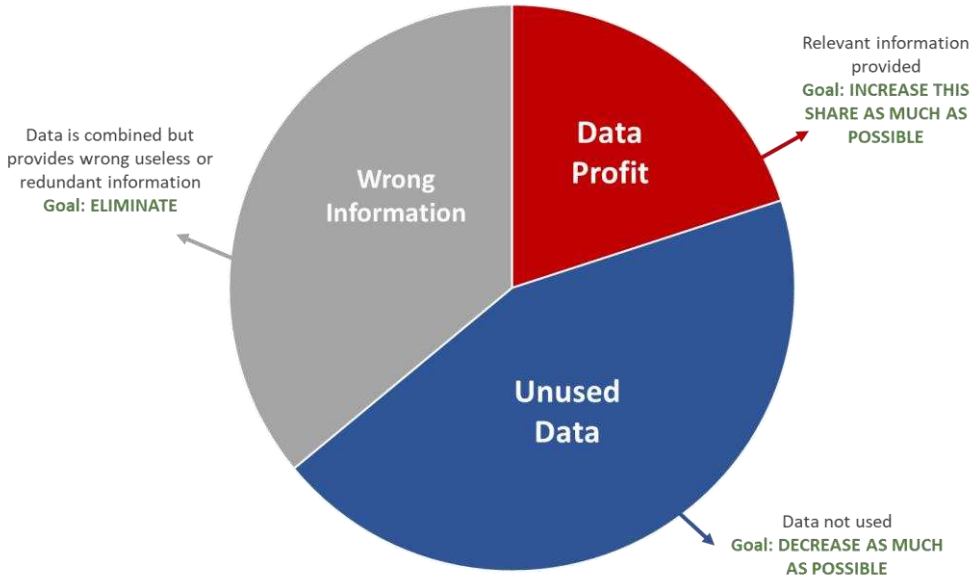


Figure 3: Digital waste and data profit

3 Applying Lean Digital Transformation

When companies introduce new technologies, -which may seem easily applicable at first- without considering the value stream holistically and may lack maturity, there is high risk of failure causing frustration for employees.

Companies that rely on lean principles achieve relatively high performance levels compared to their competitors. Arthur D. Little studied the lean lifecycle and classified it, into three phases. He determined the annual company growth rates in each phase, using a key automotive productivity indicator ("hours per vehicle") as a measure and analyzed the correlation with lean implementation [19].

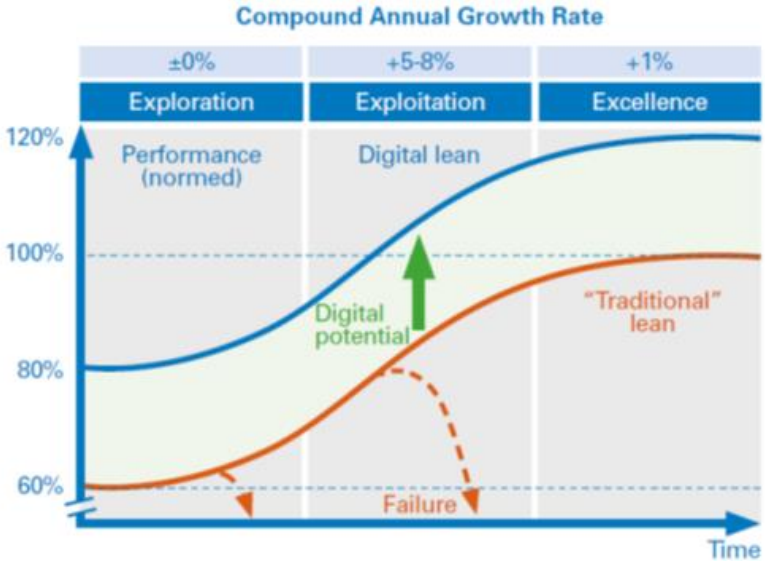


Figure 4: Performance growth rates along the lean lifecycle[8]

Performance growth of up to 8% is common during the Lean Exploitation phase. This decreases as performance improves, and tends to stabilize at around 1% in the Lean Excellence phase. Digital technologies have the potential to make a further step-change improvement across all phases.

3.1 Building blocks

In order to overcome barriers and challenges a company needs to configure its own set of technological blocks, to address its organizational characteristics and priorities. These building blocks are interconnected, and apply across the organization, in both core operational functions such as manufacturing and logistics, and in support functions such as robotics process automation in production planning and finance. This classification helps companies to trace operational needs to the relevant building block[8]:

1. *Cognitive:* using pattern recognition based on (big) data for automating tasks (e.g., big data/advanced analytics, bots, autonomous transport systems)
2. *Connected:* incorporate machines, tasks, etc., through the cross-functional use of information (e.g., collaborative, smart machines and robots)
3. *Virtual:* leverage productivity by decoupling and transforming physical conditions into virtual spaces (e.g., cyber-physical systems, augmented reality)
4. *Human centered:* design new workplaces through the use of collective knowledge (e.g., collective intelligence, virtual workplace)
5. *Value-add:* define new business models through the use of new core technologies (e.g., additive manufacturing/ 3D printing)

Firstly, one has to define a clear Lean digital vision involving all the employees in the company. It is wise to include both defensive targets, that increase the level of competitiveness in the business arena, and offensive targets, that may disrupt the existing market. The right technological building blocks must be selected, based on their specific value creation potential and profound knowledge of state-of-the-art technologies.

The full digitalization potential of the value-stream may be derived using a design approach based on two key questions:

- Which physical process steps can be automated by mature and proven technologies?
- Which remaining non-physical (information) process steps can be radically digitalized?

For better understanding systems of engagement, the Lean use case may be used, to identify, clarify, and organize requirements of Systems of Engagement. The Lean use case is made up of a set of possible sequences of interactions between system of engagement and users related to a particular goal. Lean use case can be seen as an analogue to stream value mapping in lean management. It is essential, at this point, to avoid digital shortcuts, as they typically fail or lead to disappointing or unsustainable results. Finally, a lean digital capability, which will form the basis for a long-term and sustainable competitive advantage must developed.

3.2 The four pillars of Lean and how Digital Supports Lean Initiatives

The Four Pillars of Lean	How Digital Supports Lean Initiatives
Focus on value and what is critical for the enterprise and its customers. • Refocus the product or service on customer expectations. • Propose the simplest product that meets the need (Critical to Quality).	Integrates new communication channels (social media, commercial platforms, chat rooms, forums, etc.) with traditional touchpoints to promote highly targeted communications and strengthen the collective knowledge of customers and partners in Lean logic. • Applies digital tools to facilitate collaboration (even co-creation of new products) with customers. • Utilizes information collected from customer channels to deepen knowledge of the customer and identify problem areas.
Analyze the entire value chain to eliminate all waste. • Identify all forms of waste: overproduction; overstock; over-quality; unnecessary transport costs; errors and faults; extended wait times and delays; under-utilized skills. • Eliminate waste through a value stream mapping (analytical) approach and field site conversion.	• Enables the dematerialization of paper documents and information-sharing at a low cost, almost instantaneously. • Automates low-value business processes. • Reduces delays, transport costs, and errors. • Identifies, quantifies, reduces, or even eliminates sources of waste with digital tools. • Utilizes the IoT (Internet of Things) global network of small, powerful sensors and interconnected objects to monitor equipment remotely, for example, and take proactive measures to prevent and resolve problems.
Adjust production based on customer demand. • Initiate the traditional production line with a customer request (pull production). • Allow for flexible production to cope with changes in demand.	• Supports concurrent information-sharing. • Exploits data to be more responsive to customer requests and even anticipate them through advanced analytical models. • Reduces inventory and creates more flexible and responsive production processes by concentrating on what is critical for the customer (Critical to Quality). • Analyzes negative feedback obtained through knowledge of the customer and the exploitation of Big Data. Improves the ability to predict demand and optimize stock levels
Aim for continuous improvement to achieve operational excellence. • Undertake continuous and iterative improvements (based on the Deming wheel: Plan-Do-Check-Act). • Guarantee a permanent commitment by the entire company, especially employees in contact with the ground floor. • Emphasize the importance of utilizing lessons learned.	• Leverages social media to allow collaborative and open exchanges, and enable clients and partners to create broad communities around continuous improvement. • Employs online tools (Cloud) for information-sharing and collaboration among physically distant teams, supported by Lean practices. (This adds to the advantages of collaboration and lessons learned). • Promotes an open, collaborative environment supported by knowledge-management tools and practices for developing a corporate culture augmented by the know-how of company employees. • Allows employees to be more involved in Lean initiatives through MOOC training, which invites unlimited participation and open access, enhanced by e-learning and gamification.

Source: Lean & Digital: Navigating the Transformation, Cognizant 20-20 Insights | November 2017

3.3 Expected Impacts of Lean Digital transformation

The benefits of a Lean Digital transformation must be explored in the perspective of the users in the ecosystems of engagement.

I. End Users
   Creating engagement in a digital channel with end users through an improved customer experience boosts revenues and sets the foundation of customer loyalty. *Businesses have seen a decrease of management cost of over 40% within a year of implementation.*

II. Top Managers
   Executives without the right information cannot make the right decisions about markets, resource allocation, technologies, and partnerships. In this case, engagement can be created by providing a proper business intelligence system that permits them to make the correct decisions at the appropriate time. *It has allowed heavy industries to reduce the amount of waste generated in production lines by 10% to 20%.*

III. Operative associates
   In any operational environment associates' decisions have an impact on process performance (e.g., manufacturing, maintenance, logistic processes). If provided information is real-time and relevant, the effectiveness of countermeasures to internal issues increases dramatically.

IV. Back-office associates
   Back-office activities concern most of the time compliance with well-defined standards (e.g., legal, finance, administration, HR activities). Specific apps that harness the tool of data analytics and data science can give immediately to back-office users precious information that otherwise is very difficult to be extracted in traditional IT environments. *The use of cognitive agents has reduced the loss of talent by 30%.*

4 The Challenge of Digital Transformation in Energy Industry

The global system is evolving toward an integrated and hybridized network that contains elements of old and new technologies working synergistically to provide reliable, affordable, and sustainable electric power to factories, businesses, and communities around the world.

Environment protection has been the main goal of new strategy and regulations globally that push for decarbonization, while the energy demand is expected to rise. The European Union, since 2014, has a clear strategy about clean, secure and efficient energy transition to face climate and energy challenges, which has been reinforced by the signature of the landmark 2015 Paris Agreement [22].

The electricity system is in the midst of a transformation, as technology and innovation disrupt traditional models from generation to beyond the meter. The global power industry is going to change from an electricity system based primarily upon large, centralized generation and transmission and distribution (T&D) technologies, to one that also embraces distributed, digitally-enhanced, and low-carbon technologies [23].

Since, the energy, and especially electricity, production and distribution sector, is the backbone of modern world civilization, the vision of a pan European integrated

energy system has been formed [24]. This, however, requires the vast transformation of the power system from its traditional centralised form to a decentralised form with numerous generating units of various sizes, across the grid at different voltage levels.

The electricity system is in the midst of a transformation, as technology and innovation disrupt traditional models from generation to beyond the meter. Three trends in particular are converging to produce game-changing disruptions:

- Electrification of large sectors of the economy such as transport and heating
- Decentralization, spurred by the sharp decrease in costs of distributed energy resources (DERs) like distributed storage, distributed generation, demand flexibility and energy efficiency
- Digitalization of both the grid, with smart metering, smart sensors, automation and other digital network technologies, and beyond the meter, with the advent of the Internet of Things (IoT) and a surge of power-consuming connected devices

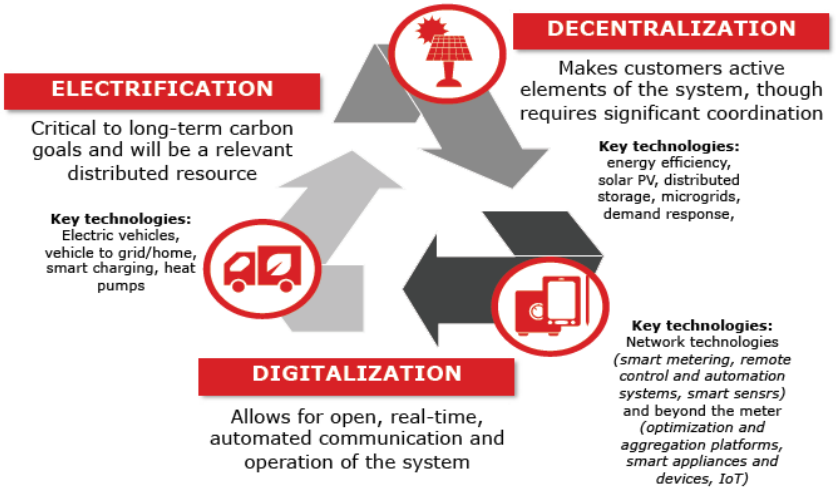


Figure 5: Three trends of the grid edge transformation [25]

The digitalization of industrial sectors comes with a new set of challenges and opportunities. As assets, facilities, and fleets become more connected, an ever-increasing amount of digital information and transactions are set to increase. There is an undeniable need to improve the efficiency, transparency, profitability, and security of digital platforms in the energy industry, which presents a large opportunity that can only be unlocked by innovation.

The energy industry needs to adopt and evolve fast. The means for its successful transformation are provided by the new technologies that caused the disruption at the first place, along with the appropriate management strategy and vision. Digital transformation of the power industry is not only inevitable, in the long term, it has to be employed as soon as possible for the incumbent companies to survive. The new technologies and the management strategy to incorporate them into the existing processes must not be perceived as threat, but embraced as the chance to meet a new era of more secure, reliable, resilient, accessible, cost efficient, low-carbon energy system [26].

4.1 Key areas for the digitalization of energy

The key areas expected to see further progress in 2019 in digitalization in energy are:

1. ***Fault prediction and dynamic maintenance*:** This is one of the clearest uses of Artificial Intelligence (AI) which enables operators to predict equipment failures by using sensor data from various units to significantly reduce their costs of downtime and maintenance.
2. ***Investment optimization:*** Increase the chances of success
3. ***Energy efficiency:*** Reduce energy use by looking at years of operational data and then issued changes to individual units within the operating constraints of the plant.
4. ***Better prediction:*** Better forecast demand of the system with the stated goal of reducing the entire country's energy usage by 10%.
5. ***Retail:*** retailers are using machine learning to understand patterns of customer behaviour, to attract and retain customers and even to predict bill (non)-payment. Customer call centres are being fronted by algorithms which chat to customers (verbally or online) and deal with queries.
6. ***Customers:*** For customers, AI solutions are also gaining traction, and many retailers are offering these systems as part of an integrated package. This increasing customer interaction with the device leads to the development of a more personalised usage profile, which reduces bills for the consumer and also helps the energy provider to accurately forecast demand.
7. ***Trading:*** Sophisticated machine learning models are also being deployed by speculators which are relying on large streams of diverse data to respond to the market changes quickly.

Digitalization opportunities in energy are large and rely heavily though on sufficient volumes of good quality data being available [27]. Global investment in digital electricity infrastructure and software has grown by over 20% annually since 2014, reaching USD 47bn in 2016. This digital investment in 2016 was almost 40% higher than investment in gas-fired power generation worldwide (USD 34bn) and almost equal to total investment in India's electricity sector (USD 55bn) [28].

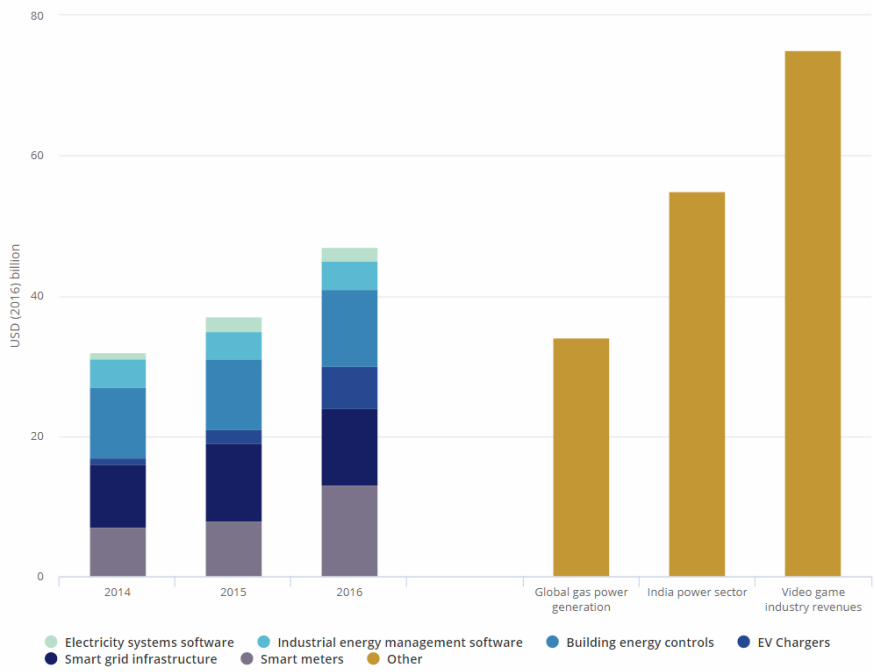


Figure 6: Investments in digital electricity infrastructure and software

4.2 The Benefits of Digital Transformation in Energy Management and Automation by Schneider electric

Schneider Electric, a pioneer in the digital transformation of energy management and automation, released the Global Digital Transformation Benefits Report 2019, presenting specific data on the power of digitization across the global spectrum, of commerce and the public sector, as stated in a company announcement.

These data substantiate quantitative business benefits from the study of 230 Schneider Electric customer projects completed in the last five years in 41 countries. All of these projects use the EcoStruxure architecture and platform.

The purpose of this report is to provide readers with a useful and realistic reference point on the potential of digital transformation in energy management and automation. At the center of this report are 12 key business benefits of digital transformation. These benefits are divided into three categories, each of which is indispensable for effective business competitiveness: capital expenditure (CapEx), operating costs (OpEx), as well as sustainability, speed and efficiency. The report focuses on four key sectors of the economy - Buildings, Data Centers, Industry and Infrastructure - all of which are undergoing transformations that radically change the way people live and work [29].

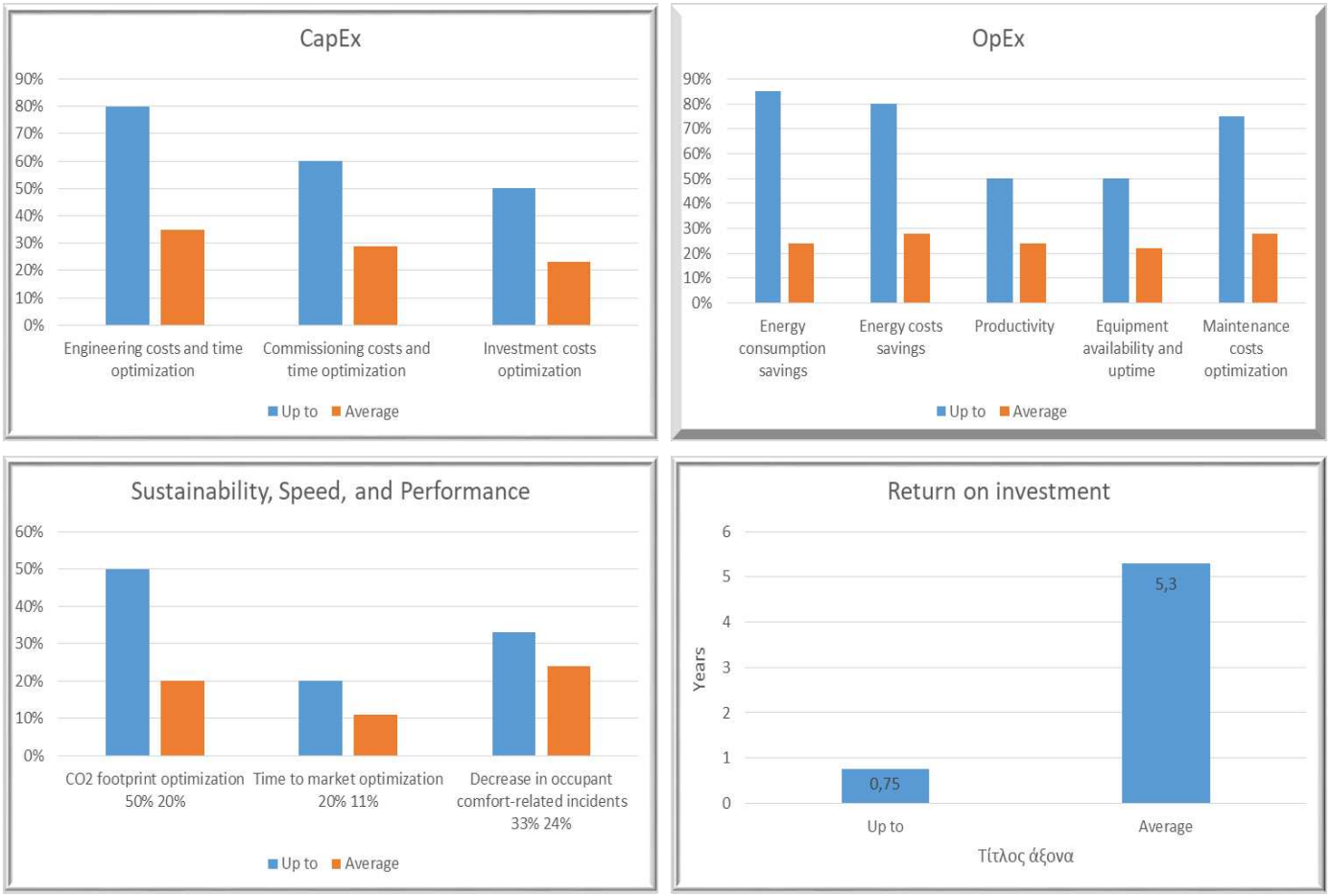


Figure 7: Benefits of Digital Transformation in Energy Management and Automation by Schneider electric

5 Transforming Enterprise Resource Planning systems to smart engaged systems

5.1 Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) as a monolithic systems of record is disappearing and making place for Intelligent ERP or i-ERP where actions and intelligence matter. Intelligent ERP comes with a mix of artificial intelligence and machine learning, blockchain technology, massive data sets, a focus on user experience, cloud and the Internet of Things [30].

ERP is a category of business management software that an organization can use to collect, store, manage, communicate and interpret data from many business activities. It provides an integrated and continuously updated view of core business processes using common databases maintained by a database management system.

These systems track business resources—cash, raw materials, production capacity—and the status of business commitments: orders, purchase orders, and payroll. The applications that make up the system share data across various departments (manufacturing, purchasing, sales, accounting, etc.) that provide the data, including outside stakeholders. Since, ERP system integrates varied organizational systems and facilitates error-free transactions and production, it enhances the organization's efficiency. However, most of ERP systems are designed with an accounting

perspective in mind and often perform poorly as tools for managing other functions, like maintenance.

ERP systems are large and complex, and were originally designed for a small subset of employees to use, users who are typically in back office departments. In contrast, Systems of Engagement put the user in the center, focusing on in-the-moment tasks, activities, and decisions and touch all employees, customers and partners.

5.2 ERP Trends

1. **Treat cloud as the gateway to modernization**

   Develop a nuanced cloud strategy that suits your business ambitions. Engineer cloud as part of a larger strategy around digital transformation, cost savings and new business models.

2. **Make your core intelligent and extended**

   Invest in intelligence and automation – powered by AI, machine-learning, and analytics: not as an add-on but as a core part of your ERP platform. Enable your business to extend at scale and in real-time.

3. **Partner with cloud captains, not traditional services firms**

   Find co-creation partners that differentiate by reimagining services delivery models, being technology agnostic, and specializing in your business.

4. **Personalize**

   Make user experience (UX) seamless across channels and platforms and personalize relentlessly.

5. **Amplify insights by converging data**

   Treat data as an asset. Free up the data in your ERP systems and converge different data sources for deeper intelligence

These five trends are fundamentally important because they can enable an enterprise to bring change both in technology and business thus assess their relative position against each trend, evaluating how they currently fare and forming a future [31].

5.3 Systems of Engagement

Systems of Engagement bring together cloud, social, analytics, and mobile technologies to enable an immediate task at hand. At the core of these systems are some basic common tenets in that they are all user-centric/role based, which means understanding the identity of the users and what applications and data they have access to, contextual, which means understanding what the user is doing and where, and use this context to improve the engagement process, and smart, which means that can support business workflows by intelligently stitch simple and straightforward processes together into more usable flows [32].

The core of a true System of Engagement is an omnichannel customer engagement platform. By integrating all of engagement channels (both digital and phone), companies are able to provide a more seamless customer experience that minimizes customer effort (a critical component of customer loyalty). Additionally, with these channels contained in a single platform, companies are better able to capture, report, and export engagement data. This creates a single source of truth for engagement data and maintains a more stable and efficient technical stack [33].

5.4 ERP to Systems of Engagement

There is a need to transform the current ERP systems that are the backbone of enterprises into smart ERP systems integrating them with engagement systems. How far this integration goes, if it is a loose one, or even if building a new smart engaged ERP from the beginning is required relies on each different organization case and vision. Sometimes, loose coupling, which refers to the interconnection of components in a system or network so that those components depend on each other to the least extent possible and helps reduce the overall complexity and dependencies between systems is an adequate choice.

The key challenge the industry has had with ERP systems is that barriers to access, usability, and enablement must be reduced and the friction removed as much as possible in order to maximize the value that can be created. The business value differs by role, by industry, and by company.

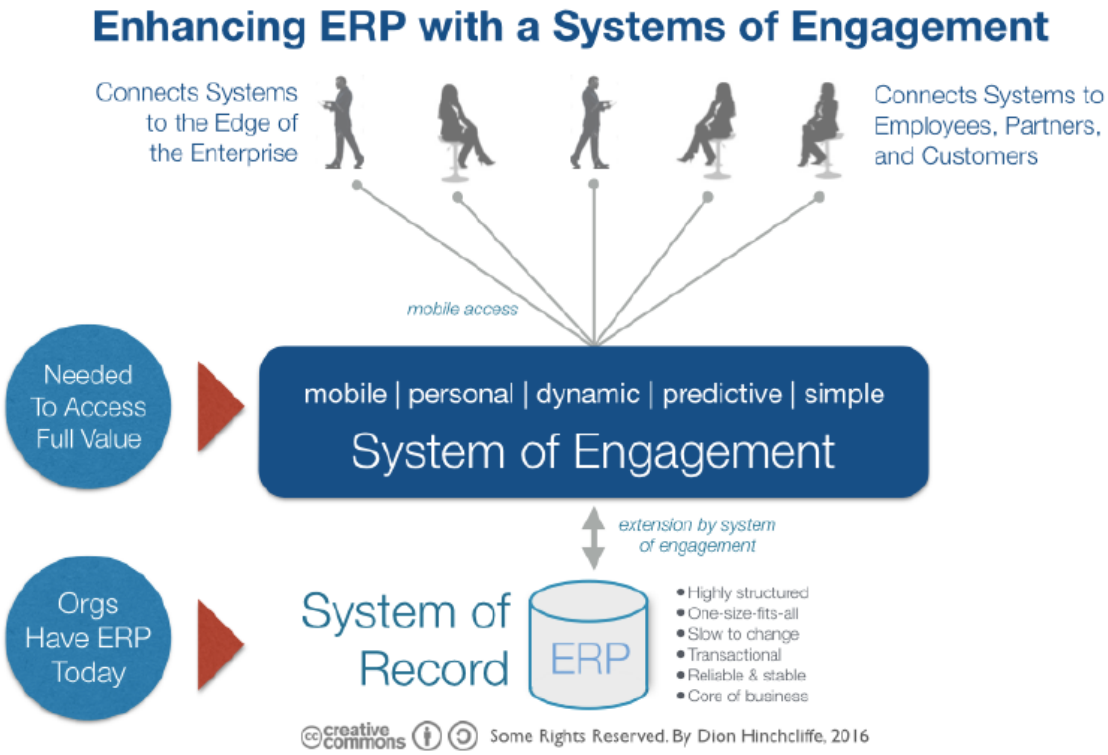


Figure 8: Increasing the value creation of ERP with a Systems of Engagement[18]

The key lies in preserving the customizations, the business logic, and the security protocols of the existing ERP system. The key tenets for turning an ERP system into a System of Engagement are:

- ✓ Leverage mobile-enablement as the engagement layer – providing rapid access, speed of task, and availability anytime, anywhere
- ✓ Focus on critical and repeatable tasks – the high volume use cases
- ✓ Simplify workflows – design for mobility and an on-the-go workforce
- ✓ Extend to the edges of the enterprise – empower employees in the field, in the
- ✓ branches, customer-facing, as well as partners
- ✓ Predictive apps – pushing information to your users when they need it
- ✓ Leverage existing security and governance protocols

It’s clear that ERP systems are not fully complete and capable as they are currently conceived in the market today. They struggle to deliver value all the way out to key stakeholders such as field employees and customers, and they are too cumbersome and complex to use by the typical worker that needs to access them. With the help of mobility as an engagement layer, ERP systems can become robust and achieve their full value as Systems of Engagement.

The outcome of doing so is clear: Faster business cycles, more people-centric processes, higher levels of agility, and the empowerment to quickly seize opportunities that traditional ERP systems simply cannot deliver by themselves today.

Conclusions

In conclusion, Lean Digital Transformation can lead more to a customer centricity rather product centricity. This happen because on customer centricity approach, the primary goal to a company is to establish a long term relationship with the customer, rather than market share. In terms of strategy, therefore, customer-centricity adopts a buyer-driven pull approach as against a sales-driven push approach. The way which products are produced focus to small batches, one piece flow and ability to produce many different products on the same equipment. Also big data will increasingly be used to optimize production schedules based on supplier, customer, machine availability and cost constraints.

The use of Lean method in Digital Transformation helps to drive the productivity to achieve the maximum quality. That means that productivity is obtained by rework elimination, able to view product quality and delivery accuracy in real-time, making trade-offs on which suppliers receive the most time-sensitive orders. Lean is a way for sustainable development and against of wastes.

One key element of Lean is called “Responsibility Based Planning [20]”. It is based on the idea of intense collaboration between people, and gives a decentralized model for agility and quick decisions, which based on people commitment and cooperation more than a control of people’s activities.

Finally, Lean Digital Transformation can lead to a simplification and improvement of working environment and working conditions. The role of the managers is to make working life simpler for people creating added value for the customer. It starts with ergonomics and work organization [21]

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