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THE IMPACT OF BIG DATA, SUSTAINABILITY, AND DIGITALIZATION ON COMPANY PERFORMANCE

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Abstract:

Nowadays companies are dealing with large amounts of data, not only for an important decision but also into their day-to-day activity. In order to handle properly these large volumes of data, from different sources without missing the opportunities, companies need to figure out how to manage big data to their advantage. Embracing the advantages of big data is not enough because in order to face the challenges of the business environment, investing in digital technology is no longer seen as giving a competitive advantage, is seen as a standard. Also in the path of evolution, the interest of companies (profit) on one side and the interests of society (social and environmental) on the other side should find a common point in order to pursue their interests in a way that will not affect future generations. Sustainability is the approach towards this future, which allows companies to grow and make profits, but at the same time provides benefits for the society.

Key words: *big data, sustainability, digitalization, performance, value, company*

1. Why is Big Data so important?

Big data is changing the way business it's done. It's helping managers to measure and manage and as a result, they know more about their business and this knowledge is translated into an improved decision-making process and increased performance, as McAfee and Brynjolfsson (2012) suggest.

According to the same authors, big data is changing the traditional business models because companies created in the digital era are aware of the potential of big data, and understand their data, how to use it, and the opportunities for gaining competitive advantage.

McAfee and Brynjolfsson (2012) claim that big data is a phenomenon which will create a management revolution because ideas, past experience, expertise, and practice of management will be changed by big data. Also, based on a research conducted by MIT Center for Digital Business and McKinsey, the results were that

companies that use data in their decision-making process are performing better on financial and operational results, compared with their peers.

Using big data as a basis for how decisions are made is not enough according to McAfee and Brynjolfsson (2012), because on one side big data is not substituting human vision insight, and on the other side, executives must find the right balance between using data, their experience, and intuition when they take important decisions.

In order to see what is the impact of big data, and how companies are benefiting from investing in big data, Davenport and Bean (2017) conducted a survey with executives, with companies from Fortune 1000. They took into consideration the investments in data starting from 2012. According to the survey, executives claim that their investment in big data was successful, see figure 1. Even though big data initiatives have a high percentage of success, challenges such as data-driven culture prevent the successful adoption of big data initiatives, claims Bean (2017).
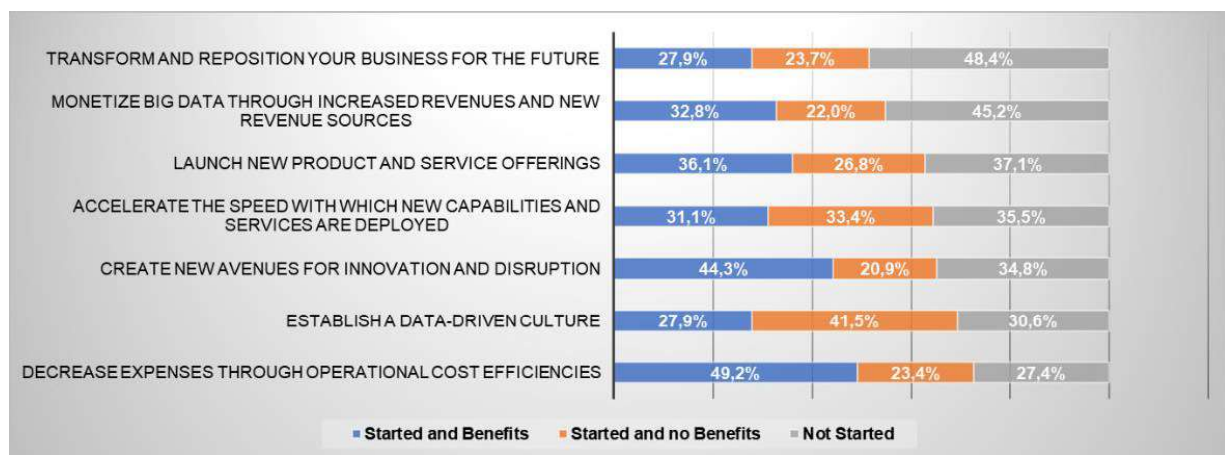
Figure 1: Big Data Initiatives and Success Rate
Source: Davenport and Bean (2017).

Big data was a turning point a few years ago. Back then companies and their executives had the difficult task to figure out the opportunities and the impact on the business of big data. Bean (2016) claims that now, big data is emerging as a corporate standard but executives still lack the metrics for big data.

Another aspect pointed out by Bean (2016) is that big data was seen as a tool that enables opportunities for innovation due to the agility it brings to organizations, it can load a large amount of data, recognizes links and patterns. But the results in innovation due to big data, are few in this stage, according to Bean (2016).

Wessel (2016) argues that if in some cases, companies need a huge amount of data to obtain the value, for innovators the size doesn't matter, but having the right data is important. In Wessel's opinion companies are spending too much time and money on gathering a huge amount of data instead of seeking the right data.

Capelli (2017) suggests that companies spend most of their money on the HR departments because there's where the real value comes from. As a result of the increased attention on the use of big data in HR, in order to make it more analytic.

Even though big data is a changing factor in business, in some areas such as HR, is not that important, according to Capelli (2017). In his opinion HR doesn't need special software or tools for big data because HR doesn't have big data. In the case of most companies, the HR department is using all the data when they are dealing with hiring process or performance management.

Other reasons that make big data difficult or impossible to apply in HR are the characteristics of HR data that creates limitations for data analysis, and the legal boundaries for companies in EU, where data related to employees cannot be legally or easily moved across boundaries. A similar situation in U.S. where if the analysis of employees data might disclose a negative impact on protected groups, according to Capelli (2017). These issues are not present in other areas of the business.

Biesdorf, Court, and Willmott (2013) suggest that the main issues related to big data and advanced analytics are technical and organizational and companies should pay attention in order to avoid ineffective and/or costly investments. Even though the evidence shows the important advantage obtained by exploiting data.

In order to avoid the situation above, Biesdorf, Court, and Willmott (2013) recommend a big data plan. They claim that when companies want to implement big data they miss this step. A simple plan that includes: data, analytical models, and the tools necessary to understand how to create business value. It also allows people involved, executives, it specialists, managers, data scientists to discuss and figure out the areas with the greatest return and also there to start from.

Making this plan is not enough, Biesdorf, Court, and Willmott (2013) suggest that companies are facing challenges and managers have to solve them. One of the common challenges is related to investment because adopting big data will bring the cost for a new data architecture, an aspect that senior executives must take into consideration.

2. Towards digitalization: are the companies prepared?

According to Unruh and Kiron (2017), the effect of digitalization on the business environment is causing concerns for the executives around the world. In several industries digitalization has disrupted the way of doing business. In retail, for example where companies like Amazon or Alibaba, hit hard the shopping malls and the classic commerce. Unruh and Kiron (2017) suggest that this effect of digitalization in retail will move in other sectors of activity like energy, hotels, transportation and soon enough in manufacturing.

In order to face the challenges and implications of digitalization, executives are creating strategies so they can be prepared to deal with digitalization.

Digital technology and it's related gadgets and services on one hand and the needs of customers which are evolving, act as very important influencers of the market and are the forces that drive digitalization, Unruh, and Kiron (2017) claim.

Same authors suggest that in order to have a "better digital future", executives should act with huge responsibility regarding digital technology. They must take into

consideration the risks and opportunities provided by the digital technology. They call this "digital transformation on purpose". In order to accomplish it, Unruh and Kiron (2017) proposed a framework (see figure 2) for a better understanding of digitalization.

Figure 2: Digitalization framework
Source: Unruh and Kiron (2017)

The first stage is digitalization which implies the "conversion of products and services into a digital format along with concomitant inventions that result from digitalization". This conversion process takes more time for the tangible assets and products.

The second stage is linked to the first stage because it uses the digitalized products obtained in the first stage, but also in this stage, new business models and processes are developed.

The third stage, where the digital transformation happens when "new digital models and processes restructure economies". As a result, technology is integrated by people in their life.

Regarding digital transformation, Ross (2017) argues that if leaders don't make the difference between digital, digitization and digital transformation, this could result in a very costly mistake. If digital addresses concerns such as technology, cloud, internet of things, mobile, accessibility and how companies should transform in order to benefit from the opportunities created by this technologies. On the other hand, digitization is the facilitator for a business to become digital. While digital transformation aims to reconsider the company's value proposition, Ross (2017) claims.

Caylan, Noterdaeme, and Naik (2016) suggest that for the industrial sector, digitization along with big data, analytics and the internet of things brought up opportunities to increase the industry value chain. The success of the digital revolution is proved by retail companies like Amazon, but Caylan, Noterdaeme, and Naik (2016) argue that there is potential for all industrial sectors. To support their idea, they created a map that shows eight value drivers in the industry, as shown in figure 3.
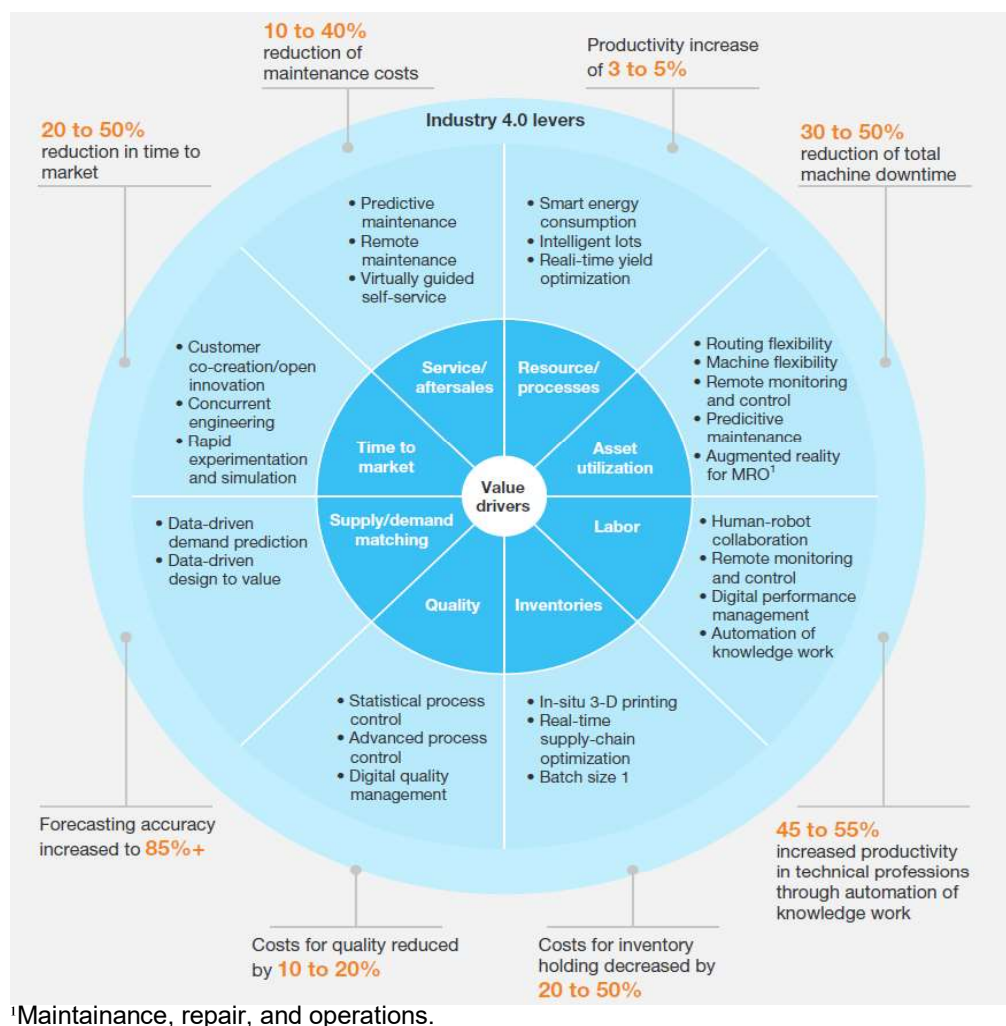
Even though the potential of digital transformation is huge, the industrial sectors compared with other sectors, made small steps towards this path of digitalization.

Although digital technologies have penetrated retail, media or high-tech industries, less than 40% on average are digitized, according to Bughin, LaBerge, and Mellbye (2017). They also claim that companies that will have digital strategies will benefit the most.

Several industries are already impacted by digitization in terms of economic performance, see figure 4, but Bughin, LaBerge, and Mellbye (2017) claim that this is only the beginning.

According to a McKinsey survey (2016), digital strategies and the investments are focused on marketing and distribution (49%) as shown in figure 5. The explanation is that the impact of digitization was huge on customer interactions.
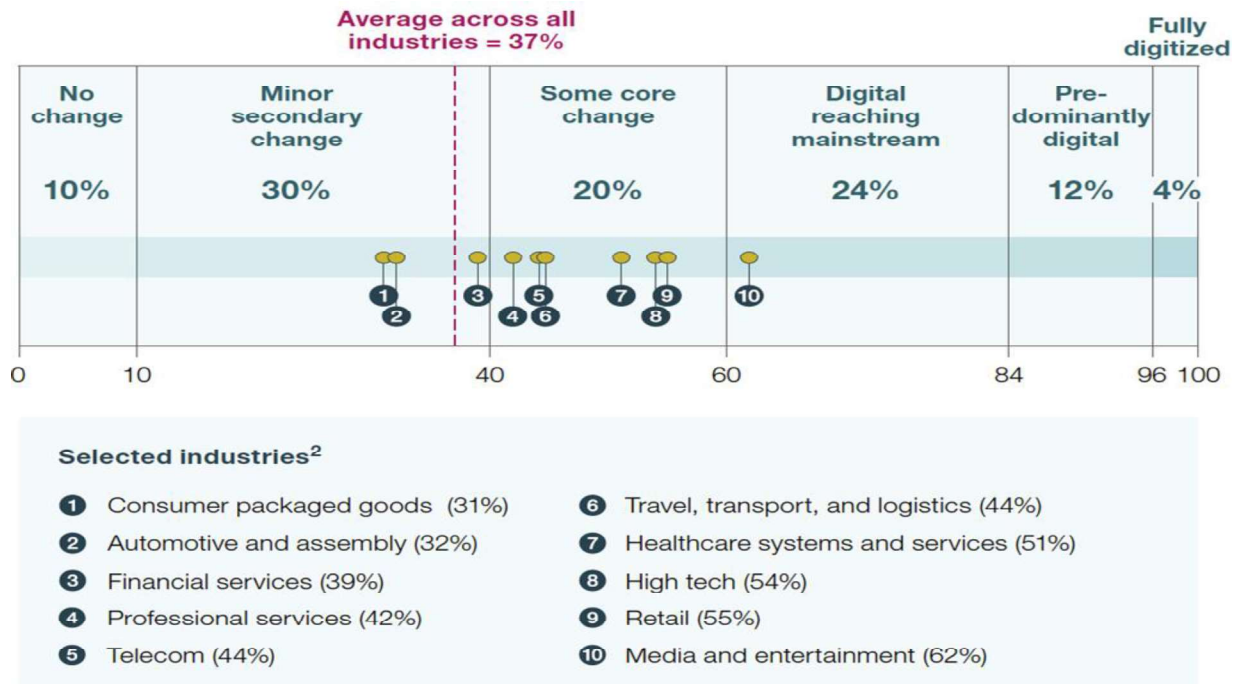
The winning companies of the digital transformation are in terms of revenue growth, EBIT growth and return on digital investment, companies that changed their corporate strategy in order to tie it with digital strategy, Bughin, LaBerge, and Mellbye (2017) claim. In order to accomplish that, companies changed their business model fundamentally. Also, the same authors suggest that a strong organizational culture is necessary in order to successfully change.

[1]Maintainance, repair, and operations.

Figure 3: The McKinsey Digital Compass maps
Source: Caylar, Noterdaeme, and Naik (2016)

Average across all industries = 37%

No change	Minor secondary change	Some core change	Digital reaching mainstream	Pre-dominantly digital	Fully digitized
10%	30%	20%	24%	12%	4%

Selected industries[2]

1. Consumer packaged goods (31%)
2. Automotive and assembly (32%)
3. Financial services (39%)
4. Professional services (42%)
5. Telecom (44%)
6. Travel, transport, and logistics (44%)
7. Healthcare systems and services (51%)
8. High tech (54%)
9. Retail (55%)
10. Media and entertainment (62%)

[1]Data reflect the average of respondents ratings on the degree of change in the past three years within each industry across 5 dimensions (products, marketing and distribution, processes, supply chains, and new entrants at the ecosystem level).
[2]For consumer packaged goods, n=85; automotive and assembly, n=112; financial services, n=310; professional services, n=307; telecom, n=55; travel, transport and logistics, n=103; healthcare systems and services, n=78; high tech, n=348; retail, n=89; and media and entertainment, n=86.

Figure 4: Perception of digital penetration by industry (% respondents)
Source: Bughin, LaBerge and Mellbye (2017)
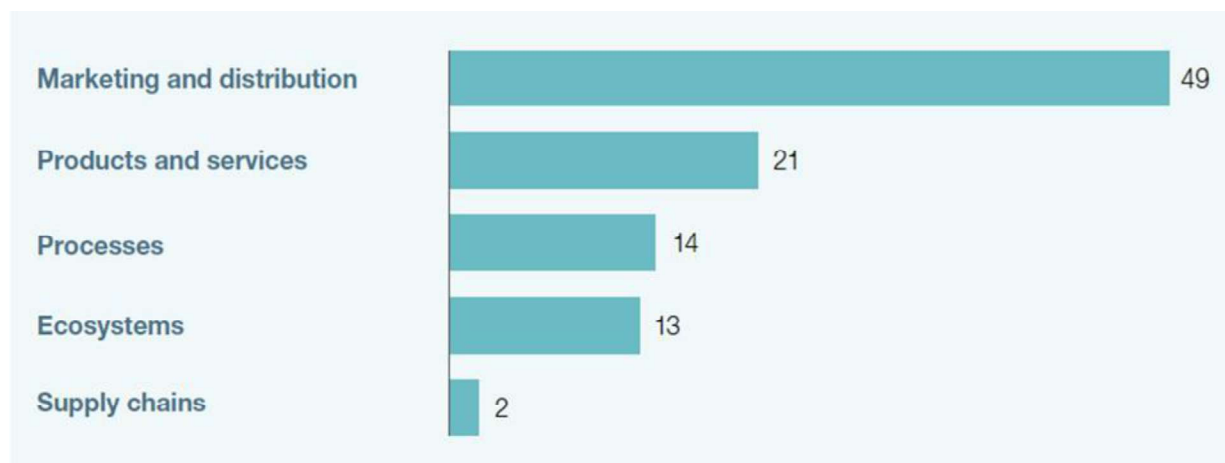
Figure 5: Where are companies focusing their forward-looking digital strategies? (% respondents)
Source: Bughin, LaBerge and Mellbye (2017)

3. Why sustainability matters that much?

Due to the fact that the business landscape changed, social and environmental issues became a priority for the organizations, since 2001 when the European Commission introduced the notion of CSR – "Corporate Social Responsibility". As a

response, organizations begun to include in their annual reports data about social and environmental concerns and their impact on performance. Sustainability reporting became a common practice when stakeholders pressured for more information due to the relevance of CSR for their companies.

Starting from the 1950s, the studies related to CSR moved from one perspective to another, for eg. from "macro-social" perspective to "organizational-level" perspective and from ethics to performance perspective (Lee, 2008). Alongside CSR theories, the studies on accounting related to this topic started to emerge (Durden 2008).

Bhattacharya and Polman (2016) claim that companies are dealing with sustainability in an "unsustainable" way. One reason is the discrepancy between theory versus practice, and the other is also related to practice because companies have difficulties in implementing a sustainable business model.

In the '80s when quality was a big concern for manufacturers, executives and their companies found a way to address this issue by including quality metrics, quality initiatives related to their incentives. As a result, the quality improved significantly, according to Burchman and Sullivan (2017).

Same authors suggest that with sustainability, the issue is similar. Even though in U.S. are "conflicting messages" about climate change, but for shareholders and customers of U.S. companies, sustainability is getting more and more to their attention. Due to the lack of metrics regarding sustainability, becomes a difficult task to add as a compensation factor for executives in case of the negative effect of sustainability on damaging the company's reputation and/or business, Burchman and Sullivan (2017), claim. However, the boards have the right to cut compensation for executives in case the situation above happens.

In their research, Burchman and Sullivan (2017) found out that in S&P 500, only 2% of the companies have environment metrics related to compensation for executives.

Unruh (2016) argues that in the '90s sustainability reporting was seen as a "logical extension of traditional financial reporting". Also, he claims that GRI's standards (Global Reporting Initiative, which "is an independent international organization that has pioneered sustainability reporting since 1997") made executives focus their attention on the issue of sustainability reporting.

Compared with financial metrics which provide a comparison between companies over a period of time, but having in mind the fact that financial metrics got their relevance from relative performance, and they should be used in comparing companies with similar characteristics and from the same industry.

Sustainability metrics are more problematic to deal with, according to Unruh (2016). He also claims that the concept of materiality is the solution. This concept was developed when financial reporting was dealing with "what merits reporting" but the concept becomes larger, including sustainability concerns. In addition, social and environmental issues become more and more important for investors, but also for stakeholders. As a response, the materiality matrix was developed, which is a

"management tool that plots sustainability issues in two dimensions". On one axis are the issues important for the business and on the other axis the issues important for stakeholders.

4. Conclusions

The purpose of this paper was to highlight some of the factors that have a huge impact on how businesses are conducted by developing game-changing strategies that have implications for the future. As we saw, big data brings opportunities for those companies that are prepared, those who include big data in their strategy. Likewise, digitalization requires a deep understanding, investment in building the IT architecture necessary to take advantage of the tools and services provided by digitalization and also an organizational culture in order to successfully adopt it. Sustainability is an issue important not only at the company level, also governments around the world are concerned about building a sustainable future. The lack of metrics and the differences between theory and practice, regarding sustainability are the challenges for companies. But with the increased interest of academics and organizations like GRI which provide guidelines regarding sustainability, progress will be made in the future, towards the path of sustainability.

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