Digital Transformation and Trust, Privacy and Security in Digital Business

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Abstract. Digital Transformation (DT) – the use of technology to radically improve performance or reach of enterprises – is becoming a hot topic for companies across the globe. Digital transformation refers to the changes associated with the application of digital technology in all aspects of human society. Digital Transformation can be the roadmap of a billion-dollar Organization. The article provides an overview of Digital Transformation and its elements. The article also provides Trust, privacy and security concern in Digital Business under the area of Digital Technology.

Keywords: Digital Transformation (DT), Digital Technology, Digital Business, Trust, Privacy, Security.

1. Introduction

Digital transformation [1][2] refers to the changes associated with the application of digital technology in all aspects of human society. Digital transformation may be thought as the third stage of embracing digital technologies: digital competence → digital literacy → digital transformation. The latter stage means that digital usages inherently enable new types of innovation and creativity in a particular domain, rather than simply enhance and support the traditional methods.

In a narrower sense, "digital transformation" may refer to the concept of "going paperless".

Digital transformation affects both individual businesses and whole segments of the society, such as government, mass communications, art, medicine or science.

In November 2011, a three-year study conducted by the MIT Center for Digital Business and Capgemini Consulting[1] concluded that only one-third of companies globally have an effective digital transformation program in place.

The study defined an "effective digital transformation program" as one that addressed

- "The What": the intensity of digital initiatives within a corporation
- "The How": the ability of a company to master transformational change to deliver business results.

According to new market research report, published by Markets, the global digital transformation market is expected to grow from $150.70 Billion to $369.22 Billion, at a Compound Annual Growth Rate (CAGR) of 19.6%. In the current scenario, North America is expected to be the largest market on the basis of spending and adoption of digital transformation market. The major vendors in the digital transformation market are Apple, IBM Corporation, Oracle Corporation, EMC Corporation, SAP AG, Adobe Systems, CA Technologies, Hewlett Packard (HP), Google, Microsoft Corporation, and many others.

2. Digital Technology usage in Digital Business

The interviews asked how four digital technologies – analytics, mobile, social media, and embedded devices – are being used in the enterprise. All of the executives we interviewed were aware of these technologies, although few considered themselves experts. Most could describe how the

company used the technology, or how it might or might not be important in the future.

Figure 1 shows how often firms in the study used each digital technology [4] to improve customer experience and operational processes. Analytics, Mobile and Social Media are widespread in these large organizations, despite their relative newness to most industries.
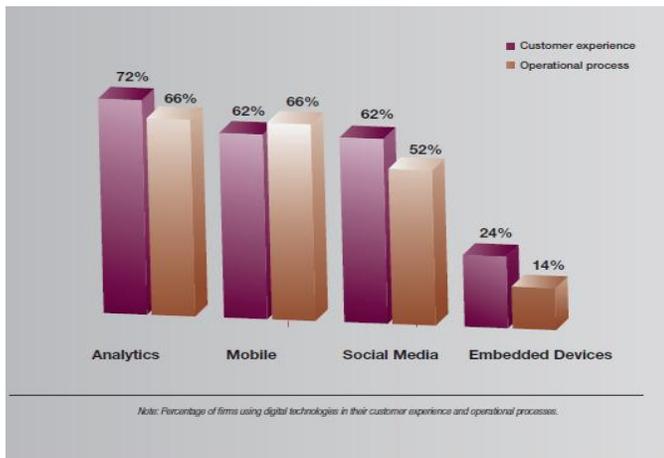
Figure:1 **Applications of digital technology in customer experience and operational process**

Companies varied greatly in the ways they used the four technologies. We identified three levels of usage:

• **Substitution** is using new technology [3][4] as an alternative or replacement for substantially the same function that the enterprise already performed with a different technology and process. Blackberries and iphones substitute for PCs in both internal operations (email) and customer experience (web access). Many employees use both methods depending on their needs at a point in time. Analytics, in the form of basic business intelligence tools and detailed reporting, substitutes for similar information sources available through other methods. Substitution is useful when it improves performance over, or is more convenient than, traditional methods.

• **Extension** is significantly improving performance or functionality of a process through technology. A power company and a paint company provide full information to field workers on mobile devices, eliminating the need for workers to spend time in the office at the start and end of shifts. A pharma company's social media physician community enables the company to learn about issues and opportunities by allowing doctors to talk with one another.

• **Breakthrough** is fundamentally redefining a process or function through technology. A paint company uses a combination of embedded devices and analytics to create fully-automated factories that deliver higher efficiency, quality and environmental protections than manually-tended factories. A hospitality firm uses predictive analytics to engage in location-based marketing with its customers.

Figure 2 shows examples of how companies are using the four digital technologies. The most common usage of each technology is in substitution -- Mobile email replaces desktop email, Facebook pages and ads substitute for web.
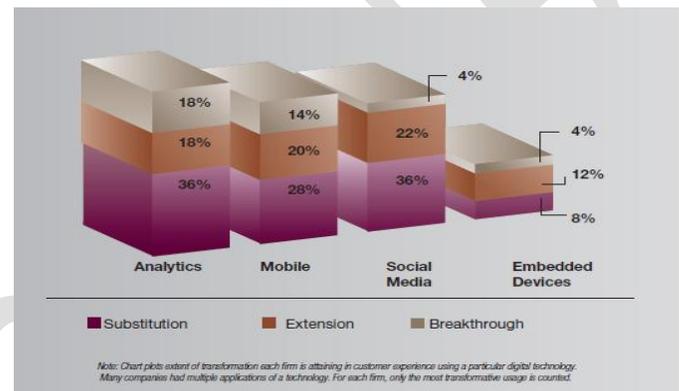
Figure:2 Use **of digital technologies to transform operational processes**

The interviews show an interesting trend toward identifying transformative opportunities that combine multiple technologies with new management practices.

• Remote-control mining equipment and automated paint factories include both mobile and analytics technologies to improve production significantly.

• Mobile phones are increasingly becoming seen as embedded devices for customer-facing applications.

• An apparel company aims to integrate its social and web-based marketing approaches with its digital product design capabilities and embedded devices in products to be more responsive to emerging consumer preferences.

• Concept stores combine multiple technologies to test or deliver a new buying experience.

These types of multi-technology solution are signs of a maturing approach to digital transformation in enterprises. Executives are beginning to envision possibilities that cross organizational and technological silos – letting the

possibilities drive technology and organization rather than the reverse.

3. Digital strategy

Digital strategy[4] is the process of specifying an organization's vision, goals, opportunities and related activities in order to maximize the business benefits of digital initiatives to the organization. There are numerous approaches to conducting digital strategy, but at their core, all go through four steps:

- identifying the opportunities and/or challenges in a business where online assets can provide a solution;
- identifying the unmet needs and goals of the external stakeholders that most closely align with those key business opportunities and/or challenges;
- developing a vision around how the online assets will fulfill those business and external stakeholder needs, goals, opportunities and challenges, and
- prioritizing a set of online initiatives which can deliver on this vision.

Within each of those stages, a number of techniques and analyses may be employed.

Senior executives drive digital transformation through an iterative three-step process [4][5]:

i. **Envision** the digital future for organization.
ii. **Invest** in digital initiatives and skills.
iii. **Lead** the change from the top.

Figure: 3 Digital transformation framework

3.1. Envision the digital future for organization

Successful digital transformation does not occur bottom up. The true value of transformation often comes from seeing value across silos and then helping everyone else see that value.

### 3.1.1. Identify and diagnose strategic assets

Interviewees, without being asked, often identified important assets that could help or hinder their transformations. These strategic assets include:

• **Sales force:** A strong source of customer loyalty is the set of relationships cultivated by a strong sales force. In addition to sales people, front line employees often are an important face to the customer, as well as having important knowledge about how business is done.

• **Point of sale and distribution channels:** Stores are often a strong source of location-based advantage, even in a digital world.

• **Products and content:** Product companies often find they can build new digital business around strong products. An electronics manufacturer is building energy management solutions around its highly successful devices for the commercial buildings market, and a manufacturer of expensive long-lived transportation products is building services that digitally diagnose and help to maintain those devices.

• **Product innovation:** A high-tech materials firm has engineering capabilities that few other firms can match in its niche markets. It has the opportunity to use digital transformation to connect its engineers more closely with global manufacturers.

• **Partnership network:** Strong partnerships can be a key lever for transformation. Networks of exclusive or trusted relationships can enable firms to combine different expertise and deliver powerful new operating models.

• **Brand:** Companies with a strong brand are able to leverage it in related offerings through mobile web, social media, new digital businesses and other digital initiatives.

• **Customer knowledge:** Across the years, companies had gathered more and more knowledge about customers. Today, some are reaching a point where they can start envisioning the next step, monetizing this relationship to launch new products, enhance customer relationships or augment sales via customer-segmentation.
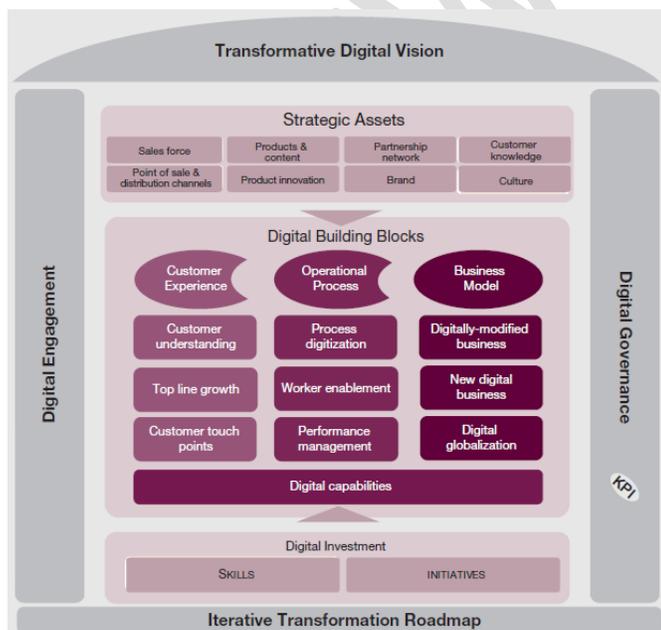
• **Culture:** Some firms are able to use culture as a powerful asset. Executives in a manufacturing firm found that the company's historically entrepreneurial culture made digital transformation easier.

• **Create a transformative vision:** Successful digital transformation comes from envisioning new ways that digital technology improves performance and customer satisfaction, not just trying to find a use for the new technologies. As we described earlier, many companies that are doing experiments in mobile marketing, social media, or analytics find that they can be quickly stymied by organizational boundaries or by culture issues.

3.1.2.   Invest in digital initiatives and skills

Transformation does not happen without investment. Digital transformation is no different. The investment may be large, and the business case may not be completely clear. It may be a series of low-risk experiments that lead to a larger investment. It often becomes a strategic bet that only senior executives can make. As with any investment, digital transformation requires understanding the need for investment, managing risk, and making the changes necessary to capitalize on the change. In addition, there is often tremendous value to be gained from making the most of investments you have already made.

• **Find the right skills:** Find good vendors for technical skills, but coordinate them. When investigating a new technology, it is often easier to hire vendors than to hire people. However, coordination is still necessary or knowledge will remain stuck in vendor silos.

Hire some stars. Analytics skills are becoming more plentiful, but are not distributed evenly across firms. One firm hired good analytics leaders from firms where these skills were more plentiful. The new people, who were skilled but experiencing limited upward growth in their firms, were able hit the ground running.

• **Invest in initiatives that advance the vision**

Very few examples of successful digital transformation were fully planned in advance. In many cases, executives built basic capabilities for one need, and then incrementally added capabilities. A set of relatively incremental changes added up to a radical transformation. Instead of working in defined offices in headquarters, employees began to envision their work happening independently of location – moving desks as needed, working on mobile devices, collaborating virtually, or working from home. Then it was only a minor step to improve the way the firm collaborated globally.

3.1.3.   Lead the change from the top

Top-level vision rarely translates to local-level action unless reinforced through top-down communication and governance. Consistent engagement, backed with appropriate coordination, KPIs, and incentives, make the difficult process of transformation possible.

• **Engage the organization**

As in most business transformation, the role of communication is paramount in effecting change and reducing organizational resistance. There are two main characteristics of communication in a digital world that are making mobilizing the workforce easier and more impactful than traditional methods:

• Moving away from "cascading" information through traditional hierarchical channels toward enterprise-wide large scale communication.

• Moving away from a one-way "broadcasting" model of communication toward offering people in the organization the opportunity to engage in a real dialogue around the transformation. Wikis, discussion forums, blogs and so on are easy tools to support such conversations.

4.   Trust, authentication and authorization

In order to assign a digital representation to an entity, the attributing party must trust that the claim of an attribute (such as name, location, role as an employee, or age) is correct and associated with the person or thing presenting the attribute. Conversely, the individual claiming an attribute may only grant selective access to its information, e.g. when one proves identity in a bar or PayPal authentication for payment at a web site. In this way, digital identity is better understood as a particular viewpoint within a mutually-agreed relationship than as an objective property. This contextual nature of digital identity is referred to as contextual identity.

4.1.   Authentication

Authentication [7] is a key aspect of trust-based identity attribution, providing a codified assurance of the identity of one entity to another. Authentication methodologies include the presentation of a unique object such as a bank credit card, the provision of confidential information such as a password or the answer to a pre-arranged question, the confirmation of ownership of an e-mail address, and more robust but relatively costly solutions utilizingencryption methodologies. In general, business-to-business authentication prioritizes security while user to business authentication tends towards simplicity. Physical authentication techniques such as iris scanning, handprinting,

and voiceprinting are currently being developed and in the hope of providing improved protection against identity theft. Those techniques fall into the area of Biometry (biometrics).

4.2.   Authorization

Authorization[7] is the determination of any entity that controls resources that the authenticated can access those resources. Authorization depends on authentication, because authorization requires that the critical attribute (i.e., the attribute that determines the authorizer's decision) must be verified. For example, authorization on a credit card gives access to the resources owned by Amazon, e.g., Amazon sends one a product. Authorization of an employee will provide that employee with access to network resources, such as printers, files, or software.

5.   Security issues and privacy

With automated face recognition, tagging, location tracking and widespread digital authentication systems many actions of a person become easily associated with identity, as a cause, sometimes privacy is lost and security is subverted. An identity system that builds on confirmed pseudonyms can provide privacy and enhance security for digital services and transactions. Cyberspace creates opportunities for identity theft. Exact copies of everything sent over a digital communications channel can be recorded. Thus, cyberspace needs a system that allows individuals to verify their identities to others without revealing to them the digital representation of their identities.

6.   Digital footprint

A digital footprint [6] is the data that is left behind by users on digital services. There are two main classifications for digital footprints: passive and active. A passive digital footprint is created when data is collected without the owner knowing, whereas active digital footprints are created when personal data is released deliberately by a user for the purpose of sharing information about oneself by means of websites or social media.

Passive digital footprints [6] can be stored in many ways depending on the situation. In an online environment a footprint may be stored in an online data base as a "hit". This footprint may track the user IP address, when it was created, and where they came from; with the footprint later being analyzed. In an offline environment, a footprint may be stored in files, which can be accessed by administrators to

view the actions performed on the machine, without being able to see who performed them.

Active digital footprints [6] can also be stored in many ways depending on the situation. In an online environment, a footprint can be stored by a user being logged into a site when making a post or edit, with the registered name being connected to the edit. In an off line environment a footprint may be stored in files, when the owner of the computer uses a keylogger, so logs can show the actions performed on the machine, and who performed them. One of the features of keylogger is to monitor the clipboard for any changes as the user will sometimes have a very good habit of copying and pasting passwords and taking screenshots.

6.1.   Web browsing

The digital footprint applicable specifically to the World Wide Web is the internet footprint; also known as cyber shadow or digital shadow, information is left behind as a result of a user's web-browsing and stored as cookies. The term usually applies to an individual person, but can also refer to a business, organization and corporation.

6.2.   Privacy issues

Digital footprints [6] are not a digital identity or passport, but the content and meta data collected impacts upon internet privacy, trust, security, digital reputation, and recommendation. As the digital world expands and integrates with more aspects of life, ownership and rights of data becomes important. Digital footprints are controversial in that privacy and openness are in competition.[6]Scott McNealy, CEO of Sun Microsystems, said in 1999 Get Over It when referring to privacy on the Internet.This later became a commonly used quote in relationship to private data and what companies do with it.

7.   Challenges on the road to transformation

What is causing firms to have difficulty starting or benefiting from digital transformation? Challenges [4] occur in all three elements of the transformation process: Initiation, Execution, and Coordination.

7.1.   Initiation challenges

7.1.1.   Lack of impetus

Impetus often starts at the very top of the firm. Executives are justifiably skeptical of the benefits of emerging technologies. The experience of e-commerce taught many executives that a fast follower approach can sometimes be lower risk than a pioneering approach. However, this

skepticism can result in bureaucratic investment processes that prevent the firm from engaging in useful digitally-enabled experiments and business changes.

Another concern issue can be lack of awareness of the opportunities or threats of digital transformation. Executives need not be aware of all changes in industries outside their own, but knowing major digital consumer services products such as Tripadvisor, Facebook, or eBay can be very useful fodder for envisioning how executives might change their own businesses.

### 7.1.2. Regulation and reputation

Many executives, especially in healthcare and financial services, are being careful about mobile and social technologies because of security and privacy concernsCompanies, especially in financial services, are taking a slow approach to social media for fear of regulatory sanction. For example, blogs, tweets and other messages are typically not reviewed as carefully as other corporate communications, but may be construed as advice by readers. Facebook as a radically new way to reach the specialists who use its products.

7.1.3. Unclear business case

Healthy skepticism or regulatory concerns are legitimate reasons to be careful when investigating new technologies. Certainly not all digital initiatives make sense for all companies (or for all employees in the company). One CIO, discussing mobile-enabled process changes, said "At the end of the day, we're still looking at value and cost. For some folks, the most cost-effective technology is still the desktop."

7.1.4. Execution challenges

Regardless of how an initial investment is justified, the interviews highlighted an important point. The real value of digital transformation comes not from the initial investment, but from continuously re-envisioning how capabilities can be extended with digital technology to increase revenue, cut costs or gain other benefits. Initial investments, made with or without a financial business case, become foundational capabilities on which additional investments can be made. When it first centralized order taking and implemented an ERP system, executives at the home improvement products company did not envision the many successful business model changes they would be able to add in the future. But, to their credit, they continuously envisioned what else they could do with their digitally-enhanced foundation, and earned higher and higher returns as a result.
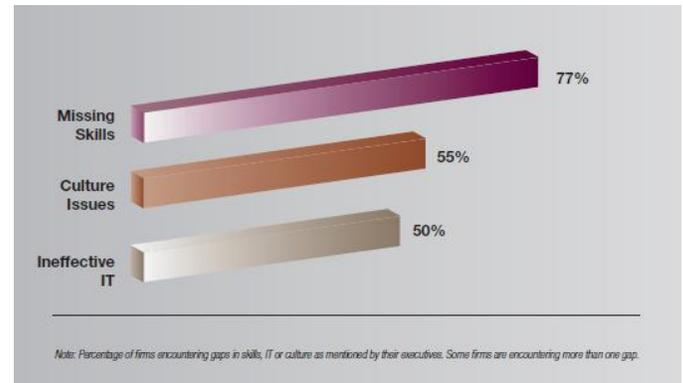
Figure: 4 Organizational gaps in digital transformation

7.1.5. IT Difficulties

Digital initiatives [4] are built on a solid foundation of technology-enabled processes and data, as well as the analytics, solution delivery and relationship capabilities to create and extend that platform. Information technology is a fundamental part of the firm's digital capabilities. However, many companies find their information technology infrastructures and capabilities severely lacking.

A strong IT/business relationship can be very helpful in transformation. The CIOs in a hospitality and medical devices firm have very strong relationships with other senior executives, enabling them to suggest and deliver important digital initiatives.

7.1.6. Governance challenges

Benefiting from transformation typically requires changes in processes or decision-making that span traditional organizational or functional structures. Transformation, like any major organizational change, requires top-down effort to help employees envision a different reality, and coordination to ensure the firm moves in the right direction.

8. Conclusion

Digital technology, which transformed the media industry, is now transforming the rest of the commercial world. Companies in all industries and regions are experimenting with – and benefiting from – digital transformation. Whether it is in the way individuals work and collaborate, the way business processes are executed within and across organizational boundaries, or in the way the company understands and services customers, digital technology provides a wealth of opportunity to those willing to change their businesses to take advantage of it.

9. Future Work

In this new era of digital business, new threats are coming out every day. In future, I will keep study on digital transformation and digital business and their related privacy and security issues. I am also trying to find the solution to overcome those privacy and security threats.

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